TILLING THE GOOD EARTH

The Impact of Technicism and Economism on Agriculture

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List of Abbreviations:
APEC: Asia Pacific Economic Forum
BSE: Bovine Spongiform Encephalopathy
CAP: Common Agricultural Policy (of the European Union)
DNA: Deoxyribonucleic Acid
GATT: General Agreement on Tariffs and Trade
G8: USA, UK, France, Germany, Italy, Japan, Canada, Russia
GDP: Gross Domestic Product
GMOs: Genetically Modified Organisms
IMF: International Monetary Fund
NAFTA: North American Free Trade Agreement
OECD: Organisation of Economic Co-Operation and Development
NGOs: Non-Government Organisations
TATE: Technical Administrative Task Environment
TNCs: Transnational Corporations
WTO: World Trade Organisation

Cross References: are indicated in the text with the Chapter (Ch) and section between brackets.

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- A study on the management of uncertainty in New Zealand agriculture undertaken as part of a consultancy project for Dr Robin Johnson of the NZ Ministry of Agriculture in 1990/91.
- A long-time interest in reformational philosophy, which was sparked in particular by a reading of Hendrik van Riessen's book 'De Maatschappij der Toekomst' (The Future of Society) in 1959.

Over the years, the reality of technicism and economism was impressed upon me in my practical work as an economist, mostly in Wellington, New Zealand's capital city.

When in 1995 I felt a need for further study, it became unexpectedly possible to meet with Prof. Egbert Schuurman during a holiday in Hawaii at the home of our mutual friend Harry Schat. He suggested a programme to me for writing a thesis on the impact of technicism and economism on agriculture.

Back in Wellington my friend and colleague Dr John Lepper offered to act as my mentor and supervisor for this task. He made it possible for me to study one day per week at home during 1997-1999. It appeared possible to apply the theory of rhizoids on which we had worked together in our consultancy practice. I thank him for many discussions, suggestions and the outline of the study presented here.

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Finally, following the example of Johann Sebastian Bach, I wish to sign off with the letters SDG-Soli Deo Gloria.

INTRODUCTION

Modern agriculture is not without controversy. On the one hand are those who believe that it should be able to pursue profitability within nations as well as across international borders, without any State intervention and aided by a steady application of science and scientific technology to stay ahead of the competition. The price mechanism should allow farmers to discover the most profitable markets. In their view agriculture is an economic sector like any other sector, subject to supply and demand.

On the other hand, many groups are concerned about features of modern agriculture such as a lack of animal welfare, pollution of air and water, a depletion of the gene pool, diminishing bio-diversity, soil degradation, salinity, rural desertification and the dangers of genetic engineering, not to mention crises such as BSE, foot-and-mouth disease and bird-flu. They plead for a return to biological farming. Across the world the movement for biological farming has been gaining momentum, although it is still rather small. There are indications that in terms of yields such farming is just as productive as industrial farming.

To come to grips with these issues, this study uses rhizoid theory as a key tool of analysis in preference to neo-classical economic theory. Combinations of social relationships, called rhizoids, are basic to most economic activities. They are organised so as to guide, for example the transformations of flows of sunshine, water and fertilisers into flows of food products by means of soil, plants, microbes, animals and technical objects. Even in the simple case of a hairdresser flows of electricity and water and stows of soap and shampoos are needed, whilst the shop must be known and accessible to customers. Fashion circles may change the style of haircuts from time to time. In this way the hairdresser is part of a culture and the way it changes. Similarly, agriculture has been changing over the centuries under the influence of changes in cultural meaning perspectives.

Perhaps the most basic shift in Western thinking has been Descartes' idea that humankind is master and ruler of nature. He saw nature as anorganic, written in the language of mathematics (Galilei) and consisting of machines, and, therefore, subject to rational mathematical thinking and experiment. As this idea took hold, culture became confined to arts, crafts and humanities, with physical and mathematical sciences seen as keys to nature. From this point of view agriculture is part of nature and should be controlled by means of scientific technology (technicism). In practice this means that scientific technological transformations should determine the shape of agriculture rather than the attempts of farmers to manage all functions of their land, plants and animals in a balanced way, with a view to making them fruitful for human life over a long period of time. Instead, farmers become subservient to technology. Economism strengthens this by emphasising the need to return a satisfactory yield on capital invested. Indeed, economics is seen as a natural activity that can be understood mathematically. Thus, nature has come to be appreciated as a set of objects to be scientifically analysed, technically developed and exploited for economic/financial gain.

The deleterious effects of this hypertrophy of three functions of human life (science, technology and economic) are indicated in two empirical studies, one about the swine fever crisis in the Dutch pork rhizoid in 1997 and the other about the development of the New Zealand Dairy rhizoid since 1950. Each of these rhizoids has been part of larger international rhizoids.

These two studies provide an insight into the crisis of modern agriculture. In each case individual farmers in modern Western markets have been trying to earn a living by maximising their production by means of scientific technology. The resulting production has to be sold to export markets around the world, being far too much to be absorbed by local communities. On such markets they must compete with the surpluses of colleagues elsewhere. Prices and incomes tend to be under downward pressure, leading to even higher production and productivity. This is the treadmill problem of agricultural economics, analysed in Ch 2.4 and Ch 3.13 It differs from the concept of treadmill used in agriculture with respect to pesticides. At the same time the production is accompanied by waste products and manure far in excess of the local eco-systems ability to absorb them. Use of artificial fertilisers to increase production has long-term adverse effects on the important populations of microbes. Surpluses (often sold at subsidised prices) in Third World countries compete with traditional peasant farming. Millions of peasant farmers are driven off their land to seek employment in urban areas, where they might find employment at low wages. Their land is often used to grow cash crops (coffee, cocoa, palm oil, tapioca, soya, etc.) by industrial large-scale methods for export to rich countries, partly to feed expanding herds of livestock. It is estimated that close to one million people are under-nourished world-wide.

Since the problems have a historic background, Part One sketches a historic overview of Western European agriculture. Although until the beginning of the 19th century agriculture developed mostly by trial and error, there was nonetheless a stream of technical innovations. As manufacturing industry developed, agriculture to produce food in the context of manors, villages, towns and monasteries lost its social local focus. From the 14th century onward, an individualistic spirit became stronger and started to displace the static much more corporatist way of viewing society inspired by the Church's social teaching. As social networks changed in sympathy with this individualist spirit, farming became much more functional in a technical/economic sense. This led to the traumatic process of the enclosures. After Britain had introduced free trade in 1850, agriculture was put increasingly on a scientific technical footing and had to play its part in a money-using economy.

The development of large-scale industrial agriculture in the Americas and Australia in the context of the British Empire, contributed to the formation of a world market. Crises developed as a result of overproduction. Surplus production in the context of world market has remained a problem of industrial agriculture.

The modern Western objectivising culture contrasts with the view of reformational philosophy that the kingdoms of things, plants and animals have

many object functions and should not be seen as exclusively scientific/technical/economic objects. Indeed, things, plants and animals are subjects in their own spheres and, therefore, to be treated and used wisely also as important contributors to the long-term health of eco-systems. Part Two provides a brief overview of the development of this objectivising culture.

Modern neo-classical economic theory has also been deeply influenced by the philosophical developments of the 17th and 18th centuries. It has become a mechanistic theory that explains how utilitarian (hedonistic) consumers and profit maximising firms drive the economic process to equilibrium between demand and supply. Labour, land (nature) and capital are seen as factors of production, a move foreshadowed already by Adam Smith. The involvement of non-market actors such as the State should be kept to a minimum, lest the system becomes sub-optimal. Agriculture is simply a sector subject to demand and supply. Karl Polanyi has shown how markets developed for land, labour and capital during the 19th century and how the implementation of such economic abstractions led to the major crisis of the Great Depression, which initiated a period of protection for agriculture.

Although neo-classical theory allows us to study the treadmill hypothesis in terms of price and income elasticities of demand, it is unable to tell us much about how it affects agriculture in a social, technical and environmental sense. It abstracts from them. Accounts of agriculture in terms of quantities, inputs used and outputs sold, money borrowed and capital invested are necessary but insufficient. If we understand the economic norm as a seeking of abundance or fruitfulness and avoidance of waste on the basis of social relationships, then, all flows, stows, and transformations should be taken into account, including those that are not accounted for in money terms. Farmers are part of intricate networks of suppliers, services, staff, processors, banks, distributors and supermarkets. Increasingly, these networks are global and subject to continuous change and this has an impact on the management of flows. Large competing TNCs control most of these networks for financial gain.

The idea that agriculture is just an economic sector like any other reflects the limited functional view of modern economic theory. It is completely divorced from both social and economic realities. Yet, economic discussions, both national and international, assume that the abstractions of neo-classical theory are an accurate representation of the real world. Debates about free trade in the context of the WTO assume that the theory of comparative advantage requires free trade. For this reason, this theory is discussed on the basis of James Meade's work, especially in the light of his role in the writing of GATT. In spite of the theoretical underpinning of comparative advantage as a basis for free trade, Meade concludes that there may be valid arguments for protection, once the restrictive assumptions of the theory are relaxed and freedom of capital and labour is possible. Nevertheless, we should try to build a liberal economic order and accept the intervention of international agreements in domestic economies.

This study accepts Schuurman's view that agriculture should use primarily biological methods in order to produce harvests that are sufficient to feed people, without destroying eco-systems. Traditionally, agriculture has been conducted in the form of family farms, albeit with the exception of latifundia. Under the influence of technicism and economism, however, this notion has been displaced by an exclusive emphasis on agriculture as a sector that should be producing efficiently and effectively, regardless, by and large, of its social context and environmental impact. This serves as the background to a discussion of economism (the ideology of economic growth and material welfare as the foundation of society) and technicism (what can be made should be made). The implications of all this for the relationship between agriculture and nature is then sketched in terms of Dooyeweerd's theory of enkapsis. The result is that technicism and economism result in an upside-down enkaptic relationship between a farm and the plants and animals it cares for, meaning that a farm becomes dependent on science, technology and economics rather than these three being helpful servants to the farmer.

Given current concerns about sustainability Part Two ends with a suggestion for a heuristic cosmonomic framework, guided by the love of neighbour (present and future) for evaluating technologies and rejects an approach in terms of legal definitions. The development of a new commons is suggested in which land, water and other infrastructure should be subject to social management and principles, with involvement of all people concerned with the management of a territory (eco-system).

Part Three sets out rhizoid theory and applies it to international trade relationships and theory. By applying it to free trade, as it is shaped by the negotiations under the auspices of the WTO, it is argued that free trade is not necessarily always a good idea. Indeed, recent empirical studies document the destructive effects of the introduction of modern agriculture, under colonial/free trade on Third World agriculture. In fact, when the UK adopted free trade its Empire started to rely on an agricultural rhizoid that encompassed all its parts so as to serve as a basis for its industrial expansion.

So, what would happen if all barriers to trade in agricultural products were removed? Under the impact of technicism and economism modern rhizoids would adapt and would become very large-scale world-wide rhizoids. A tendency to over-production would emerge, leading to even sharper competition and larger rhizoids. However, such a development would also initiate a much more pronounced swing to smaller, local biological agriculture. The dialectic would cause the high-tech industrial rhizoids to adopt more organic methods.

The study ends with the view that technicism and economism can only be overcome by a return to a culture of response, although efforts in this regard will always be subject to human weakness. Nevertheless, there are signs around the world, suggesting that alternatives are feasible.

PART ONE: AGRICULTURE THE FOCUS

CHAPTER ONE: HISTORY OF AGRICULTURE: DOMESTIC TRADE AND TECHNOLOGY

1.1 Introduction

The purpose of this chapter is to outline the development of agriculture from the European Middle Ages to the middle of the 19th century. This period is chosen because it provides the background to an understanding of farming in the present time.

Slicher van Bath divided his history of Western agriculture from A.D. 500-1850 into two main periods. The first was the period of 500-1150, which he called the period of direct agricultural consumption '...in which the non-agrarian part of the population obtained the produce of the land direct from the producer without any middleman', whilst he called the second, from 1150-1850, the period of indirect agricultural consumption.[1] He puts the beginning of his history around 500, because the demand and supply system of Roman times had come to an end by then. He ends in the middle of the 19th century because 'in the second half of that era the industrial element in the economy of Western Europe was coming steadily to the fore.'[2]

However this may be, rather than follow Slicher van Bath in putting the break in the period under review around 1150, I prefer to put it at 1300, the end not only of a period of great prosperity, but also a period that saw the development of mixed farming, a first agricultural revolution, involving a close co-operation between farmers, plants and animals. The 14th century was a period of economic decline, famines, plague and war. In contrast, it was also the century in which the Renaissance began to make its mark and capitalism took root. Would there perhaps be a link between these apparently contrasting movements? The Black Death struck the whole of Europe in 1347 and contributed to a massive loss of population. The 100 years war between England and France (1340-1453) similarly caused major disruptions with long-term effects. Catastrophic events of such magnitude must have affected people's views, policies, institutions and international relationships. Would agriculture not have been affected in some way?

The procedure in this chapter is to provide a very quick overview of the general features of the period 1000-1300, especially as they bear upon the history of agriculture, followed by a more detailed analysis of the period 1300-1850.

1.2 FROM 1000 to 1300

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[1] B.H. Slicher van Bath, *The Agrarian History of Western Europe A.D 500-1850,* Edward Arnold, London, 1963.

[2] ibid., p. 5.

1.2.1 General Characteristics

Economically, between the end of the first millennium and the end of the 13th century Western Europe experienced a period of boom. It was the period of the high Middle Ages. Arts, trades and crafts developed rapidly. The population expanded. Many large churches were built.

Feudalism was another key characteristic of this period. The invasions of the Norsemen, between 800-1000 had made the land unsafe. In various places lords and monasteries were able to defend and pacify areas, so that farmers could go about their normal business secure in the knowledge that they could find shelter inside the castle or monastery. Implicit contracts between lords and farmers emerged under which lords would provide military security to their demesne and farmers food for the lords' households. Such contracts were known as 'peace'. The word peace became a key word during this period. A close co-operation between the church (peace of souls), the lords and the monarchy developed. The king would restrain the local lords. The country was organised in church parishes. Monasteries and abbeys were as much part of the rural fabric as landlords and farmers. The Cistercian monks for example, operated a network of settlements around Europe and made substantial contributions to the development of industry and agriculture. Sermons emphasised the importance of farming. The tithe (ecclesiastical tax) became part of the tax burden. The church overarched the rest of society, which was seen as akin to a body in which the various stations and grades all have their own place and task and are hierarchically organised. The leading philosophy was Thomism, marked by a dualism of nature and grace.

As peace spread, this system began to change slowly. From being based on exchange in kind it became much more monetised. A powerful stimulus to such monetisation came from taxes imposed by the king. Farmers had to obtain money by selling part of their produce in towns. As lords moved to towns, to the royal court or on crusades, and their castles housed fewer people, they preferred to be paid in money. Merchants would sell the produce obtained either to the inhabitants of cities or to places nearby that could, especially in France, be reached along waterways. Farmers provided not only food but also raw materials such as wool, linen and hemp for use in local industries.[3] As prosperity increased lords wanted more luxury and hence demanded more from their land. When productivity could not be increased rapidly enough, they extended their estates under cultivation. In order to obtain labour to work these new lands, they offered farmers freedom.

A remarkable consequence of the greater use of money was the emergence of contrived scarcity. Under the old feudal system, landlords as well as towns would hold reserves of goods supplied in kind against the eventuality of a siege or a bad harvest. As the country became pacified and money became a more important means of payment, such reserves were not kept anymore.

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[3] L. Brassé-Brossard, *Le Destin de l'Agriculture Française*, Presse Universitaire de France, Paris, 1949, pp. 22, 23.

Merchants considered stocks as stores of value or as means for speculative purposes. Such speculation contrived scarcity.[4]

1.2.2 Agriculture

Agriculture was organised by villages, which had common fields, land in possession of the lord as well as private plots of land. Agriculture in these village communities was very much a co-operative affair, as decisions about farming activities were taken by consent. The basic reason for this was that a village usually had two or three great fields, one of which was left fallow every year. The work on these fields needed to be carefully planned and organised. Intertwined with the co-operative village community was the lord's manor, comprising a demesne directly exploited by him, and peasant holdings from which he collected rents and fees.[5] Under feudalism a lord granted land to a vassal in return for military service. During the Middle Ages a whole network of lord-vassal relationships developed, persisting sometimes well beyond the Middle Ages, as in France (Ancien Régime).

The distinction between feudalism and the manorial system is well put by Gies:

> In the manorial system, peasant laboured for lord in return for land of his own; in the feudal system, lord held land from king or overlord in return for supplying soldiers on demand. In practice the relationships were never so simple and grew more complicated over time. All kinds of local variations developed, and both peasant labour service and knightly military service were increasingly converted into money payments.[6]

During the three centuries ending in 1300 agriculture developed steadily. Key technical innovations were:

1. The invention of haying.
2. Replacement of the metal scythe by the sickle.
3. The construction of stables and haystacks.
4. The associated use of manure for fertilising fields.
5. The two-wheeled cart that could be tipped over.
6. The two-wheeled plough with coulter and mouldboards.
7. A halter which allowed horses to draw farm implements.
8. The harrow.

The invention of the new plough was particularly significant as it allowed the tilling of the heavy clay soils of Northern Europe. Such heavy ploughs needed appropriate traction. The development of a new type of halter enabled farmers to substitute horses for oxen. After the soil had been ploughed it required

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[4] ibid., p. 35.

[5] Frances and Joseph Gies, *Life in a Medieval Village*, Harper Perennial, 1991, p. 17.

[6] ibid., p. 18.

preparation for sowing. The harrow was indispensable for this purpose. It consisted of a wooden frame and a set of iron hooks or sticks.

The introduction of the new plough required a different use of land because it was difficult to turn. The usual square fields were converted into long narrow strips. Since this necessitated a major revamping of fields, with all the attendant problems of negotiating with neighbours, it took a long time before the full benefits of the new plough were available. Consequently, the old two-course rotation changed but slowly towards the more productive three-course rotation. Mazoyer and Roudart show, however, that a more profound reason for the slow introduction of the three-course system was that mathematically the yield of the second group of cereals (cereals sown in spring) had to be superior to the winter grains.[7] This was difficult to achieve because of a lack of manure for the fourth stage of the system. It required a build-up of herds and flocks.

Thus, over a period of three centuries key mechanical farm implements, many of which are still in use today, and farm buildings were put in place. Together they enabled a sustained expansion of agriculture, especially through the development from a biennial rotation system to a three-year system.

As villages were able to prosper on the basis of the new agricultural systems, more land was required close to the villages for orchards and gardens. Farmers used part of their land for pigs and poultry. Moreover, the expansion of the population led to a growing need of wood for heating and building purposes. Forests were cut and lords introduced forest management systems, usually reserving for themselves the right to cut the tallest stands at intervals of 100-120 years. In various regions it became possible to substitute coal for wood. Nevertheless, throughout the period deforestation took place on a large scale.

Mazoyer and Roudart sum up the gist of the new type of agriculture developed between 1000 and 1300 as involving a close co-operation between farmers, animals and land. Animals provided traction as well as precious manure and so enabled a large increase in agricultural productivity. Indeed, the introduction of mixed farming (animals and crops) has remained an essential feature of European farming. However, as the discussions in later chapters will show, the industrialising of agriculture in the 20th century has been disturbing the system of mixed farming, for example through specialised large-scale production of one kind of animal, concentrated in a small area, such as intensive pig-farming in South East Brabant in the Netherlands. This has negative consequences both for animals, human beings and the environment in general.

The rough sketch given also indicates that agricultural techniques evolved on the basis not only of perceived needs but also by means of technical

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[7] Marcel Mazoyer et Laurence Roudart, *Histoire des Agricultures du Monde; du néolithique à la crise contemporaine*, Éditions du Seuil, Paris, 1997, p. 275.

innovations in the rest of society. Each new invention lifted an old constraint and introduced a new one. Only when all elements were in place and land-use had been suitably adjusted to the new techniques was a new equilibrium reached. We could almost conclude that the symbiosis of agriculture and other sectors of society had reached a stage of self-replication. In general, technical development was much more a matter of numerous cumulative improvements rather than the result of a systematic search for innovations. A beginning of systematic improvement could already be observed. Walter of Henley in England, for instance, worked on the basis of experiments and discussed various agricultural problems and methods in detail.[8]

Towards the end of the 13th century, most available land was in use. In many areas new farmland, not always suitable for farming, had been found by the felling of forests on mountain slopes or by the draining of wetlands. Erosion of such land could silt up fish-ponds. Inadequately drained land could be blown away in a storm. An almost single-minded focus on the growing of wheat introduced another potential problem. When harvests failed, starvation threatened. A series of climate changes in the early part of the 14th century led to harvest failures that weakened the health of the people.

Another impending change was foreshadowed at the close of the 13th century. The expansion of the wool industry in Flanders created a demand for raw wool, which was supplied by merchants acting as middlemen. Many lords became keen to have sheep on land otherwise used for growing food.

Thus, the fixed hierarchical social structures of the Middle Ages in which local lords had a bond with farmers and artisans were united in guilds, with state authorities subject to a directing influence from the church began to come under pressure. The introduction of money allowed lords to reside in cities, to invest in industry and banking and to draw income from their landed estates in the country. The church exercised authority, or so it claimed to protect the poor. It was strongly opposed to the demands of the merchants, especially their preference for lending at interest (Ch 9.6, 9.7). As kings and nation states became more powerful, they claimed that the divine right of the church should be theirs to exercise. Jean Bodin (1529/30-1596) argued that the king is above the law. He should have absolute power to determine the well-being of the commonwealth. As such kings and nation-states needed to raise armies, they made sure that they had access to finance (mercantilism). The power of money increased along with the nation-state. Suppression of liberties and keeping the poor under control were accepted as part of the system. Enlightenment thinkers such as J.J. Rousseau rejected any justification of power in terms of divine law. The 19th and 20th centuries have seen the effects of attempts to remove all vestiges of divine orderings. Millions have died at the hands of followers of Marx such as Lenin, Stalin and Mao, including millions of peasants. They put their faith in totalitarian states. With the end of the Cold War, however, the power of money as exercised by the TNCs appears to have taken the place that once was held by the church and the state. The Reformation of the 16th century retained the idea of divine law

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[8] Jean Gimpel, *The Medieval Machine*, 2nd ed., Pimlico, London, 1988, p. 39.

but saw this in terms of all social structures being directly accountable to God, with office bearers being subject to checks and balances to ensure that they could account for their stewardship. However, as secularism has gained the upper hand, this view has become very marginal.

1.3 FROM 1300 to 1850

1.3.1 General Characteristics

As from the Renaissance (1250-1650), subjectivism, which emphasised the need to think rationally about the world, became the dominant feature of the outlook on life and the world and increasingly of practical life. The thoughts of Greek and Roman thinkers were discovered and considered rational, in contradistinction to the 'faith' of the church. The periods of rationalism and the Enlightenment (1650-1800) focus on humankind's rational, especially mathematical thinking. Although scientific technology becomes important from the Renaissance onward, rational thinking and a considerable interest in technical innovations were already part of Western culture during the Middle Ages. Thus, the agricultural and industrial revolutions of the period of the Enlightenment built on agricultural achievements of the Middle Ages and Renaissance.

After the economic depression associated with the 100 years war between England and France, commercial life began to flourish. The development of a money-using economy received a strong impetus from the introduction of double-entry bookkeeping, invented by Fra Luca Paccioli towards the close of the 15th century (his book was published in 1494). The system of accounting simultaneously for changes in capital/liabilities and in assets facilitated the flow of capital around Europe and the Mediterranean. It also enabled merchants to accurately calculate the monetary profitability of their enterprises and to adjust their prices to meet the challenges of competition. Far-flung expeditions to the Americas and the East could now be planned, financed and accounted for on the basis of profits and losses. This accounting innovation has stimulated algebraic thinking, since it involves working with equations expressed in both positive and negative numbers. It has also had a powerful influence on the development of both economic life and economic theory. The latter is still expressed in systems of equations, both in micro-and in macro-economics, with data gathered in accounting systems.

Over the centuries the monetary accounting system would develop a critical blindness to non-monetary aspects of commerce, simply because they could not be quantified easily in money terms. The rationality of the profit and loss account contributed to the thinking that it was in the self-interest of traders and manufacturers to achieve a profit by competing sharply with others. The idea of the Middle Ages that prices should be just, that is sufficient to enable producers to receive a proper reward for their labour, as an expression of God's commandment to love one's neighbour, was soon displaced by the norm of improving the financial balance sheet.

During the 14th century a number of dramatic events took place. First, the rise in prosperity of towns had led to a migration of lords, especially sons of lords who were unable to inherit the land (primogeniture was customary). They joined the ranks of rich merchants and other members of the leading social groups. If they owned land in the countryside they insisted on extracting a suitable rate of profitability. To this end serfs were liberated, as they were considered too much of a burden. They also wanted to get rid of perpetual leases and fixed amounts of rents and taxes to be paid. Rents in particular should vary with the amount of revenue earned. In 1315 Louis X of France liberated all serfs of the Crown on the ground that it was a right of nature to be born free. In England liberation took place at about the same time. In the rest of Europe serfdom remained until the 19th century. However, the lords tended to reduce their tenant farmers (former serfs) to the social status of serfs. Many erstwhile serfs moved to towns to join the ranks of the growing underclass. The guilds had become true monopolists and restricted trade to keep prices high, so that employment growth was insufficient to absorb the rural poor. Feudal lords often established their own processing facilities and expected their farmers to use them exclusively against payment. Abuse of such monopoly positions easily occurred. High milling charges became a source of resentment and strife both in parts of England and in France.[9]

Right through the 14th century revolts erupted. In 1324 peasants in Flanders refused to pay either excises to their lords or tithes to the church. In 1337 the Jacques revolted in Provence. In 1384 Wat Tyler headed a revolutionary movement in England. In 1379 weavers in Gent (Flanders) started a revolution which spread to all cities in the area and became so threatening that the King of France moved in to repress it in 1382. The 100 years war (1340-1453) between England and France reinforced the social tensions as in France the common people had to fight the war for national liberation (Jeanne d'Arc). Moreover, the display of wealth and luxury by the rich as well as by the church caused much resentment. Biéler, quoting Pirenne, sketched the social movement as follows:

> This revolutionary movement is motivated by a religious mysticism that stresses simplicity, even poverty and the holding of goods in common. A deep spiritual malaise afflicts the people accentuated by the major scandal of the papal court.[10]

This movement spread throughout Europe including the miners of Saxony and Bohemia. It inspired reformational movements such as those led by John Wycliffe in England (the Lollards) and John Hus in Bohemia. These movements continued into the first half of the 16th century.

Conflicts between peasants, large-scale commercial farming and urban populations would be a feature of industrialisation right through to the present

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[9] Slicher van Bath, op. cit., p. 50.

[10] Andre Biéler, *La Pensée Économique et Sociale de Calvin*, University of Geneva (Georg &Cie), 1961, p. 5.

time. Currently, there are conflicts of this nature in Third World countries (in Africa, Asia (China) and Latin-America) as well as between the Third and the First World (Ch 12.4).

The 100 years war had the effect of displacing commercial trade routes from their trajectory through France towards the sea to the benefit of Flanders and Holland and towards the routes along the Rhine. The Hanseatic League received a new lease of life. The development of trade routes led to the birth of commercial capitalism. A lively financial circulation emerged between the ports and the merchant cities. Bills of exchange came into common usage. Gold coins were struck in large numbers. Banks were established, especially in Italian cities (Florence). The wool industry became a major export industry for Flanders. Merchants became so important to that industry that they took it over in fact. The changes in traffic routes imposed by the 100 years war led to the establishment of financial intermediaries in France and Flanders. Financiers and merchants became dominant groups. They clashed with the monopolies of the town-based industrialists and set up their own manufacturing plants (fabrics etc.) in the countryside or in small towns where they could employ very cheap labour. This reinforced the unemployment in the major cities. The merchants/financiers were able to accumulate large fortunes. The exploitation of silver mines in Bohemia and Southern Germany (the Fuggers) had the same result. These financiers threw their weight around in political life. The impoverishment of the 100 years war threw the kings in the arms of the financiers. The former protected the latter politically and became dependent upon them. New commercial and financial centres emerged outside the established protectionist cities. Antwerp is a good example. Flanders and Northern Italy benefited greatly from the 100 years war. It is in these areas that the Renaissance was born. As a movement it took root among the rich elites of the time.

The House of Burgundy lost power as a result of the war. The armies of Charles the Bold were defeated in 1477 by the Swiss. His territories were incorporated into those of the House of Habsburg. Subsequently, a long fight broke out between the King of France and the Habsburg Emperor. The riches obtained by the victorious Swiss caused a moral crisis, which was followed by a spiritual reaction. Eventually this engendered a puritan mindset, which spread, from Switzerland and Geneva, to England in the 16th century. The crisis also deepened the gap between the rich in the cities and the poor in the countryside. The merchants slowly displaced the lesser nobility as the most powerful group in society.

The process of economic and social change, which began already in the 13th century and accelerated after the 100 years war during the 14th and 15th century, became a veritable revolution during the 16th century. Cities became the focus of commercial and political life, whereas the power of noble families declined. The exception was central and Eastern Germany, but without Bohemia and Saxony, where the feudal lords increased their power and enslaved their serfs instead of liberating them. The power of the cities reflected itself also in a much more individualistic spirit. Wealth was a key to such power.

From the 12th century onward export industries emerged in the cities of Flanders and Italy. From the 13th century onward the wealthy merchants thrived on cheap production (cheap wages based on workers released from the country) and export trade. The accumulation of capital helped to stimulate further growth of the export trade. Banks were established in Italy and allowed Italian finance to penetrate the rest of the West. From 1280 Florence followed the example of the British and the cities of Brabant to establish its own manufacturing plants for woollen products in direct competition with the successful Flemish. The Flemish wool industry went into a steep decline. However, by 1340 the same fate struck Florence.

The exploitation of silver and copper mines in Austria and Germany during the 15th century enabled the Fuggers to become major financiers. They used their wealth, in part, to support kings and emperors as a counterweight to the growing influence of the states general (parliaments). *Thus, the absolutist governments of kings in nation-states during the 16th and 17th centuries (Louis XIV, for instance) relied on financial power.*

Of course, Governments preferred to be independent of bankers. They substituted tax revenues for bank loans. In the 18th century the French scientist Lavoisier (1743-1794) was not only a founder of chemical sciences, discovering the principle of the conservation of matter in chemical reactions (the weight of the materials after a chemical reaction equals the weight prior to the process, as shown by the two scales of a balance), but also a tax farmer. The rationality of balancing the books was similar to doing chemistry.[11] However, in order to maximise tax revenue, economic activity should be as free as possible so that people would have an incentive to produce to maximise profits. The idea of economic freedom to produce and expand in a context of competition could be combined with the idea of strong states that would be able to wage war. War itself would advance progress by stimulating technical development. Immanuel Kant was a proponent of such ideas.[12] At the same time a dialectic between economic freedom and state authority (control over monetary and fiscal policies) was started that has prevailed until today.

The depression of the 14th century led to a ruthless competition between cities and groups of merchants. New technologies (the windmill, for example) and increasing mobility flattened the edifice of trade and production restrictions, which had been built up to prevent destructive competition.[13] During the 16th century fights for markets broke out everywhere. One wanted free trade for oneself but trade restrictions for competitors. The result was that most lost out in a general depression, which afflicted large parts of Europe around 1567-1575.

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[11] Pierre Thuillier, *La Grande Implosion; rapport sur l'effondrement de l'Occident,* Fayard, Paris, 1995, p.186.

[12] I.Kant, *Idee vir 'n Algemene Geskiedenis in Wêreldburgerlike Perspektief,* trans. J.J. Venter, Departement Sentrale Publikasies, Potchefstroom University, 1992 (original 1784), pp. 24-36.

[13] Jean-Louis Gombeaud, Maurice Decaillot, *Le Retour de la très Grande Dépression,* Économica, Paris, 1997, p. 118.

The capitalist (financial capitalism) economy freed itself not only from urban monopolies but sought also to extend itself beyond Europe. The Portuguese and Spanish discoveries in the Americas and Far East opened the way to such new enterprises. This led to an enormous flow of silver and gold to Europe during the 16th century. Spain became one of the most powerful nations during the 15th and 16th centuries, partly because of the discovery of the Americas in 1492, followed by the colonisation of Latin America. Its neighbour Portugal had acquired Brazil as well as colonies in Africa and the Far East. In the latter regions Portugal competed with the English and the Dutch. The aim was to gain control over the lucrative spice trade. Eventually the Dutch won this contest. The English founded large colonies in North America in contest with the French. The influx of precious metals from overseas caused a major inflation during the 16th century. Mortgages were invented and a speculative fever developed. Between 1547 and 1554 the value of land in France doubled. Agriculture expanded by enlargement of the area under cultivation. The feudal lords were ruined, however, because their rents were set as fixed sums of money. Workers in town suffered as their wages lagged behind the cost of living, leading to strikes and other social troubles.

The invention of movable print in the 15th century enabled a swift circulation of ideas in subsequent centuries. It enabled the dissemination of records of good or new agricultural practices as well as the swift circulation of ideas. Without the printing press the Reformation of the 16th century would not have taken off as fast as it did. The Reformation itself stimulated the search for technical innovations as it had a positive view on the significance of the natural world (Ch 3.6).

The development of capitalist industry and commerce fostered individualism and, therefore, weakened the social hierarchy characteristic during the Middle Ages.

The various economic, social and political developments briefly alluded to should make it clear that the whole period 1300-1600 was one of immense change. This was reflected also in a wide range of new philosophical and religious thinking. The humanist movement began with the re-discovery of classical Greek and Latin literature. Gradually, Scholastic thinking, expressed as a synthesis between Christianity and Greek thinking, started to lose its grip on Western culture. Initially the synthesis took on different forms, with a shift, for example, to Platonic and Stoic thinking. Mystic and occult streams of thought also became strong. Yet, other thinkers put greater stress on Biblical thinking (Bradwardine, Wycliffe, Huss).

During the long 16th century (1470-1620) the Renaissance contributed an amazing range of wonderful paintings, sculptures, music and literature, especially in Italy. During that same century the Reformation started in Germany and spread quickly to other European countries.

An interesting figure of early humanism/pre-reformation thinking is Petrarca (1304-74). On the one hand this author hankered after a revival of classical literature, whilst on the other he continued to adhere to the thinking of St. Augustine. In his publications on a range of subjects he blended Platonic ideas with the doctrines of Cicero and Seneca. A stoic influence appears, for example in the title of his work: *De Remediis Utriusque Fortunae*. As he denounced the metaphysical subtleties of the Scholastics, he 'became one of the fathers of the revolution which gave birth to modern philosophy.'[14]

The ongoing battles between and inside cities in the 14th and 15th centuries encouraged individualism and the autonomy of the human person. The world outside became a nature to be tamed and harnessed for human ends.[15] The belief that man is born again by himself rather than through the church began to take hold during the Renaissance, for example in the work of Pico Della Mirandola (1463-1494).

The Reformation of the 16th century, which started with Martin Luther in Germany (1517), Ulrich Zwingli in Switzerland and John Calvin in Geneva and France, rediscovered the Gospel of God's free grace in Christ (justification by faith). Individual believers should be able to read the Bible and to hear the divine service in the vernacular. The church should not be an intermediary between the people and God. The reformation rejected the dualism of nature and grace, which was characteristic of the scholastic synthesis, and replaced it with a ground motive of creation, fall and redemption through Christ. However, this happened neither immediately nor across all churches that went over to the Reformation. Various pre-reformation thinkers continued to exercise influence. Key reformers such as Calvin and Zwingli were influenced by Stoic thinking through the work of Seneca. Neo-platonism had an influence as well via the publications of St. Augustine. Nevertheless, the hierarchical organisation of mediaeval life was rejected and the concept of vocation as applying to all areas of life put to the fore. Although some of these concepts were soon diluted or distorted, as in the Puritan movement (they emphasised a type of workaholic ethic and saw material prosperity as a sign of divine election), the Reformation had profound social, political and economic effects throughout Europe and some of its overseas colonies. Some of these effects came about through the reaction of the Counter-reformation led by the order of the Jesuits, especially through the devastation wrought by the 30 years war (1618-1648) in German lands. Although the Reformation appealed to the common people, in contrast to the Renaissance, eventually the West fell much more under the influence of the ideas of the Renaissance.

Politically, the feudal system led to the rise of the House of Habsburg (Burgundy), uniting Spain, Flanders, large parts of Holland and Germany in the 15th and 16th centuries. The 80 years war between Spain and Holland (1568-1648), dominated in part by the conflict between Rome and the

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[14] F. Ueberweg, *History of Philosophy*, vol. 2, English trans. G.S. Morris, 4th edition, Hodder and Stoughton, London, 1874, p. 462.

[15] John Hale, *The Civilization of Europe in the Renaissance*, Fontana Press, London, 1993, pp. 509-584.

Reformation, concluded with the Peace of Munster in 1648. This conference legitimised the nation-state. The old Roman Empire quickly lost its significance.

During the 17th and 18th century the colonies in the Americas were short of labour as a result of the slaughtering of the natives by their conquerors and the effects of diseases introduced by the Europeans. This led to the development of a triangular flow of international trade. Merchants would dispatch ships to Africa to load slaves for sale in the Americas, from whence they returned laden with sugar, tobacco etc. The colonies served as a source of raw materials for home-based industries.

The emphasis on the nation-state was strongly associated with mercantilism. Since the state had to be able to fight wars or to defend itself against intruders, it had to have the means of equipping and maintaining armies. To this end, the country needed to have a positive trade balance, which was to be achieved by an encouragement and protection of local industry so as to have a strong basis for exporting and as little need as possible for imports. Of course, if all states want to export and none to import, then, who will buy the exports? Trade with colonies provided a solution.

Philosophically, the spirit of the Renaissance found a deeper expression in the rationalism of the 16th/17th century followed by the Enlightenment in the 17th/18th century. John Locke (1632-1704) developed the theory of innate, inalienable human rights (natural law) to freedom, life and property. A state consists of free individual persons who through a social contract establish the state, basically as similar to a limited liability company. The idea of a social contract was not original to Locke. It can be traced back to Cicero (106 BC-43BC) and the Epicureans.[16] These ideas motivated the French Revolution of 1789 against the injustices of the Ancien Régime (feudal system) and set the scene for the 19th and 20th centuries.

In England the Industrial Revolution took shape in the 18th century, particularly on the basis of the steam-engine. This self-regulating machine revolutionised transport systems, the generation of energy and the manufacture of goods. It became the core element of a technological system.

1.3.2 Agriculture

1.3.2.1 Organisation

During most of this period, but especially until the end of the 15th century, agriculture was largely subsistence farming in the sense that a village or manor largely grew its own food. Such local farming was open-field as farmers had the right of grazing in and over a field when it was not under crop. Even during the 16th and 17th centuries, when trade in grain developed, the volumes shipped were but a fraction of total consumption.[17]

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[16] J.P.A. Mekkes, *Ontwikkeling der Humanistische Rechtsstaatstheorieen*, Libertas, Utrecht/Rotterdam, 1940, p. 72.

[17] F. Braudel, *Beschaving, Economie en Kapitalisme (15e-18e eeuw)*, vol. 1, Armand Collin, transl. Roland Fagel, Geurt Rombach, Contact, Amsterdam, 1988 , p. 120.

Ault describes the lay-out of open–field farming as follows:

> Each great field was divided into ploughstrips which were grouped in furlongs. The strips, many or few, of each landholder lay scattered through the tracts, intermingled with those of his neighbours. The origin of this arrangement has been explained in different ways but it is clear that if some villagers had ploughlands more outlying than the rest they would be at a disadvantage in making their way from the village crofts, to and fro, at the slow pace of oxen. Each year one of the great fields of a village lay fallow, that is, it was not under crop for an entire year. In this way the soil could maintain its level of fertility without manure, little of which was available. It was important in an age of subsistence farming with little carry-over that a landholder have no more of his ploughstrips in the fallow field than in those under crop.[18]

For such a system to work smoothly, the rights and duties of participants had to be clearly established and the means of addressing problems worked out. As Ault put it:

> But the best pasture was the stubble. Every landholder had a right to turn his beasts into the stubble of any field after harvest until seed-time which, in the case of a field lying fallow, would be a year. It is obvious that if the right of pasture was to be enjoyed by all and shared equitably there would have to be communal control, field-wide if not village-wide. The right of common pasture has rightly been called 'the determining idea' of the open-field system.[19]

Indeed, the very purpose of Ault's book is to provide an insight into the details of the by-laws drawn up by farmers to make this system work. In most cases, the village community was part of a manor under the control of a landlord. Most of the farmers were the lord's tenants. In England there was a large variety of land tenures. Eric Kerridge has provided a detailed summary when refuting Tawney's claim that the agrarian revolution started in the 16th century as rich merchants obtained land for enclosures and the growing of wool by offering higher rents to tenants or by evicting them from their tenancies. Devices such as claimed by Tawney did not exist as tenants enjoyed very considerable legal protection against rent manipulation and enjoyed security of tenure.[20]

What Kerridge, however, agrees on is that farming had evolved since the early Middle Ages from a self-sufficiency operation to farming for profit. The law adapted to this change by evolving a law of estates as distinct from and parallel to the law of tenures. This made it possible, for instance, to provide agricultural leases. The evolution in this regard is that during the 16th century the terms of farm leases became shorter, from 40, 60 or even 99 years to

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[18] W.O. Ault, *Open-Field Farming in Medieval England; a study of village by-laws*, George Allen and Unwin, New York, 1972, p. 15.

[19] ibid., pp. 15/16.

[20] Eric Kerridge, *Agrarian Problems in the Sixteenth Century and After*, George Allen and Unwin, London, 1969. Tawney's statements came from R.H. Tawney, *The Agrarian Problem of the Sixteenth Century*, Longmans, London, 1912.

terms of 7, 14 or 21 years, renewable every 7 years. This allowed a land market to develop, as indeed claimed by Tawney.[21] We may conclude that during the 16th century farming became much more based upon capital investment as a supplier of wool to the fast growing wool industry in England. At the same time, the strong legal protection of tenants allowed farmers to invest time and effort in farm improvements.

The use of common land in England is particularly interesting, not only because of the issues raised by enclosures of such lands but also from the point of view prevalent since the 18th century that private property rights make for greater efficiency. They may well do so if efficiency is understood in the context of a money-using competitive commercial system. (Ch 9.3 and 10.9.3).

Joan Thirsk has noted that the importance of common land varied by type of farming, which, in turn, was determined largely by geography. Her hypothesis is:

> Common fields and co-operative husbandry were best suited to, and survived longest, in areas of mixed husbandry, whereas they either never came into existence, or met an early death, in pastoral areas. This proposition stands up well when tested in highland England.[22]

Discussing farming techniques in arable husbandry during the period 1500-1640 she notes:

> Many were the complaints about bad farming-about those who exhausted their land with a few seasons' crops and abandoned it again, and those who skimped the ploughings and stirrings. We can see why common-field regulations, and indeed, all village by-laws were necessary to maintain minimum standards of husbandry. Indeed it is tempting to argue that some of the worst examples of bad farming must have come not from the common field but from the enclosed areas which were populated by small family farmers. But we cannot be sure.[23]

Clearly, with villages being at the centre of agricultural life, often with a manor, manorial court and parish church, there was a close social control over the conduct of agricultural activities. This might have been fostered by the corporate culture of the Catholic Church.[24] Such a social organisation may be described as a closed social/economic rhizoid (Ch 11.4.11). As life became more dynamic under the impetus of an advancing monetary economy with international commercial links, operating on the basis of having to return a profit on capital invested, whilst land was used for industrial as well as for agricultural purposes, such closed networks made way to open networks that necessitated a much more individual approach to ownership. The importance

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[21] Kerridge, ibid., p. 47.

[22] Joan Thirsk, The Structure of Regions in *The Agrarian History of England and Wales*, vol. 4, *1500-1640* ed. by Joan Thirsk, University Press, Cambridge, 1967, p. 7.

[23] op. cit., Farming Techniques, pp. 162, 163.

[24] A vivid account of village life in the 13th century is given by Frances and Joseph Gies, op.cit.

of co-operative ownership in agriculture will be discussed in Ch 10.9.3. Along with the changes brought about by a much more secular perspective on life, the view of people changed. The authority of lords and priests, with the latter seen as close to God in the Middle Ages, changed to a much more functional one, with lords seen as having to secure the material welfare of their domains and priests as people officiating at weddings, burials and ensuring the moral education of the young.

A much more individualistic trend appears to have set in during the 16th century as a result of the dissolution of the monasteries, high inflation and regular religious upheavals. People became only interested in their own freehold, according to Joyce Youings.[25]

1.3.2.2 The Crisis of the 14th Century

As noted above the expansion of the population towards the end of the 13th century was such that ecologically dangerous steps were taken to increase agricultural production. The destruction of fish-ponds, made it necessary to substitute meat for fish, making livestock farming relatively more profitable than arable farming.[26] Moreover, the triennial system was not as good as it first appeared. It drained minerals from the soil after an extended period of application, despite the use of manure. In the first half of the 14th century these developments conspired to cause a series of ecological disasters and severe famines. As a result of the latter the population became very weak and thus easy prey to the onslaught of the plague introduced from the East into Western Europe by 1347.

The strong increase in population and the associated growing shortage of arable land during the boom years of the 12th and 13th centuries gave rise to a migration from the West into the East (east of the river Elbe), towards the Baltic countries, Eastern Prussia, Poland, Silesia and Transylvania. Landlords in those countries actively recruited prospective settlers in the West by offering attractive terms such as hereditary leases and freedom from taxation for up to 20 years. These settlers carried on farming in their new areas in the same way as they had learnt in the West. Thus, Flemish farmers set up small farms and ruled their villages according to Flemish law. By contrast, the local lords (including monasteries and Teutonic knights) exploited very large estates, using Slavs as villeins.

The Teutonic knights when chased from Palestine had established vast grain-growing estates in Eastern Prussia during the 14th century. They exported large quantities of grain and rye to the West through the intermediaries of Dantzig merchants. When they believed that the Dutch could give them a better deal, the trade was captured by the latter and large quantities of cheap grain and rye from the East were sold at low prices in the West (around 1450 at a price 80% below the French price). The decline in prices was such that

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[25] Joyce Youings, The Church, in Thirsk, op.cit., p. 388.

[26] Slicher van Bath, op.cit., does not discuss the relationship between the decline of fishponds due to erosion and the rise of livestock farming.

some members of the Teutonic order in Germany were forced out of business.[27]

Nevertheless, the trade in grain from East to West rose to a peak in the 17th century as Dutch traders bought the grain cheaply and sold it at high prices, lifted by inflation, in the West. They sold salt and wine, from France, as well as Dutch industrial products, including building materials, textiles and spices to the Eastern lords.[28]

The regular occurrence of war combined with relatively low productivity of agriculture, despite impressive improvements was the reason for a rather slow recovery from the crisis of the 14th century.

The depression of the 14th century, combined with the severe loss of population, had the effect of lowering the price of cereals. The fall in prices was so steep that small farmers were driven off the land. They moved into the cities. In some areas textile manufacturers took advantage of the depressed conditions in rural areas to set up home-based industries. As prices of livestock did not decline as rapidly as of cereals, arable land was converted into grazing land. The boom in the wool industry during the 15th century raised the price of wool and so encouraged sheep-farming. In Germany farmers switched from growing cereals for food to cultivating industrial crops such as hops and flax.[29] Thus, the effects of the depression on agriculture stimulated the development of agriculture as a supplier of raw materials for industrial purposes.

In the East, the depression worked out to the disadvantage of the Flemish settlers. Hereditary leases were whittled away, taxes were imposed and increased and the lords insisted on the performance of services on their estates in lieu of rent payments. After the 30 years war (1620-1648), the descendants of the Flemish settlers were indistinguishable from the locals. Slicher van Bath comments on the situation then prevailing, as follows:

> The East German Rittergutsbesitzer (owner of a knight's estate) grew cereals for export to Western Europe and exploited his estate for profit. By every means, permissible or otherwise, he sought to enlarge the area under his control. He exploited the peasants and tried to drive them from their land. His estate was simply a plantation business concern, producing for the market.[30]

In contrast to the English situation, the East German one appeared to feature a more pronounced social distinction between large landlords and small peasants, without the detailed regulations about common lands. It was more like the latifundia of the Roman Empire. We may note here a correspondence

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[27] Jean-Louis Gombeaud, op. cit., pp. 113/114.

[28] J. Thomas Lindblad, Nederland en de Oostzee 1600-1850, in *Goud uit Graan*, Waanders, Zwolle, 1998, pp. 6-27.

[29] Slicher van Bath, op.cit., p. 143.

[30] ibid., page 157.

between the effects of modernisation on peasant populations in East Prussia in the 17th century and on such populations in the 20th and 21st centuries, especially in Africa and Latin America (Ch 12.4).

1.3.2.3 Towards the Elimination of the Fallow

The key to the development of agriculture from the 14th to the 19th century was the replacement of the triennial system, marked by a long fallow period of 15 months and a shorter one of 8 months, by new rotation systems that did not rely on any fallow period. Although farmers in Flanders, Brabant and Artois planted crops such as peas and vetches on land lying fallow already in the 15th century, it was not until the end of the 18th century and in France until the middle of the 19th century before this new system was generally implemented. Mazoyer and Roudart attribute this delayed dissemination to legal, social and economic factors.[31] Under the old system where villages had certain lands in common use those farmers who planted crops on part of their land had to provide access to the herds or flocks of their fellow villagers for grazing after they had harvested, so that they lost out on secondary growth. Lords or other rulers achieved sole control of enclosed land either by decreeing it or by the owner of the land paying the owners of the animals needing grazing space. It goes without saying that various groups of farmers resisted enclosures. Small farmers who had no animals of their own needed the fertilisation by animals provided by common access. Farmers without land but holding large herds or flocks obviously wanted access to commons as well as to grazing land after harvest. Similarly, small peasants without land but with small herds or flocks did not want to lose access to commons. Abolition of the commons was the easiest way to rearrange land in areas where parcels of land cultivated privately were small, or where ownership was dispersed over a number of parcels in various locations, or where strips of land were closely intertwined as to ownership. Naturally, various groups whose livelihood was at stake opposed such rearrangements. Hence, political power was deployed to obtain the sought for enclosures.

The accounts available do not suggest that enclosures were necessarily sought in order to improve the efficiency of management of the lands held in common. Rather, they involved, often complex, relationships between population, farming types, price movements and Government legislation.

The move towards the elimination of the fallow was by no means a linear process. Slicher van Bath mentions cases of farmers changing towards the three-course rotation from the two-course rotation during the 18th century in France and the Northern Netherlands. In general, production would increase as a result of such a move (due to only one third of the land instead of one half lying fallow) and this might allow the use of horses instead of oxen, leading to an increase in productivity. The yield, however, could decline under an intensive rotation to the point where the two-course rotation was more advantageous.[32]

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[31] op. cit., pp. 313-354.

[32] op. cit., p. 60.

The three-course rotation was operated under two modes, either when the use of fields was free or where usage was subject to regulation. The larger the population to be served, the more necessary regulations were to ensure that all farmers, for instance, cleared their harvest by a given date, so that animals could graze on the stubbles. As van Bath puts it: 'The feeding of man and beast was formerly so closely interrelated that the balance could not, with impunity, be weighted in favour of one to the detriment of the other.'[33]

The increase in productivity and production made possible by a more productive use of fallow land depended on an interaction between the husbandry of animals and the growing of legumes and rooted crops such as turnips, clovers, rye-grass, cabbage or industrial crops such as sugarbeet, hennep and flax. Sheep and cattle would feed on the crops grown on the former fallow land and produce thereby a much higher amount of manure which, in turn, would raise the yield of cereals. Many of the crops could be harvested and preserved for feeding out to animals during winter months. Moreover, the increase in animals would provide extra traction power as well as by-products such as skins and milk for processing into butter and cheese, with the skimmed milk enabling the rearing of pigs. The key to the new system was the much improved capability of the soil to retain its fertility. The crops would draw chemicals from the soil, but would also bind nitrogen. Over time the use of manure and crops would increase the amount of compost in the soil so that it would retain water. A disadvantage of the old system was that the soils were not sufficiently replenished, allowing minerals to be leached. Nevertheless, the use of hay during the old systems had opened the way to the joint use of crops, cereals and animals.

During the 16th and 17th centuries the use of clover and turnips spread throughout England and the countries along the river Rhine to be followed by the rest of Europe during the 18th and 19th centuries. Gradually, a diversity of systems developed depending both on new insights and local circumstances of soil and climate. What became known as the agricultural revolution in England was in fact more a matter of landlords applying themselves to their landed estates during the rule of the Whigs from 1714 until 1761.[34] When the Conservatives returned to power in 1761 enclosures rose significantly, from 246 Acts between 1702-1762 (covering 400,000 acres) to about 2,000 Acts covering 3,000,000 acres between 1761 and 1801. Between 1802 and 1844 another 2,000 Acts came into force, covering 2,500,000 acres. In 1845 a general Enclosure Act was passed.[35] Thus, for about a century the squires were able to improve their estates and to set up modern farms. They travelled around Europe to pick up new ideas. Sir Richard Weston, for instance, studied farming methods in Waas (Flanders) and Brabant already in 1650 and

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[33] ibid., p. 61.

[34] Ralph Whitlock, *The English Farm*, J.M. Dent and Sons, London, 1983, p. 143.

[35] Whitlock, ibid., p. 146.

his descriptions laid the foundations for the improvements of the 18th century, especially in the form of the Norfolk System.[36]

The question then is why the farmers in Flanders were so highly advanced in their farming methods even on soils of medium or poor quality. Slicher van Bath ascribes this to the high population density of those areas. Cereals had to be imported already in the 16th century from the Baltics. Farmers started growing industrial crops at an early stage, not only for the local industries, especially textile, but also for export. Farmers used even imported grain for their own needs. The relatively high population density stimulated the development of horticulture close to towns. Manure was obtained from the towns and from livestock farms. Special implements were developed for this intensive horticulture. The growing of industrial crops required processing and hence special equipment such as oil-presses for colza and drying ovens to obtain dye from madder.[37] A lively trade in manure developed. City excrement was shipped by barges from towns to country-side. This view is a most interesting one as it contradicts the usual view that a population can only grow when there is a surplus of food available. In reality, there is likely to be a more complicated two-way relationship.

Usually towns grow, with a consequent increase in population density, because of the development of industries. Cities in Flanders were centres of the cloth industry connected through transport networks with cities in Italy and Northern Europe. During the 18th century cities in England grew strongly because of the development of large mechanised textile factories. In the latter case the enclosure movement stimulated the shift of people from the rural to the urban areas. The shakers and movers in those days saw land as well as industry as avenues for making a profit. The effects of changing land use on people did not concern them.

Hooykaas has shown that during the 17th and 18th centuries on the continent as well as in England and Scotland interest in experimental methods and in the mechanical arts had developed, especially under the influence of Protestantism. This must have played a key role in the development of industry as well as in agricultural improvements.[38]

Merton's research of the attitudes to science and technology in 17th century England found that people were particularly interested in those applications of science that furthered the conveniences of life. Inventions and improvements had to have a utilitarian value. This utilitarianism combined with the increasing acceptance of wealth as a source of social prestige. There was rapidly increasing vertical mobility.[39] This belief in progress and wealth became even

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[36] Slicher van Bath, op. cit., p. 250.

[37] ibid., pp. 242, 243.

[38] R. Hooykaas, *Religion and the Rise of Modern Science*, Scottish Academic Press, Edinburgh, 1972, pp.75-97.

[39] Robert K. Merton, *Science, Technology and Society in Seventeenth Century England*, Howard Fertig, New York, 1970, p. 237.

more widespread during the 18th century. We may surmise that the associated social changes reduced the respect for those at the bottom of the social ladder. The church's traditional concern for the marginalized dissipated.

In the 18th century Viscount Townshend advocated the use of turnips (his nickname became 'Turnip Townshend') as part of what became known as the Norfolk system, named after the county of that name. This system alternated a root crop and a straw crop (first year, roots; second year, barley; third year, seeds; fourth year, wheat). In other parts of England, 5 and 6-year rotations came into usage. Another improver in Norfolk, Thomas Coke, introduced the seed-drill as well as the practice of sowing in straight rows. By organising parties for farmers to disseminate his latest discoveries, Coke started an informal farm extension service. Jethro Tull must be credited with the invention of the seed-drill and the horse-plough, both of which enabled the effective cultivation of turnips and seeds. The Norfolk system was used in association with the running of sheep to provide wool for the booming wool industry at that time. Tull believed that the fertility of turnips depended on the intensity of contact between the roots and soil particles. Thus, he made the soil around the turnips as fine as possible. However, after a couple of excellent harvests he found that the yield suddenly declined. His fellow countrymen Home and Dickson realised that minerals lost should be replenished by means of animal manure.

Mechanical implements were steadily improved. Threshing machines were patented in England in 1776 and 1788. Livestock breeding was also put on a modern footing, by the identification of desired characteristics and a rigorous process of culling till they were achieved, according to Whitlock.[40] Therefore, in the farming community some of the principles of genetics discovered by Mendel were already known. Robert Bakewell was one of the pioneers in this field.

Such a systematic approach foreshadowed the scientific methods that would become common in following centuries. Bakewell, for example, defined the type of animal he wanted on the basis of what he thought the market required (he specialised in breeding to the exclusion of other farming). Thus, his experiments with Longhorn cattle were aimed at producing a fat quick-maturing, meaty beast. To get there he sacrificed other essential qualities of a cow such as milking capacity, prolificacy, mothering qualities, hardiness and high food conversion. His new breed became soon very rare.[41] Breeders that followed him aimed at animals that were large in weight, size and fat (the Durham Ox).

All this sounds very familiar to people in the 21st century. As a result we may not realise what a major break with the traditional way of using and considering nature was involved in these developments. The new thinking of Descartes and Francis Bacon (Ch 3.7) was bearing fruit. Both believed that

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[40] Whitlock, ibid., p. 162.

[41] Whitlock, ibid., p. 166.

humankind could control nature by discovering how it worked. As a result people lost respect for the intrinsic worth of soil, animals, plants and even human beings. The question posed now was: how can we change and adapt them for the attainment of our end of greater material welfare. This issue will be explored in Part Two.

The introduction of the innovations associated with the phasing out of fallow lands came much later in France than in England. Under the regime of Louis the XIV (died 1715) the country had to support large armies and their suppliers. As much as 300,000 men were involved. They were largely supplied by the farming communities. Agricultural production and productivity suffered as a result. Taxes had to be raised to finance the military campaigns. The speculative schemes of John Law (1671-1729) had brought many people to ruin. In this depressed environment Quesnay argued in 1756 that money could not possible be a source of wealth for a nation. Spain had had large quantities of gold and silver, but had become impoverished. John Law's ventures had shown how one could go bankrupt through financial speculation. Quesnay stated boldly that only agriculture could create something from almost nothing (sunshine, rain and human labour). His ideas found a ready ear amongst many leading French. Agricultural societies were established. The physiocrats (Ch 3.9) wanted to import new techniques from England and Flanders. French farmers were not impressed. What was the point of increasing production if there were no markets for the increased production? They would have to accept lower prices. Thus, the agricultural revolution had to wait in France until a network of railway lines had expanded the market space for farmers. This happened as from the middle of the 19th century.

The reaction of the physiocrats to the promotion of industry by the likes of Colbert et al. was sympathetic inasmuch as the provision of food and other materials by agriculture should not be ignored. Sympathetic too, even though not wholly accurate, is their branding of money dealers and bankers as being part of the sterile class. We could take this also as a protest against the instability inflicted by short-term speculative capital flows in the modern globalised economy. Indeed, their system raises the issue of the relationship between financial capital and the exploitation of the earth's resources (Ch 7.6 and 9.4). After the Second World War, the French Government, followed in the 1960s by the European Economic Community, decided to stimulate agricultural production, partly as a way of safeguarding food supplies (Ch 2.8). This, however, has been accompanied by a major stimulus to the industrial production of agricultural inputs and the industrial processing of farm outputs. The physiocrats were too simplistic in their view that only agriculture is capable of producing a useful net surplus of goods to the community. In a sense they came to this view by retro-projecting their view on progress into the distant past as if there had been an ideal beginning to which one should return to get progress on the rails again.

The diversity of feudal taxes and restrictions on the employment of labour often instituted by powerful guilds during the Middle Ages were obstacles to the spread of the new farming techniques of the 18th century. The former in particular made it difficult to sell farm produce over longer distances. Since

the new system was much more productive than the old, farmers needed to have markets to sell their surplus harvests. As these were not always available, due to a lack of transport facilities (waterways, roads) or distances were too long for perishable commodities, the introduction of the new methods was often delayed. The large areas of uncultivated lands during the 17th and 18th centuries resulted from the same lack of markets.

The guilds were institutions that expressed the idea of corporate responsibility prevalent in the Middle Ages. Guilds were brotherhoods of people exercising the same trade, with provisions for training, quality maintenance and the care of widows and orphans. Everybody in a certain locality wanting to be involved in a trade should have the opportunity. Hence, competition from outsiders was prevented and rules for the setting of prices, working hours etc. promulgated. The emphasis was on solidarity and equality of opportunity. These ideas and practices clashed with the spirit of individualism, innovation and competition through exports of the 18th century. Freedom and free market exchange became the over-riding ideas leading to the French revolution. Perhaps the Free-masons are an example of an old guild transformed from the Christian basic concept of a Middle Aged guild into a secular global construct of freedom.

In terms of farm management, the new systems introduced during the 18th century increased the workload on the farm. With an unchanged area of land more animals needed care and more crops had to be husbanded and harvested. The invention of mechanical implements during the 19th century was, therefore, very welcome indeed. Mazoyer and Roudart calculate, convincingly, that the new system for a small farm of 5 hectares in the temperate regions of North Western Europe, without the use of mechanised implements, doubled productivity as well as production, compared with the old system.[42] Slicher van Bath reports the invention of the mechanical thresher in England. Driven by horses during the war years from 1800 to 1813 when labour was scarce it was considered a blessing. After the war, however, unemployment rose rapidly in southern and eastern England. Rioting broke out in Berkshire in 1830. Some fifty threshing machines were destroyed. Nevertheless, mechanisation carried on and led to the introduction of the steam-thresher which saved 80%-83% of human labour.[43]

Such introduction of labour-saving technology has been a feature of life until the present time. It has reduced workers to extensions of the machinery or to consumers of the products turned out. Chapters 8 and 9 on technicism and economism will address the background to such loss of human dignity in more detail.

1.3.2.4 Interaction between Industry and Agriculture

It should not be thought that agriculture developed in isolation from other parts of society. Slicher van Bath outlines in particular how such interaction took

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[42] op.cit., p. 329.

[43] Slicher van Bath, op. cit., p. 307.

shape during the agricultural depression (in Europe) of 1650-1750. A strong fall in prices of cereals (to a quarter or a third of their former value) occurred during this period, albeit without a general fall in farm production. The fall in cereal prices stimulated not only a switch to livestock farming but also to viticulture in suitable areas. Furthermore, farmers started growing industrial crops (tree nurseries, bulbs, flax, madder, hemp, weld, fruits), whilst in various areas rural textile industries were established, usually by merchants and under deplorable social conditions. These industries, however, were exposed to competition from England's growing machine-based textile (cotton) industry. Cotton displaced linen. In general, Industry was believed to be more important than agriculture. Quesnay, writing in 1756 and 1757 argued the opposite, as mentioned above. He recommended that only the most fertile land should be used for growing cereals and that less fertile land should be used for cattle raising.[44]

In terms of economic practice, the outlook is often described as mercantilism. The emerging nation states attempted to achieve a positive trade balance (exports exceeding imports) and believed that it was the Government's duty to intervene in economic life to foster industry so as to produce exportable goods and to discourage imports of finished products. Imports should be confined to those raw materials the country did not possess. The rationale of such a policy was to make the state as strong as possible, militarily as well as commercially. When the Middle ages ended and the Holy Roman empire lost its grip, every country had to fend for itself. The more powerful a state was the less likely that it could be attacked by poorer nations. In France, mercantilism began already during the reign of Louis XI (1461-1483) to achieve its highpoint under Jean Baptiste Colbert during the reign of Louis XIV (1643-1715). In France, major attempts were made to develop a silk industry.

Someone characterised the basic motivation of mercantilism in these words: 'try to surpass other nations'.[45] This extended to attempts to build colonial empires in the East Indies and in the Americas, if need be by force of arms. How far people were prepared to go in this respect is shown for example in the struggle between England and Holland to control the spice trade.[46] In order to stay ahead in this competition the ability to organise and equip armies and navies was important. Thus, mercantilism foreshadowed the formation of a military/industrial complex. As industry grew in importance, the commercial sector came to appreciate financial wealth and saw the State as a means to achieve it. State and industry had common objectives. One used to say *Pecunia nervus rei publicae* in those days.[47]

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[44] Slicher van Bath, op. cit., pp. 206-218.

[45] P.A. Diepenhorst, Het Mercantilisme in *Voorlezingen over de Geschiedenis der Economie*, Utrecht, G.J.A. Ruys, 1910, p. 6 (he sources this to a certain Schweizer, without reference).

[46] Giles Milton, *Nathaniel's Nutmeg; how one man's courage changed the course of history*, Hodder and Stoughton, London, 1999.

[47] As quoted by J. Wemelsfelder in *Christelijke Encyclopedie*, J.H. Kok, Kampen, 1959, vol. 4 under *Mercantilisme*.

However, since the main emphasis fell on a commercially and militarily strong state, the poor were considered as a nuisance, especially since measures were provided to train people for jobs. By reducing the task of the Government to that of a commercial/industrial manager mercantilism amounted to a form of economism. The economic task displaced the task of promoting public justice for all citizens. Similarly, there was an over-emphasis on technical management, as witnessed by a pre-occupation with industry rather than with ensuring that all sectors of society could develop harmoniously. As a result of these pre-occupations, the poor were treated harshly. In this connection the English Corn Law of 1689 set reference prices for grain products that were judged as being not too high for purchasers, but which would allow land-owners and tenant-farmers to do well. If the actual price fell below the reference price export bounties were made available, and imports prohibited. Clearly, people depending on wages were not supposed to benefit from ample domestic supplies and low prices of bread. In France a deliberate re-allocation of land to the growing of mulberry trees and vines had a similar effect.

The general idea of fostering a strong state able to compete led to a concern for promoting those economic sectors that were deemed to be the most conducive to attaining this objective. In the Netherlands this was international trade rather than industry.[48] The impact of economism in that country was shown by the use of often highly unethical means to secure pecuniary/commercial advantages. The development of major trading companies such as the East Indies Company in Britain and the United East Indies Company (Vereenigde Oost Indische Compagnie) with a mixture of private and Government involvement to exploit overseas colonies pre-figures the importance of large business corporations in the 19th and 20th centuries. Similarly, the use of technical innovation for the sake of commercial interests foreshadows the growth of technicism and economism in the 19th and 20th centuries (Ch 6-10 and Part III).

Many accounts indicate that the leading circles in the time of mercantilism cared little for the welfare of workers and soldiers. Under Elisabeth I the Poor law of 1601 instituted a paternalistic regime complete with workhouses. However, she also issued the Apprentice Act of 1562 to foster the formation of a skilled labour force, a logical move in view of the interest in promoting industry. Braudel notes that the attitude towards the poor progressively hardened during the 16th and 17th centuries. At first, strangers and beggars were fed and then pushed out of the towns. Then, they were shaved and later on they were given lashes and finally they were sent to the galleys or condemned to forced labour (workhouses).[49] During the 18th century the poor engaged the interest of various writers, as reported by Burnett:

> Eighteenth-century writers were much given to 'political arithmetic'-to calculations of what the poor earned and what they needed to spend, usually with the object of showing that their wages, if wisely laid out, were amply

[48] Diepenhorst, op.cit., pp. 22/23.

[49] F. Braudel, op. cit., p. 68.

> sufficient for a comfortable subsistence: they were representative of the mercantilist interest in cheap labour and the belief that higher earnings would both demoralize the recipient and price the nation out of her overseas markets.[50]

Such an attitude we encounter also in the work of Olivier de Serres, a French farmer and advisor of Laffemas, Controller-General of the Commercial Council. In 1600 he published: *Théatre de l'Agriculture*. He paints a picture of paternalistic relationships on large farms in the Cevennes. Workers cannot be trusted and should be tightly controlled. He pays them as little as possible. He chases paupers away. At the same time, he considers profits made from his farm as a sign of divine election. This view was widely endorsed, witness the 19 editions of his book between 1600 and 1674.[51] Ideas such as these have remained a feature of Western civilisation until the present time (Ch 6).

After 1750 grain prices started rising rapidly in sympathy with a major expansion of the population throughout Europe. The price rises were caused by inflation, by population growth and also by the growth in the number of horses. Expansion of industry and transport required the use of horses for traction. Marriages took place at a much earlier age, as the economic situation improved. In turn, the growth of the population contributed to rising demand and prices. Thus, the great agricultural improvers in Britain were working in a climate of general optimism, at least until the war with Napoleon. The rapid increases in agricultural productivity and in the growth of industry were a major reason why no epidemics and famines ended the boom in population growth.[52] This optimism and rising prosperity was not enjoyed by all, however. The counterpart of rising prices of cereals and other food products was a sharp decline in real wages. Again, this could be seen throughout Europe. This may well have assisted industrialisation. Slicher van Bath draws attention to a new development in the second half of the 18th century. Whereas previously, farmers decided on converting from animal to arable farming or vice versa on the basis of changes in grain prices, now the volume of production could also be changed, according as to whether new agricultural methods were applied or not.[53] However this may be, at the end of the 18th century there were reports of farmers so keen to convert land to arable usage that they left only small and infertile land for cattle and hence had insufficient manure for their arable land (they suffered from 'Ackergier' and 'Ackersucht').[54] The conversion of land to more labour-intensive tillage was based not only on cheaper labour, but also stimulated by low rates of interest.

Evidence of increases in population that result in lower wages and poverty is mixed. Le Roy Ladurie shows that during the period 1500-1570 the South of

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[50] John Burnett, *A History of the Cost of Living*, Penguin Books, Harmondsworth, 1969, p. 162.

[51] Details from Emmanuel Le Roy Ladurie, *De Boeren van de Languedoc*, trans. B. Herklots and M. Versteeg, Ooievaar, Amsterdam, 1996, p. 172.

[52] Slicher van Bath, op.cit., pp. 221ff.

[53] ibid., p. 232.

[54] ibid., p. 232.

France experienced a population explosion, which was associated with a decided fall in real wages as a reserve army of itinerant workers emerged. The price inflation of the 16th century, however, was also a key factor. Comparing 16th century Languedoc, where the population doubled within a century with 18th century Catalonia, where the same doubling of the population occurred, Le Roy Ladurie notes that the latter's production rose at a faster clip than the population because of an ingenious irrigation policy. Real wages rose instead of falling.[55] This contrast indicates that Malthus and Ricardo turned incidental events of population growth exceeding food supplies and hence causing poverty into an abstract general theory. In reality, one should examine how population change interacts with a range of other factors such as government administration, technical change and social institutions.

The interaction between industry and agriculture is also shown in the fact that areas which first introduced new agricultural techniques were also areas where commerce and industry were flourishing such as Flanders (wool, painting, tapestry) and England (wool industry followed by coal mines, metallurgy and cotton textiles). These industries needed a supply of food for their urban populations. Such rising demand was a strong incentive for neighbouring farmers to improve their productivity as well as for the ruling powers to enable the removal of legal impediments to the introduction of new methods. It is probably fair to say that both the Industrial revolution and the Agricultural revolution (understood in a narrow technical sense) needed each other to succeed.

Joan Thirsk has provided a vivid sketch of the interaction between wider social change and the development of agriculture and industry in England during the 17th century.[56] She divides her review over three broad groups of farmers. First, the arable farmers specialised in wheat growing. They tended to live in villages dominated by a squire and where could be found yeomen, husbandmen, cottagers, labourers and paupers. They met the crisis of falling grain prices by intensifying their production, as the total area of land could not be expanded. They did this by growing more fodder crops, so that more stock could be held. In turn, this increased the volume of manure and hence increased the yield of wheat per acre. Turnips were used as a fodder crop after introduction by Flemish aliens. Moreover, they experimented with better varieties of seed and introduced the watering of meadows. Some land was turned over to pasture-farming. Thirsk, bearing out the views of Hooykaas and Merton, refers to a zeal for experiments by substantial yeomen and gentry on the most fertile wheatlands. They had the capital to experiment. In addition, they consolidated and enclosed land and increased the size of farms in order to benefit from economies of scale. The crisis led to the decline of the small landowner in the specialised arable regions and in the vale lands.

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[55] op.cit., p. 142.

[56] Joan Thirsk, Seventeenth-Century Agriculture and Social Change in *Land, Church and People, essays* ed. by Joan Thirsk, British Agricultural History Society 1970, pp.148-177.

A second group of farmers distinguished by Thirsk are what she calls variant villages, situated on poorer lands for grain growing, but which remained under arable cultivation. Usually they were not under the control of a squire and had a large group of freehold farmers. Often immigrant squatters and cottagers were able to come in. Their response to the crisis was twofold. They diversified into industries such as framework knitting and also started to cultivate a wide variety of special, labour-intensive cash crops such as fruit and vegetables, herbs and spices and industrial dyes.

Traditional pasture farming districts formed the third group. These featured isolated family farms, hamlets and villages, which were usually without a squire. They had a tendency to separate the rich from the poor. The farming system was based on imported wheat, spacious commons for grazing and supplementary work in industries. These communities came under stress as the result of improvers (gentry and nobility) trying to increase their land holdings by drainage of fens and deforestation. Thus, grazing land was reduced. When such projects had been completed they had large farms for corn-growing often run by foreigners such as Dutchmen. It was in these areas that rioting occurred in 1629-1632. Bad weather, intrusions from improvers and the adverse effects of the 30 years war in Europe (1619-1648) on the demand for cloth undermined the economic basis of pasture farming. In other areas of pasture farming steady advances were made in developing a wide variety of breeds of cattle, sheep and horses. Handicraft industries flourished and provided many opportunities for alternative sources of employment and income. Thirsk estimates that 'such farmers must have comprised somewhere near half the farming population of the kingdom.'[57] It was not attractive for such farmers to walk off their land and take up full-time employment in factories.

In contrast to the dual-economy areas of England, countries on the periphery of Europe such as the Southern parts of Portugal, Spain, Italy, Hungary, Slovakia, Poland and Prussia continued to practice the old systems, often on large estates owned by lords and operated by people who were practically serfs. Some of these continued to practice the biennial system into the 20th century. A location on the periphery suffered from the disadvantage of having to sell any surplus produce in the industrial centres at prices set by productive local farmers. After deduction of transport costs, the net return was not high enough to provide the landowners with an incentive to expand and improve their systems. They rather invested whatever savings they had in the new industries in England, Flanders and the Netherlands. Thus, the backwardness of the peripheral regions was perpetuated. This was not so much a deliberate policy of the richer industrialising areas of Europe, as dependency theorists tend to believe, but rather in consequence of factors which conspired to engender rapid growth in some parts of regions in the centre.

It is also possible that the rich in the peripheral regions invested their wealth in

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[57] ibid., p. 172.

churches, perhaps as an investment in the realm of grace, and various forms of conspicuous consumption rather than in new industries and agriculture, so that poverty was perpetuated. Spain could be cited as an example.

1.3.2.5. Agricultural Productivity

Considering the whole period from 1000 to about 1800 we should bear in mind Braudel's point that grains were the basic source of food supplies throughout this period in Europe. Raising grains is not easy because the crop rapidly depletes the soil, whilst their biological productivity (yield of grain harvested per grain of wheat sown) is rather low. Most of the grains required were grown close to major population centres. As populations increased, grains had to be supplied from areas at larger distances from the centres. Sicily, Prussia, Poland, the Baltic countries, Russia all served as peripheral suppliers at one time or another.

For the period of the 15th to the 18th century Braudel reckons that the average productivity of grain was about 1:5 or about 6 quintals per hectare.[58] Quoting statistician J.C. Toutain, he calculates that around 1775 France had a population of 25 million people and that they consumed 80 million quintals per annum. Adding to this the grain to be set aside for the next harvest and for the feeding of animals, total production would have been close to 100 million quintals. Given that agricultural land amounted to about 15 million hectares, the required production could be obtained with a productivity of grain of 5/6 quintals per hectare. This is not much different from the rate of productivity obtained towards the end of the 13th century. Since France was basically self-sufficient in grain production, imports and exports were peripheral in nature.

Quoting B.H. Slicher van Bath, Braudel provides the following table of productivity development over the period under review, divided into four phases:

Productivity of Grain in Europe (1200-1820)

A. Before 1200-1249. Productivity of seed sown 3 to 3.7: 1
   - I. England 1200-1249: 3.7
   - II. France before 1200: 3.0

B. 1250-1820. Productivity of seed sown 4.1-4.7:1
   - I. England 1250-1499: 4.7
   - II. France 1300-1499: 4.3
   - III. Germany, Scandinavia 1500-1699: 4.2
   - IV. Eastern Europe 1550-1820: 4.1

C. 1500-1820. Productivity of seed sown 6.3-7:1
   - I. England and Netherlands 1500-1700: 7.0
   - II. France, Spain, Italy 1500-1820: 6.3
   - III. Germany, Scandinavian countries 1700-1820: 6.4

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[58] F. Braudel, op.cit., p. 116.

D. 1750-1820. Productivity of seed sown > 10

I. England, Ireland, Netherlands 1750-1820: 10.6

In the long term (about 600years) productivity increased by about 186% in the first group of countries, with considerable fluctuations from one period to another. The 14th century (Black Death) was one of low improvement. Braudel makes the important point that from 1750 to 1820 the strongest growth in the yields of grain occurred in countries with the most rapid increase in their populations (England, Ireland and the Netherlands).[59] This confirms the point made by Slicher van Bath with regard to the advanced state of farming in Flanders in the 15th and 16th centuries when the population grew strongly. Similarly, there was an interaction between population growth, the need to provide food supplies and the general increase in productivity arising from the Industrial Revolution.

In England the population grew rapidly from about 1750 onward, from approximately 6.7 million in 1760 to 12 million in 1820 and almost 18 million in 1850. Since 1740 the birth rate exceeded the death rate. Urban industrialised areas had a higher rate of population growth than the agricultural districts. An analysis of counties that had the same population density in 1701 showed that by 1831 all had grown in population, but the industrial districts had now 45% of the total, whereas the share of the agricultural districts had declined from 33.3% to 26.0%. Immigrants had helped to increase the urban populations as well as early marriages.[60]

The increase in the demand for food associated with the acceleration in population growth from 1750 onward was met by a reduction in exports and an increase in imports. The Corn Law attempted to regulate the domestic price of imported grain by applying variable import duties. At the same time, British industry sold its products at high prices in the domestic market and at low prices in export markets. The export index rose from 100 in 1700 to 544 in 1800.[61] Most of the workforce consisted of women and children who had to work long hours to compensate for low wages. Profits made were re-invested in new capital equipment.

Thus, between 1770 and 1820 real wages fell. Whilst high prices had stimulated high production, the rapid increase in the supply of workers had allowed wage increases to lag behind price increases. Between 1817 and 1850, however, real wages rose, although other components of the standard of living such as housing, hours of work, diet, infant mortality and urban infrastructure were appalling (Ch 6.2).[62]

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[59] ibid., p. 116.

[60] Braudel, op.cit., vol. 3, pp. 522ff.

[61] Braudel, ibid., p. 544.

[62] Braudel, ibid., p. 575.

Robert Kurz reproduces a statistic covering the whole period reviewed. It indicates the real wage of an English carpenter in terms of the quantity of grain it could buy, as follows:[63]

Period	Wage in kilos of grain per day
1301-1350	94.6
1401-1450	155.1
1601-1650	48.3
1701-1750	94.6
1751-1800	79.6
1801-1850	94.6

1.3.2.6. The Real Agricultural Revolution

Mazoyer and Roudart conclude their survey of the period until 1850 by noting that the ideas underlying the new agriculture had not been thought up by economists and agricultural experts but rather by farmers themselves.[64]

We have already seen that this statement is only partially true inasmuch as the culture of the 17th and 18th centuries was marked by a spirit of experimenting supported by popular science, often spread by local clergy and lords.

The disagreements about the time when the agrarian revolution started in England certainly indicate that the revolution must have taken place over a rather long period, inasmuch as one cannot point to a brief period which would fulfil the role of watershed between a pre-and a post-revolutionary period. Eric Kerridge has argued on the basis of documentary evidence that the agrarian revolution started round about 1560/63 and ended around 1690. He justifies this by dating all the key innovations such as up-and-down husbandry, fen drainage, floating upwards, marling, swarding, cole-seed cultivation, catchwork floating, carrot cultivation, extensive woading and liming, the introduction of soap-ash, ridge-and-furrow floating, burn-baking downlands, and sainfoin, clover, turnip and rye-grass cultivation.[65] If this record is correct, then, we are dealing with a number of innovations each of which must have spread through the British farming communities with remarkable rapidity and have stimulated local adaptations that reflected the peculiar characteristics of each district. The point about the 18th century, then, must be that it was the time of the great and much more systematically working experimenters and improvers.

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[63] Robert Kurz, *Schwarzbuch Kapitalismus; Abgesang der Marktwirtschaft*, Eichborn, Frankfurt am Main, 1999, p. 18. The data are calculated by I. Wallerstein on the basis of data provided by Slicher van Bath.

[64] op. cit., p. 352.

[65] Eric Kerridge, *The Agricultural Revolution*, George Allen and Unwin, London, 1967, pp. 347/348.

Moreover, the emergence of the empirical scientific method applied to practical problems, as advocated, for example, by people like Francis Bacon (1561-1628) would have had a stimulating influence. This was certainly true for Jethro Tull, even though his role in the revolution has been cut down to size somewhat in recent research.

Eric Hobsbawm suggests a different interpretation of the Agricultural Revolution in his study of the age of revolution.[66] In his view between 1789 and 1848 a dual revolution took place in Europe, namely the more political French Revolution and the English Industrial Revolution. Since European society in 1789 was primarily agricultural, this dual revolution could not but affect the land. He puts it like this:

> The great frozen ice-cap of the world's traditional agrarian systems and rural social relations lay above the fertile soil of economic growth. It had at all costs to be melted, so that that soil could be ploughed by the forces of profit-pursuing private enterprise.[67]

Hobsbawm cites three specific changes necessary to put private enterprise in the driver's seat of agriculture:

1. Land had to be turned into a commodity to be bought and sold.
2. The owners of land had to be motivated by self-interest to make monetary profits.
3. The rural population had to be turned into freely mobile wage-workers for the growing industrial sectors.

In Chapter 3.12 the change in thinking that led to a strong preference for private property rather than for property held in common on the basis of commonly accepted regulations will be elaborated on.

The major obstacles to the transformation of traditional societies implied by these three changes were the pre-capitalist landlords and the traditional peasantry. Neither group was very keen. It required the abolition of feudalism. In France, of course, the National Assembly abolished them in one fell swoop on the night of the 4/5th August 1789. France became a country of peasant proprietors. In other European countries it took the conquests of Napoleon to remove them, although after his defeat in 1815 many such changes were reversed again. The liberation of serfs took place in many countries but as already indicated the pattern was usually that the freed serfs became enslaved in a financial sense. Lands held by the church were generally divided and sold to new keen owners. In England the landlords were already in favour of capitalist enterprise. The problem there was the conversion of peasant farmers to wage-workers. This was achieved through the Poor Law Amendment Act of 1834, which centralised the provision of relief into workhouses operated by a number of parishes together. It required the poor

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[66] Eric Hobsbawm, *The Age of Revolution 1789-1848,* Abacus (Weidenfeld and Nicholson), 1962/1997, pp. 183-207.

[67] ibid., p. 184.

to find work at whatever wage rate was offered. Refusal saw them end up in work-houses where conditions were worse than in regular employment. In the USA, founded on Enlightenment principles, farmers were all those who had land on a commercial basis. Application of this private ownership principle ran counter to the principles of the Indians. Since the Enlightenment principles were seen as natural, the white settlers displaced the Indians from their tribal lands without any compunction. In fact, this is still going on in the Amazon forest.

In this context, there has been a parallel debate in philosophy and economics about property relationships with respect to nature. On the one hand, Descartes (Ch 4.4.2) reduced nature to that which is mechanical, subject to a 'supernatural' control of human reason. On the other hand, John Locke used not only this concept but also the Medieval idea of natural law, which is a rational construct.[68] Both concepts have merged into the labour theory of property espoused by Locke, Rousseau and Marx. It is still prevalent today. Those who capture a piece of nature and apply their efforts to it are entitled to ownership. Semi-nomadic people have no such rights.

In most countries the transformation was achieved over a fifty year period from about 1790 to 1850, often at the expense of great human suffering, as in Ireland.

By contrast, Denmark laid the basis for modern agriculture in the 1780s. Danish agriculture in the 18th century was organised along Prussian lines in the form of large estates worked by people who were practically serfs and had to work for low wages or could be compelled to provide services for free. The triennial system was still in use. The king of Denmark sent commissions of enquiry to Britain to find out what agricultural system should be used in Denmark to lift the country's productivity. Soon two schools of thought emerged. One wanted to introduce large-scale farming along British lines. The other wanted to employ productively the large number of people on the land by means of State support. The king and the Government administration supported the latter view and eventually prevailed. In 1786 a High Commission for Agriculture was established, the old feudal duty system abolished and a statute setting out the rights and obligations of farmers and landlords introduced. The right of inheritance to farmland was limited to the oldest son only to prevent the parcelling up of farms into unprofitable smallholdings. In 1788 a State bank was established to extend long-term loans to farmers at subsidised rates of interest to allow them to become landowners. By 1820 farmers owned already half of the land under cultivation.

The transformation of traditional agriculture had been achieved by and large around 1850. Yet, farming communities were not necessarily happy about the changes. Farm-labourers were not well off. They left farming where they could, often to migrate overseas. The abolition of feudal rights had made for a much more uncertain existence and lack of economic security.

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[68] J.J. Venter, *Early Modern Concepts of "Natural Law"*, Acta Academica, vol. 33(2), 2001, UFS-SASOL, Library, UFS, Bloemfontein, pp. 1-39.

1.4 Conclusion

During the period 1000-1300 mixed farming was introduced in Europe, whilst town and country had a harmonious relationship, with technology being developed in parallel in town and in agriculture. The symbiosis was such that population could expand and large cathedrals built. The corporate culture of Christianity played a major role in this. From the 14th century onward things began to change. Disasters and wars inspired a more individualistic attitude. Commerce, industry and trade began to develop, aided by the double-entry accounting system. Profits and losses could be quantified. The symbiosis of town and country started to fall apart to the detriment of peasants. Peasant revolts broke out, sometimes worsened by spiritual/ religious ideas. The changes in the spiritual climate brought about by Renaissance and Reformation strengthened the individualist tendencies. The Enclosure movement led to the demise of the commons in favour of private property and the advent of industrial farming. The spirit of experimenting and improving led to another agricultural revolution in the 18th century, marked by the elimination of the fallow and a systematic approach to cultivation and breeding. The rationalist/scientism movement of the 17th and 18th centuries led to the First Industrial Revolution. Previously mercantilism had stimulated competition between states as well as colonialism and industry. On the whole, agricultural productivity rose steadily but slowly. Trade in agricultural products was confined to Europe and to the disposition of surpluses. Agricultural food producing rhizoids tended to be small in areas with high population densities, where they were often linked to nearby cities. By contrast, industrial farming became part of international open rhizoids. After 1850, however, they became global in scope and much more scientifically based. Chapter 2 will outline this development and its consequences.

CHAPTER TWO: TOWARDS LARGE-SCALE INDUSTRIAL AGRICULTURE FROM 1850 TO THE PRESENT

2.1 Introduction

The Industrial Revolution of the 18th century has transformed all societies around the world starting with major Western countries such as the UK, France, Germany and the USA. The two World Wars of the 20th century have accelerated this process. This industrial transformation has profoundly affected agriculture, not only in the so-called developed world but increasingly also in the Third World. During the 19th and early 20th centuries the latter were colonies compelled to export crops grown for the industrialised metropolitan centres at the expense of their traditional peasant agriculture. During the second half of the 20th century rich Western countries have been expanding their agriculture by means of import protection and subsidies to the point where their production exceeds their needs, so that export surpluses have been sold at subsidised prices to Third World countries, thereby displacing peasant farmers to urban centres.

The industrial transformation of the past two centuries has been pushed along by scientific discoveries and technical innovations. During the 19th century railways, steam ships, telegraph and telephone enabled the import and export of agricultural commodities over long distances. The introduction of refrigeration extended international trade also to perishable commodities. The resulting international specialisation has stimulated large-scale farming and productivity growth. The resulting downward pressure on prices in the face of low income and price elasticity of demand has led to elaborate systems to protect agriculture and/or farmers' incomes in developed countries.

This chapter aims at providing an overview of changes in agriculture under international world-wide trade and under the impact of a much more scientific-technological approach to farming.

2.2 Interdependence of Agriculture and Industry

The new system of land use without fallow, introduced during the 18th century, increased farmers' workload considerably, since it required that each plot of land should be attended to every year. There was much more harvesting to be done as well as a greater number of animals to be looked after. Thus, time became very precious. Prior to the industrial revolution farmers would take pieces of iron and wood to local artisans such as smiths and wagon-makers and order the fabrication of a piece of equipment. Under the fallow-less system there was no time anymore for such activities.

The industrial revolution brought relief. New manufactured farm implements could take over manual work from the farmer. Although, initially, the machines were designed to take over the role of distinct human activities such as threshing, a substantial number of hands were still required to operate them. The main advantage of the early mechanisation was that the work could be done more quickly.

The new industries designed and sold a wide range of mechanical farm implements made from steel such as sowing machines, self-binders, harrows and at a later stage steam-powered ploughs and threshing machines. Nevertheless, animals, especially horses, continued to provide most of the traction power till at least the 1940s. The use of steam-powered threshing machines remained limited to the most advanced farming regions of Europe. Issues of finance, scale, infrastructure and social tradition prevented a more rapid adoption of the new technologies.

Farmers in the USA were the first to deploy mechanical implements, because they were short of manpower and had large land areas to till. Soon, however, large estates in Britain and Prussia would imitate the American systems, thereby reducing the number of farmhands. In those early stages smaller farms of at least 10 or 15 hectares also profited from mechanisation by a reduction in the use of seasonal labour. Other than in the large territories of the New World, however, there was no virgin land available in Europe to allow larger scale farming on the basis of the new mechanical implements. Farmers either operated their farms with less labour, which was then forced to migrate to urban areas, or enlarged their operations by buying neighbouring farms.[69]

Around the middle of the 19th century steam power revolutionised transport both at sea and on land. Steam ships began to displace sailing ships and railways were constructed, on the old European continent as well as in countries such as the USA, Canada, Argentina, South Africa and Australia. The combination of rapid means of transport with the availability of mechanised farm implements enabled settlers in these countries to put farming on a large-scale basis. Given that the population of these vast plains was small, the surplus produced had to be exported to the populous areas of Europe.

Within Europe the new railway systems enabled a greater specialisation of agriculture to be achieved, although the mixed farming systems remained in place both in France and in Germany as the expansion of both the population and agricultural productivity was too slow for a complete specialisation. On the other hand European regions close to waterways and seaports such as Denmark, the Netherlands and the river valleys of the Loire, the Rhine, and the Tag became specialised in pork, dairy and wine production.

The UK had become the main importing country for agricultural products since the abolition of the Corn Laws in 1846-1849. Its former colonies in the USA and its colonies in Canada, Australia, South Africa, India and New Zealand as well as Argentina (not a formal colony but a major foreign investment destination) took full advantage of this opportunity. The UK, of course, financed the development of agriculture and infrastructure such as railways in those countries. The import of large quantities of cheap overseas produce led to a fall in land rents as well as in food prices within the UK. Thus, wages

[69] Mazoyer and Roudart, op.cit., p. 365.

could be kept low so as to stimulate the export of industrial products not only to the overseas suppliers of farm produce but also to the rest of the world.

Thus, around 1840-1860 an intricate commercial/monetary system came into play. Manufacturers were able to accumulate profits from exporting which were invested around the globe in mining, agriculture and railways. Thus, new export markets and new sources of raw materials and food products were developed. London was the world's financial centre, organised around the maintenance of the gold standard. Agriculture became an indispensable part of this global financial/commercial system.

This was not necessarily to the advantage of the people in the colonies. By being connected to the imperial system, many farmers in India, for example, had to abandon their subsistence farming to produce for the world market. Even during times of major famine the English insisted on the priority of exports, driven by a belief in free markets, and on a minimum of relief and backed up by military power. Utilitarian principles and an acceptance of Malthus's theory that populations grow more rapidly than food supplies, resulting in famines, were invoked to justify such harsh treatment.[70]

In fact, the root of these beliefs can already be found in Thomas Hobbes' philosophy (Ch 4.4.3). By constructing a state of nature, in which there are no laws, and in which nature is seen as sub-rational, some people may become aggressive enough to start a war for glory or power or for resources, especially when they are scarce. When combined with the idea of progress through science and technology, Western colonial powers believed they were fitter than others and, therefore, entitled to the resources of those that appeared less 'rational' than they.[71] Chapters 4 (Controlling Nature), 8 (Technicism) and 12 (International Trade) will further discuss this issue.

In 19th century India millions of farmers had to switch from subsistence farming to export farming or to working in factories. Forests were felled on a large scale. Similar processes took place in China. The English forced China into a trading network with India based on opium and textiles. Traditional social systems to cope with the risk of droughts were destroyed in the process. Future droughts, therefore, led to severe famines and poverty, in contrast to those in previous centuries.[72] Moreover, since fiscal policy at state level was restricted by the automatism of the gold standard, necessary development projects could not take place.[73]

Within Europe, Denmark and the Netherlands became suppliers of the UK market especially in terms of bacon, poultry and later on flowers and horticultural products. Sometimes, supplying countries competed sharply.

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[70] Mike Davis, *Late Victorian Holocausts; El-Nino famines and the making of the Third World*, Verso, London, 2001.

[71] A.P. Martinich, *Hobbes*, Routledge, New York/London, 2005, pp. 63-79.

[72] Davis, op.cit.., p. 288.

[73] ibid., p. 290.

Canada, for instance, became a competitor of New Zealand as an exporter of dairy products to the UK when the USA developed its own dairy industry and stopped importing from Canada.

In addition to the reduction in the costs of transport brought about by railway networks and steamships, the invention of refrigeration around 1875 stimulated exports of hitherto very perishable commodities such as meat and dairy products across the oceans to the British market, especially from British colonies and areas under virtual British control such as Argentina.

With regard to farm technology, an important impetus to an increase in biological productivity was given by Baron Julius von Liebig's (1803-1873) discovery around 1850 of the importance of minerals, especially nitrogen, phosphate and potassium, for sound plant growth. Farm productivity could be stimulated if farmers administered extra chemical fertilisers in the right doses, sequence and at the appropriate time. This was a new idea since up until that time one believed with Aristotle that plants consume organic humus to grow rather than being reliant on inorganic minerals. Unfortunately, von Liebig assumed that plants fixed nitrogen from ammonia in the air. Consequently, the fertiliser he patented did not work very well. Nevertheless, von Liebig believed that he was right, even in the face of evidence that plants obtain nitrogen from the soil in the form of nitrates. For von Liebig a logically and internally consistent theory was more important than facts. Yet, his was a key contribution to the development of modern agriculture. As Tudge put it:

> He more than anyone established the key importance of experimental science, and the model of the modern chemical laboratory. He also focussed on the key issue: the fertilization and the growth of crops.... He emphasised the essential role of soil minerals.[74]

Prior to the application of fertilisers produced in chemical factories, farmers had been importing Peru guano as extra phosphate. The development initiated by von Liebig is a typical instance of the growing importance of the application of the scientific method in agricultural technology. As scientists discovered how plants made use of chemicals in the soil they used this knowledge to design manufacturing plants to make these chemicals industrially. What was overlooked, however, was that the chemicals concerned are not absorbed by plants in a pure form and are not even found in a pure form in the soil. They occur in the soil together with other organisms, such as bacteria. By interfering with these intricate and, certainly at that time, largely unknown, soil structures on the basis of abstract scientific knowledge embodied in technologically designed manufacturing systems, the scene was set for an ever increasing use of chemicals in agriculture, without much concern for any potentially adverse consequences. As the ample use of chemical fertilisers diminished resistance to diseases and insects of soil and plants, pesticides and insecticides had to be applied in ever larger quantities

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[74] C. Tudge, *So Shall We Reap (how everyone who is liable to be born in the next ten thousand years could eat very well indeed; and why, in practice, our immediate descendants are likely to be in serious trouble)* , Allen Lane, Penguin Group, 2003, p. 192.

to enable plants to remain productive. Unforeseen adverse effects on soil- and plant-life required yet other chemicals. Thus, the productivity of agriculture could be raised only by a continuous application of new methods, machinery, processes and chemicals. Apparently, von Liebig regretted his invention towards the end of his life, but his warnings were ignored by the chemical industry.[75] Initially, application of chemical fertilisers remained fairly limited with only an estimated 10%-15% of minerals exported by harvests being accounted for by artificial fertilisers by 1900.[76]

The application of chemical fertilisers and pesticides interacted with the development of mechanical implements. The former required machines for their distribution over the large areas planted by means of farm machinery. The latter became largely useless unless chemical fertilisers and pesticides could be applied. The new railway systems made it possible to transport the products of industry such as farm implements and artificial fertilisers from the industrial areas to the farming regions and to transport farm produce quickly over large distances to destinations in other countries and continents.

Other areas in which technical advances occurred were nutrition and genetics.[77] In 1809 Thaer in Germany developed tables showing the amounts of soluble nutrients in various feeding stuffs as a guide to farmers. In 1860 Henneberg and Stohmann worked out the quantities of proteins, carbohydrates and minerals required to maintain an animal's live-weight. The distinction between maintenance and production rations was then developed, leading to Kellner providing precise feeding standards for each of these conditions, so that farmers could work out the right rations for livestock performing its various functions. The manufacture of oil cakes for supplementary feeding of cows during winter and of containers for the production of silage should also be mentioned.

The new means of transport and communication had important effects on the structure of farming within England and continental countries. Dairy farms in England used to convert their milk into cheese and butter on the farm. With new transport facilities milk could be collected on the farm for processing and sale to towns. Milk production and consumption in England soared. Dairy farmers switched from dual-usage cows (milk and meat) to single-purpose cows (milk fat only). Continental breeds of cows such as Friesians and Jerseys were imported into England.

Science began to play an ever greater role in the development of agriculture. In the middle of the 19th century the first experimental station was set up in Rothamsted by J.B. Lawes. Scientific experiments have been undertaken either to test theories or to find science-based solutions to practical problems.

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[75] Bernard Jensen & Mark Anderson, *Empty Harvest: understanding the link between our food, our immunity, and our planet*, Avery Publishing Grouping, New York, 1990.

[76] Mazoyer and Roudart, op. cit., p. 368.

[77] Robert Trow-Smith, *Life From The Land; the growth of farming in Western Europe*, Longmans, London, 1967 pp. 166-200.

At present experimental institutions tend to co-operate closely with universities.

Particular mention should be made of the Haber Bosch process (developed from 1908 to 1913 in Germany) to fix nitrogen. Currently, the annual turnover of nitrogen in the world's crops is about 175 million tonnes, of which 80 million tonnes is fixed by the Haber Bosch process.[78] This industrial process has enabled a massive increase in soil fertility, albeit not on a long-term sustainable basis, and in this way, a doubling of the world's population in less than eighty years.

2.3 Towards Large-Scale Farming

Mazoyer and Roudart wonder how all those small farms in Europe at the end of the 19th century have been able to transform themselves into the present highly specialised, technically very advanced agriculture? They outline the following milestones:

First, advances in mechanisation have driven specialisation, especially after the Second World War. Tractors have become steadily more powerful, from 10/30 hp in the late 1940s to 120 hp and more in the late 1980s, allowing one person to work 15 ha in 1950, but over 200 ha in 1990. Mechanical implements were first drawn by tractors but have become stand-alone able to carry out multiple functions. Implements have also become much more specialised depending on the type of crops, the terrain and the ability to process a crop harvested through a number of stages. In order for machines to work more smoothly the selection of plants and animals has been done with machines in mind. Straw of grain crops has become shorter for example, and also grain crops are now maturing at the same time rather than with various parts maturing over a series of periods. This makes it easier to have the machines cut and thresh a whole bloc in one go. Cows have been selected so as to produce more milk per animal, to have udders and teats of the right shape and position to fit a modern milking machine and to be docile enough to be milked in a large rotary shed. A milking cow at the start of the century would yield about 2,000 litres per annum, compared with 10,000 litres at present.

Secondly, the rapid development and application of chemistry has enabled the use of a wide variety of chemical fertilisers and chemical pesticides so as to raise yields of plants and animals.

Thirdly, selective breeding techniques have been rigorously applied, not only to raise the productivity of the plants and animals themselves but also to raise the productivity of agricultural implements, fertilisers and chemical pesticides and herbicides. Plants have been systematically selected to be able to absorb a maximum of fertilisers so as to produce the highest possible yield, given prices of fertilisers and crops. Selective breeding techniques have, therefore, been applied to suit the mechanisation of agriculture, without necessarily

[78] Tudge, op.cit., p. 196.

taking into account the well-being of animals or the long-term risks of selective breeding. The recent development of genetic modification has created other major risks and uncertainties (Ch 10.5).

The increase in productivity has been so large that surpluses must be exported. In turn, this has contributed to further specialisation. Agriculture (including horticulture) has been evolving into a world-wide production system. Although selective breeding may have made various cultures less dependent on the particular characteristics of certain regions, regional specialisation has remained dependent on such traits. The continental plains of the Americas and Russia have remained major producers of cereals. Crops such as sugar-beet and potatoes are difficult to transport and, therefore, are processed and grown close to major urban centres. Similarly, farming operations dependent on the input of large volumes of fodder tend to be located close to major ports and close to transport links. Such inputs, however, may originate in far-away countries. Air transport, on the other hand, has made it possible to grow flowers and perishable fruits far away from such urban centres. Specialisation has also affected farm operations as such. More and more processing functions have been transferred to downstream factories. Similarly, upstream factories and specialist service providers have taken over an increasing number of input functions.

The growing dependence of agriculture on science and technology as well as on international trade should be seen in the light of technicism and economism (Ch 10).

2.4 Biological Innovation

The 19th century has been characterised as the age of breeding. Sheep and pig breeds were constantly improved, mostly by trial and error. The Danes, however, set out to breed systematically a pig suitable for the production of bacon for the British market.

Trial and error were much in evidence as farmers both in the New World and Europe had to contend with many attacks of pests and diseases on their crops and livestock. Alan L. Olmstead has noted that 50 million people migrated from Europe to the Americas between 1840 and 1914 and wrestled 40 percent of the earth's useable land from the control of indigenous peoples.

> As the frontiers pushed outward, settlers repeatedly attempted to introduce both Old World and New World crops and animals into a succession of regions about which the newcomers had little practical information. This was intrinsically a biological process as farmers and governments gradually unlocked the mysteries of local soil characteristics (or at least their capabilities), climate, and cultural practices required for agricultural success. The economic transformation of three continents was a huge undertaking that ranks among the great achievements of all time.[79]

[79] Alan L. Olmstead, Biological Innovation and American Agricultural Development, Alan Lloyd Fellowship Lecture, *Australian Agricultural and Resource Economics Society*, Christchurch, 1999, p.3.

Olmstead notes that the development of agriculture in the new lands of the Americas involved a vast and uncontrolled international trade in plants and animals. Thus, pests that were endemic in the USA such as powdery mildew (a fungus that attacks grape vines) and Phylloxera (a louse that sucks the roots of vines) devastated Europe's vineyards. On both sides of the Atlantic efforts were made to control these pests. A French scientist discovered a lime-sulphur compound to prevent powdery mildew and Californians found that Phylloxera could only be combated by tearing up vines and replanting vineyards with European varieties grafted onto American roots. In terms of cotton, Olmstead documents the search for new varieties since the end of the 1700s in order to prevent rot and boll weevil attacks. By 1920 442 varieties of cotton were used in the States compared to only a few varieties in the early 1900s.

Dairying improved as a result of Pasteur's discoveries. In 1892 the first test for TB (developed by Robert Koch) took place in the USA. By 1940 TB was all but eliminated from milk products. In the latter half of the 1800s ensilage was developed with the effect of improving the feeding and production of dairy cattle during winter.

A significant development in selective breeding techniques in the 19th century was the change from natural selection to hybridization. Mendel's discoveries, recovered in the early 1900s, accelerated this process.

After 1940 the introduction of Artificial Insemination, advanced breeding technologies and molecular biology (the structure of DNA was discovered in 1953) has continued to increase agricultural productivity.

Taking the technical developments sketched in the previous section and the stream of biological innovation since 1850 into account in the context of a large world market functioning within the British Empire, the treadmill of farmers trying to maintain their income by increasing productivity, production and scale of operation came into operation. It should be realised that farms work under fixed cost conditions, as they have a fixed area of land to till, with given labour and implements. The more is produced at a given price, the higher income will be. Given a slowly growing demand for food, supplies tend to increase more rapidly than demand, so that prices weaken. In large protected markets such as the European Union, the treadmill operates as well.

2.5 Free Trade

Early in the 19th century a major debate took place in England as to whether the protection against imports of wheat should be maintained or abandoned. Merchants and industrialists were in favour of free trade. They believed that their export position could be enhanced if free imports of wheat could keep its price and, hence, wage rates, low. In the late 1830s Richard Cobden and John Bright founded the Anti-Corn-Law League, which lobbied for the removal of import duties. The opposition came from landlords, as represented by the

Conservatives. In 1846 the Conservative Prime Minister Robert Peel was persuaded to abolish the Corn-Law over a period from 1846-1849. The Irish famine of 1845-1849 had also indicated to Peel that import duties should be abolished, provided it could be cast as part of a general policy to remove all monopolies and restrictions. To deal with this crisis a liberal import of grain was necessary, but would be seen by the opponents of the Corn-laws as proving their point.[80] Gash makes it plausible that Peel supported abolition also on account of his belief in progress through technology. Under competition from the products of the colonies British agriculture should be able to compete, under free trade, on the basis of scientific farming.[81]

Peel put this idea into effect by offering investment grants, for example to his tenants for drainage and other improvements.

At present, it appears that Peel's views have become predominant in the modern global world economy as well as amongst theoretical economists.

Although the period of true free trade in agricultural products came to an end in the Long Depression, free trade has remained an ideal until the present time, underpinned by classical and neo-classical economics. Indeed, in the context of the WTO (Ch 13) attempts are being made to dismantle systems of agricultural protection.

2.6 The Long Depression 1870-1894

As mentioned above the development of large-scale farming in the United States, Canada, India, Russia and Australia in the middle of the 19th century enabled the export of large quantities of cereals to Europe. The American Civil War contributed to such exports as the Northern States lost their markets in the South. The end of the Civil War led to a fall in ocean freight rates and, consequently, lower import prices in Europe. In Europe itself investment in farm implements and the application of industrial fertilisers had raised productivity and production at a rate exceeding population growth, so that prices fell. The costs of shipping American grain to Europe decreased by two thirds between 1870 and 1900. Pollard notes that American exports rose from an annual average of 46 million bushels in 1869-71 to a peak of 166 million bushels in 1878-80, to drop back to 123 million bushels in 1881-6.[82]

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The large imports of grain caused a glut in Europe, which triggered what became known as the Long Depression from 1870 to 1895. Many farmers became insolvent and had to leave farming or sell to others. Governments responded to the crisis by institutional innovation and the implementation of measures to protect their own agricultural industries. Tariffs abolished during the period of free trade, following the abolition of the British Corn Laws were

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[80] Norman Gash, *Peel*, Longman Group, London, 1976, p.267.

[81] ibid, p. 300.

[82] Sydney Pollard, *Peaceful Conquest; the Industrialization of Europe 1760-1970*, Oxford University Press, 1981, p. 265.

re-introduced. Although the systems so put in place were altered from time to time, they have never been abandoned in full. Indeed, since the 1960s the European Union has implemented its CAP with features invented during the Long Depression. The following notes may serve to bring out some features of the various responses.

2.6.1 Denmark

The Danes and later on the Dutch used the cheap supplies of grain to intensify their agriculture and to strengthen their export position for pork, eggs and dairy produce on the UK market, partly because the prices of these products had not declined as much as the price of grain. Their advanced co-operative systems, set up in part in response to the crisis, assisted them in this endeavour. They could do so because agriculture was an important sector in their economy and, therefore, politically important. The Danes were able to take advantage of the system they had been developing since the late 18th century.[83] Farming co-operatives set up export bureaus to facilitate exporting to the industrial urban centres of Germany and Britain. These bureaus had wide powers to regulate markets and prices. They laid down technical specifications and maintained strict quality control. Thus, the Danish farmers benefited from the growing demand for quality food on the part of the British and German labour force. Effectively, Danish farmers started working for export markets, but without, individually, knowing the limits of such markets. For all practical purposes they would consider them to be infinite. If they managed to increase production they would enjoy a higher amount of income as long as Danish supplies were too small to influence the world market price.

The success of the Danish co-operative movement inspired other countries, especially the Netherlands, to introduce similar co-operative structures, also with the view of exporting to the British market. These co-operatives were highly integrated and worked closely with Government departments and institutions to foster productivity and export sales. Individual farmers lost some of their independence in return for incomes higher than they would have received otherwise. The emphasis on exports meant that farmers easily lost touch with the local populations they used to serve in the past.

In general, how a country reacted to the crisis depended on how its process of industrialisation had been interacting with its agriculture. As Pollard puts it:

> As soon as any region began to specialize in industry (even in the proto-industrial phase), it would induce a complementary specialization towards food and perhaps also raw material supply in its hinterland or other supplying area. Industrialization, since it proceeded regionally, led to a widespread intensification of such geographical specialization and the trade generated thereby, in an upward spiral of greater output and cost-reducing efficiency.[84]

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[83] For much of the following outline see: Claude Servolin, *L'Agriculture Moderne*, Éditions du Seuil, Paris, 1989.

[84] Pollard, op.cit., pp. 266/67.

Since in Britain and Belgium agrarian interests were politically weak, cheap supplies of food from abroad were welcomed. On the other hand, Russia and the Balkan countries expanded their food exports and taxed their agriculture in order to promote industrial development.

Although Germany and France had developed both their industry and their agriculture, they had become food importers nonetheless. They were more inclined than others, therefore, to protect both and to develop more towards self-sufficiency than the other countries mentioned. As from the late 1870s they started to protect both their industry and their agriculture by means of tariffs and other import barriers.[85] They were careful to differentiate protection for agriculture between products grown for industrial use as raw materials and products grown for food. They protected the former at a lesser rate than the latter. Industrial interests were keen to remain competitive against the British and sought lower levels of protection for agricultural imports. Germany made a series of bilateral agreements providing concessions to European countries exporting to the German market.

2.6.2 Germany

Germany had large grain growing farms in the East, which for centuries had been exporters of grain to the rest of Germany as well as to other European countries and England. The Prussian Junkers, hit hard by the loss of both export and domestic markets, wanted protection. However, the industrialists in other parts of Germany wanted to maintain low food prices to keep wages low. Due, in part, to the dominating position of Prussia, also in the new Empire, and in part to the formation of a strong pressure group in the *Bund der Landwirte* in 1893, the Junkers obtained high tariffs on imported grain. They proposed a national monopoly in trading cereals with regulated prices and a reserve fund from which deficiency payments or input subsidies could be paid in cases of domestic over-or under-production.[86]

2.6.3 France

The Revolution of 1789 had led to the splitting up of large estates into many smaller farms. In 1882 there were more than 2.5 million farms of one hectare upwards, with another 2 million below one hectare, with the average farm being 8.7 ha. Protection had been introduced between 1810 and 1820. From 1860 to 1885 most tariffs had been abolished. They were re-introduced to cope with the effects of cheap imports.

In the aftermath of the defeat in the Franco-Prussian War (1870-71) and the Commune of 1870 Minister of Agriculture Meline believed that France should aim to mobilise national savings for the export of capital to the rest of the world. France should become a banker to the world and to this end both industry and agriculture should be protected. The traditional propensity of the large agricultural population to save for rainy days and to buy land and property of their own would then be harnessed for the accumulation of funds.

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[85] ibid., pp. 267-270.

[86] Robert Trow-Smith, op.cit., p. 162.

Investment in agriculture would be limited severely not only on the farms but also in supplying and processing sectors. Manpower on the land was numerous and cheap. This policy was supported by large landowners. In the West they partitioned their estates into 'average' farms from which they required a reasonable rent. The rent should be moderate in order to prevent farmers from rebelling. Modernisation was also resisted as it might give farmers a taste of progress and an easier life.

The policy required a strict control over the rural population. In 1884 an act to regulate farmers' unions was enacted. The catholic parts of the country organised farmers according to Thomistic corporative principles of self-government within the context of a broader whole. The key figure in the agricultural system should be the employer, seen as similar to the father in the family and the king in the state. Agricultural banks and union shops in villages were part of the system. On the left of the spectrum, republican minded landlords around Paris similarly organised the farmers in co-operatives, banks and unions. The State supported these edifices, especially the co-operative banks. Meanwhile, the farmers saved assiduously to buy their own farms to such an extent that the demand for farmland pushed up prices. Landlords were happy to sell.

By 1914 France had attained the ideal of self-sufficiency in agriculture. At that time about 40% of the population worked in agriculture. The Great War, however, provided a major shock to the system, as much land was taken out of production and many farmers lost their lives or served in the army. The Government had to sell many of the investments it had so successfully made abroad. Clearly, it also had to reorganise the production and distribution system.

2.7 The Great Depression 1929-1940

The USA saw its agricultural fertility decline soon after a period of major exports late in the 19th century and had to resort, therefore, to the use of fertilisers. Mechanisation caused rural people to move to the cities where they found employment in the new mechanical and chemical industries. Import protection was used during the Civil War, with tariffs of 48%. Tariffs were increased rather than reduced, especially on manufactured products. Germany followed the same policy for its growing industries and purchased meat, wool and grain from British colonies and the USA.

During the First World War belligerent countries availed themselves of import protection and other types of intervention to stimulate agricultural production. Britain, for example, commandeered the export of cheese, butter and meat from its colonies at fixed prices. Within the UK farmers enjoyed guaranteed prices for cereals. Agricultural productivity rose markedly.

As farmers could not reverse these new practices, oversupply resulted as soon as normal supplies from overseas were restored. During the 1920s, the UK and other European countries resumed their previous open-market policies. Such a lowering of import barriers was a major benefit to the British

colonies and the USA. They over-produced, however, so that the prices of grain and other raw materials fell. In the UK unemployment rose sharply in 1927 and 1928, also because of its decision in 1925 to re-introduce the 1914 gold parity for Sterling.

Despite the fall in prices agricultural production was maintained, partly because supplying countries had to repay debts. Australia commenced a policy of developing more grain producing land. In 1927 British bankers refused to refinance Australian loans. In 1929 Germany reduced its imports of wool from down under. US farmers could not get rid of their surplus grain. A financial collapse was inevitable. In 1931 the UK abandoned the gold standard and devalued the Pound. Other countries had no choice but to devalue as well. Thus, competition by price was replaced by competition by devaluation. Import tariffs were imposed. Britain imposed tariffs on imported foodstuffs from 1931 onward, but weakened them by Imperial Preferences for imports from its colonies. As the 1930s wore on import protection appeared to stabilise markets somewhat, so that a slow recovery could begin. The UK saw its unemployment fall very quickly. By 1937-1938, however, new signs of depression emerged.

In 1932 Britain re-introduced guaranteed wheat prices as well as deficiency payments for farmers equal to the difference between guaranteed and market prices. The USA also introduced a system of protection for agriculture, with the Agricultural Adjustment Act of 1933. It aimed at securing an income to farmers comparable to that enjoyed by the rest of the population. To this end target prices were set for various products and farmers would be paid deficiency payments if market prices fell below the target levels. The Federal Government would try to limit deficiency payments by entering the market and buying produce to lift prices. In order to restrain the build-up of stocks, farmers could be asked to set aside land or to limit areas to be planted with certain products.

France had a different policy. It used import quotas because tariffs did not make sense in a time of major instability. Moreover, towards the end of the thirties the Government embarked upon a policy of market organisation. Wine could only be sold if one had a permit. Trade in wheat was nationalised. The implementation of such a policy was facilitated by the Agricultural Chambers set up in 1919 and 1924. All farmers were eligible to take part in the elections for their members. On the one hand, they had to represent farmers' interest to the Government. On the other hand, the Chambers acted as channels for the implementation of Government policy. In addition, professional organisations were founded for about every special product.

Germany applied such organisations much more rigorously under the inspiration of Nazi-ideology (the corporatisation of economic life). In 1933 farmers were compelled to belong to the State Food Corporation. This Corporation organised all marketing and determined most commodity prices

within narrow limits.[87] By 1936 food imports had fallen to half the pre-depression level.

2.8 Post Second World War

Faced with destruction at the end of the Second World War and the memory of the Great Depression of the 1930s major Western powers set out to redesign the political and institutional landscape so as to prevent such disasters. Competitive devaluations and import protection policies should be avoided. The IMF and the World Bank were set up to co-ordinate financial policies. The GATT was set up to reduce import protection in an orderly way. The following sections detail the instruments used to regulate farming.

2.8.1 The United Kingdom

In 1947 the Agriculture Act guaranteed markets and prices for 'such part of the nation's food and other agricultural produce as in the national interest it is desirable to produce in the United Kingdom.' This was to be achieved by an annual Price Review. The Act included a deficiency payments system, similar to the 1932 Act. Under this system food imports could be allowed without restriction. Moreover, shop prices could be maintained at levels deemed to be reasonable. In order to encourage farmers to increase their productivity, the Government made grants available for farm buildings, small farm reorganisation and amalgamation, pensions and quittance, on fertilisers and hill stock, on office records and drainage and many other items.[88]

2.8.2 France

The First Plan (Monnet, 1946) detailed that agriculture should release part of its workforce, produce enough for local consumption, increase its exports, especially to Europe which needed foodstuffs, and lower its costs. Nevertheless, the family farm should remain predominant. Larger estates should mechanise. The policy was so successful that in 1953 a major glut of dairy produce and beef occurred. The Government reacted by establishing a series of new public organisations whose task it was to regulate markets and in particular to achieve a 'just price', low enough for consumers but sufficient to reward farmers for their labour. Every year intervention prices would be set such that the State would purchase stock when market prices were to fall below the intervention level. The State would also assist in the export of surplus intervention stocks. Later on this idea became the basis of the CAP of the European Union. Clearly, this system could only work on the basis of import protection.

The intervention system assumed that over- or under-production would be cyclical. Given regular economic growth demand for food would rise steadily and shift to richer types of animal food. The modernisation of farming would enable an increase in production resulting in lower unit costs. Intervention

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[87] Trow-Smith, ibid., p. 205.

[88] Trow-Smith, ibid., p. 208.

would be required only in case of temporary disturbances in production or demand.

Over time French agricultural exports diversified into two types: first, exports of what are called 'noble' products such as wine and branded cheeses; second, surplus intervention stocks. French intervention policies require a major involvement of agribusiness. They purchase produce from farmers, transform, distribute and export it. They administer the intervention funds and tend to use part of them for the rejuvenation of their own capital equipment. Since private firms sell to the most profitable markets, their private interests tend to clash with those of co-operatives owned by producers, often set up by the State in order to rationalise a production sector in trouble such as the wine industry in 1907 (Phylloxera) and the meat and dairy sectors in the 1950s and 1960s. Usually, such clashes involve the distribution of intervention funds. The State solves such conflicts by the establishment of inter-professional organisations who carry out an arbitration function.

The system has had the effect of reducing the number of smaller and inefficient farmers. The more efficient producers keep marketing their produce when prices are set at a lower level. The resulting over-supply depresses prices, so that another batch of smaller farmers is eliminated. As surviving farmers buy their land the scale of production is enlarged. By controlling, even if indirectly, minimum prices the State exercises a major influence over the state of agriculture. Servolin notes that the State views farmers primarily as workers whose efforts should be properly rewarded rather than as business people.[89]

2.8.3 The Old European System of Farm Support[90]

The Treaty of Rome, which in 1957 became the founding document of the European Economic Community (6 member states) stated (Article 39) the following objectives for an agricultural support policy:

1. To guarantee the security of food supplies.
2. To increase agricultural productivity by the development of technical progress.
3. The stabilisation of markets.
4. To guarantee an equitable standard of living for the agricultural population.

In order to achieve these four objectives, four principles were adopted:

1. Free circulation of agricultural produce within the EEC.
2. An external community import tariff and community preference, meaning that import protection would vary so as to provide sufficient protection for EEC production in the sense that prices of imported products would be slightly higher than those produced domestically.

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[89] Servolin, op.cit., pp. 105-108.

[90] The next two sections are based on: Jean-Paul Charvet, *La France Agricole en État de Choc*, Éditions Liris, Paris, 1994.

3. Guaranteed minimum prices prevailing within the common market, achieved by the EEC purchasing produce at the pre-announced minimum prices, by variable levies on imported products and by export restitutions for sales to third countries.
4. Financial solidarity between member states as carried out by a common financial agency which would receive the import levies as well as a small percentage of the value-added consumption taxes collected.

The CAP came into effect in 1962 and has been an outstanding success, as measured by the yardstick of the first two objectives. Since the 1970s production has exceeded the level of self-sufficiency for most products so that surpluses have had to be exported. In 1989 the Community of 12 members had surpluses varying from nil for potatoes to 36% (that is over the 100% level of community consumption) for grain. Deficits occurred only for a few products such as rice (-25%) and oil-based products (-35%). Since the surpluses had to be sold (by means of subsidies) on already saturated world markets, price wars were inevitable, especially with the other major surplus producer, the United States.

Scientific advisory services and suppliers of farm machinery, medicines, fertilisers, services, education and training found farmers, who were always profitable as a result of these policies, very willing to innovate and invest in new products and systems. Productivity both per hectare and per labourer, therefore, rose significantly. Since the 1960s dairy productivity doubled in France, whilst the productivity of grain production trebled. One man was able to cultivate 130-150 hectares of grain by the early 1990s, similar to the USA.

However, there was also a downside to this achievement, namely:

1. Production in excess of the capacity of both domestic and international markets to absorb it.
2. Too great a concentration of intensive activities, causing pollution of water as well as an over-exploitation of water for irrigation purposes.

By way of example, the EEC imported, net of exports, 9 million tonnes of grain in 1975, whereas in 1989 28 million tonnes net were exported. From an international perspective, the objective of market stabilisation, has certainly not been achieved.

Since about the middle of the 1980s measures have been taken to reduce over-production, especially through the quota system for dairy products (implemented in 1984) , super-levies (dairy), co-responsibility levies, maximum guaranteed quotas for cereals and oil-seeds and set-aside policies. Moreover, intervention prices have been lowered.

Some of these policies, especially the tradeable milk quota system, have created rent values. Farmers who want to expand must purchase extra quota. Their bidding has raised the price both of land and quotas, enabling many older and smaller farmers to cease production or to migrate to Eastern Europe where land is cheaper.

The objective of guaranteeing an equitable standard of living for rural populations has not been attained, inasmuch as the incomes of farmers continue to lag behind those of other professions. Over the period 1975-1990 the prices of agricultural products, measured at the farm gate fell about 30% in real terms or by about 2.5% p.a. on average, despite the support system. The prices of intermediary products (fertilisers, machinery) on the other hand, have risen on average by about 3% p.a. The income of full-time farmers fell by 3% per annum over the same period, but it rose in total by 10%, implying a reduction in the number of farmers. In 1975 14.5 million people worked on a full-time equivalent basis, compared with only 8.4 million in 1990.

The financial system involved in the price support policy has produced some un-even results, with larger farms and specialised regions benefiting more than others, according to Charvet.[91]

2.8.4 The New Policy of the European Union

As from 1992/93 new policies have been put in place to comply with the Uruguay Round and the persistence of surplus stocks. The fall of the Iron-Curtain between the Soviet-Union and the countries under its control and the rest of Europe in 1989 also contributed to a different policy outlook. Germany, in particular had to incorporate former Eastern Germany within its farming system. Should other Central European countries join the European Union, then the costs of the pre-1992 policy were feared to become far too high.

The objectives of the new policy are:

1. To achieve a better control of production through a more extensive system of agriculture which should be more benign to the environment.
2. To maintain a sufficient number of farmers by ensuring a more equitable distribution of community support between regions and farmers.
3. To encourage a multiple use of land, so that farmers are not just producers of food but also custodians of the environment or foresters.
4. To ensure that European agriculture remains competitive on world markets and to develop non-food usage of agricultural production.

In practice the EU has lowered its intervention prices and has compensated farmers by paying a certain amount per hectare. Moreover, the total area allowed to be cultivated has been fixed. Those who want to plant part of their land in trees qualify for a subsidy.

The direct payment per hectare entails a switch from support through prices, paid for by consumers, to State support financed from taxes. The direct payments can vary by region. Regions are defined by individual states. By and large Northern European states define regions broadly, sometimes using the country as a whole as a region (in the case of grains this is done by Luxembourg, Denmark and Ireland). The UK has four regions (Scotland,

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[91] op. cit., pp. 113 and 114.

Northern Ireland, Wales and England) and the Netherlands two. Germany uses the Lander as regions, with the exception of Lower Saxony, which is divided into nine regions. France's regions tend to be the *départements*, but the amount of deficiency payment is calculated for one third on the basis of the national yield and for two thirds on the basis of the regional yield. Since the most efficient farmers obtain the same subsidy per hectare as the less efficient, the policy provides more solidarity between the farmers of a region.

By contrast, Southern states have many regions, divided between irrigated and non-irrigated ones. Thus, Italy has a total of 256 regions and Spain 300. This reduces the levelling effect of the deficiency payments and so might contribute to larger-scale farming.

The system of export subsidies, internal intervention prices and threshold prices at the border remains in place, although the rates will keep falling until world market levels are reached.

The areas of land set aside (grains) can be varied from year to year in the light of changes in world markets. France uses a 6 year rotation, so that a designated area of land must be taken out of production for six years. The European Commission has recommended 20 plants that can be grown on such land. Farmers are allowed, for instance, to grow plants for the production of ethanol and other bio-fuels. Farmers are not allowed to lease the land for other than agricultural activities such as fairs or circuses. An important exception to the policy is that producers of 92 tonnes of grain per annum are exempted from the set-aside rules. This includes many small farmers.

In the dairy industry the EU has also been reducing intervention prices, but on the basis of the 1984 quota system administered by individual countries.

Charvet believes that the new grain policy will result in farmers ceasing to maximise production in large regions. They will rather reduce costs, especially costs of inputs, because in those areas the most efficient farmers get comparatively less direct income payments per hectare. He also notes that the policy imposes a different culture on farmers. Other than their colleagues in the USA they are not used to setting aside land as a tool to control market prices. Nor are they used to cultivating land extensively.

I agree with Charvet that farmers who receive less in compensation per hectare may not reduce production by applying less input, in other words by farming more extensively.[92] Charvet believes that they might apply better quality seeds and would set aside land of lesser quality. Such a reaction is tantamount to farming more intensively. I propose to argue that the critical issue is the relationship between fixed costs and prices. Farmers have a major investment in machinery, buildings and knowledge. The deficiency payments represent a fixed amount of income or a reduction in fixed costs. This lessens their need to increase productivity. On the other hand, the prices they receive for their produce are lower than before. There is at least a

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[92] ibid., p. 146.

possibility that the fall in output price might outweigh the reduction in per unit costs of production due to the direct income payment. In this case farmers will again attempt to increase their productivity and production, for instance, by buying adjacent farms. Even a fall in unit costs exceeding the fall in output prices, for a given level of output, might tempt farmers to increase their profits by increasing productivity.

Clearly, less efficient farmers who receive deficiency payments based on higher performance than theirs, will have an incentive either to have an easier life or to use the opportunity to invest in better machinery and better farm management practices.

The future of the EU's policy will be determined on the basis of the following considerations:

1. To reduce the financial burden of the CAP.
2. A switch from support based upon production to direct income support, provided that the latter is less per farmer than the former. Direct support may be linked to environmental objectives.
3. A gradual reduction in export subsidies as agreed in the current Doha Round of the WTO. However, this may require a quota system of production to prevent over-production.

2.8.5 The United States System

The support system put in place in the 1930s provides two levels of support. The first is the loan rate. This is a base price. At this price farmers can obtain a loan for the grain they have sown but not yet harvested, for a maximum period of nine months. If the farmer believes he can sell his crop at a good price, he will repay the loan plus interest. Should at the end of the nine months, the price be lower than the price at which the loan was granted, then the Commodity Credit Corporation (CCC) will buy the crop. The farmer retains the loan and does not have to pay the interest. When prices on world markets are low, the CCC can accumulate large stocks, which by themselves will have a depressing effect on world prices. The key position of the USA on world markets is such that often the loan rate has served as the world market price. In order to move stocks, the USA has used the Export Enhancement Program under which surplus stocks can be sold on world markets at subsidised prices.

The other support price is the target price, which is set at a level in excess of the loan rate. This price is used to calculate the deficiency payments for farmers who have agreed to set aside part of their land. Deficiency payments are equal to the difference between market price and target price or, if the market price falls below the loan rate, between the loan rate and the target price. During 1991-1995 the target prices were frozen at their 1990 level. With falling world market prices and falling loan rates, the deficiency payments increased rapidly. The size of land on which deficiency payments are calculated varies from crop to crop. The area set aside from production does not count; nor does 15% of the base count. Thus, a farmer with a base area (equal to past five years including set-aside land) of 100 hectares and with a

need to set aside 5% of land would be paid for 100-15-5=80 hectares. The yield used would be based upon a longer-term average, often of six years, but differing from one year to another and from one crop to another. Farmers with superior productivity could have that taken into account at least until 1986 when the yields used were frozen and farmers could not be paid for higher than average productivity.

Until 1996 the USA farm policy was administered on a crop by crop basis. Farmers had base acres for each regulated crop. This changed in 1996. The 1996 Federal Agriculture Improvement and Reform Act (FAIR) freed many producers of 'program-commodities' (maize, grain, sorghum, wheat, barley, oats, cotton and rice) from this system and merged their accounts into a single 'whole farm base' and allowed production of any but a few crops on these lands. Farmers with recorded base acres had the opportunity to sign a seven year contract with the US Department of Agriculture under which payments on the merged base acres will continue on a declining schedule until the year 2002. They could sign up for a schedule of fixed payments. Not surprisingly most of them did. They will be entitled to lump-sum payments (limited to $80,000 per operation) on top of market receipts. The distribution of subsidies has not changed as farmers with large combined acreages will continue to receive the highest support payments. Stuart and Runge have estimated that 90% of receipts and payments will flow to the 100,000-200,000 largest producers of field crops.[93] Moreover, the new system excludes a number of commodities (dairy products, sugar, peanuts and tobacco). The authors just cited argue that in times of high world prices, the lump-sum payments over the next seven years will be seen as unfair. Should world market prices slump, then they believe that farmers will plead for a re-introduction of a safety net of deficiency payments. This is indeed what has been happening in recent years, with a new Farm Bill signed by President Bush in 2002 involving continued subsidies over a ten year period.

2.9 The Green Revolution

During the 1960s research stations in Mexico (wheat, maize) and the Philippines (rice), led by Norman Borlaug, developed semi-dwarf varieties with short stems. In fertilised soil these had a higher yield than traditional long stem varieties. Asian countries with large and rapidly growing populations such as India and Pakistan were enabled to reduce their imports of grain/rice and within a decade became net exporters. A downside of this was that the new varieties required relatively large amounts of fertiliser and water, which were only affordable by rich farmers. Millions of farmers lost their land. The extra fertilisers and pesticides required the construction of chemical plants or had to be imported. Access to irrigation also needed to be established. To obtain economies of scale richer farmers purchased (cheaply) land from poorer farmers who left for the cities.

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[93] Kimberley Stuart and C. Ford Runge, Agricultural Policy Reform in the US, *The Australian Journal of Agricultural and Resource Economics*, Vol. 41, Issue 1, March 1997 pp. 117-136.

2.10 The Third World

Since 1994 agriculture has been part of the international trading regime controlled by the WTO. The WTO's membership consists of rich as well as poor (Third World) countries. In the negotiations for another round of trade liberalisation the Third World countries aided by the so-called Cairns Group countries (major exporters of agricultural products such as Australia, New Zealand and Uruguay) have been pushing for a removal or substantial reduction in subsidised exports and for a removal of import barriers by the EU, the USA and Canada, since cheap exports have had a detrimental effect on their agriculture, whilst lack of market access has prevented them from exporting to the developed countries. As their farmers cannot compete with such cheap imports, they have been forced off their land to seek employment in large urban centres. At the same time the land abandoned by traditional farmers is acquired by large corporations and used to grow export crops.

Small farmers in the Third World growing cotton, cocoa, coffee etc. on small plots using traditional implements and human labour have been hit hard by subsidised exports from the USA as well as by the collapse of the International Coffee Agreement whereby major coffee producing countries were bound by export quotas. The latter was called into existence in order to prevent small farmers becoming communist as a result of low world prices. Coffee is the world's most traded product after oil. 125 million people live on growing coffee in 60 countries. As a result of structural over-production prices have been falling, impoverishing growers. Brazil has worsened the problem by opening large plantations on flat lands, where mechanisation is feasible. Coffee roasters have been able to make major profits in this market. However, faced with deteriorating quality of supplies they have started special programmes in countries like Vietnam to train farmers in growing special varieties according to their specifications. Organisations such as Max Havelaar and Transfair make agreements with growers to grow quality coffee organically for sale at higher prices.[94]

The grievances of the Third World bear a close resemblance to the causes of the peasant risings in Europe during the period 1350-1600 (Ch 1). As feudal lords attempted to increase the profitability of their landed estates by reducing the costs of wages, they incurred the wrath of peasants. Their opulent urban lifestyles added fuel to the flames of discontent. The enclosure movement and the associated attack on the commons had similar social effects. All we need to do is to substitute First World countries and TNCs for the lords and the Third World for the peasants in this story to appreciate the depth of injustice felt by the latter during recent negotiations for a new Agricultural Agreement.

Davis has related how the introduction of modern farming in India during the latter half of the 19th century led to enclosures and, therefore, to a similar attempt to privatise the commons. Traditional village agriculture was destroyed and thousands of peasants were compelled to seek their fortunes

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[94] *Die Zeit*, Hamburg, 14 August 2003.

in the cities. The incorporation of the new agriculture into the networks of the British Empire reduced traditional food security.[95]

After the Second World War countries like India, Indonesia and Nigeria became independent, through often bloody upheavals. Their decolonisation, however, has not restored the old self-reliant subsistence farming communities. Millions of peasants have been losing their land as a result of First World trading practices and modern farming technology. They are now an impoverished pool of cheap labour in large Third World urban centres. Social upheavals are bound to break out sooner or later. Indeed, there are signs that social protest movements against modernisation are gaining momentum. The Zapatistas in Mexico (under sub-commandant Marcos), the re-election of President Hugo-Chavez in Venezuela (land-reform) and the growing number of NGOs, who have been very vocal in protesting against free-trade policies and globalisation, may be mentioned.

2.11 Demand

Although it has been generally true that the demand for food increases but slowly given the limited capacities of people's stomachs, some products may be in greater demand than others. Tudge has outlined how a view prevalent for many years amongst experts on nutrition that humans need to get sufficient protein from the consumption of meat rather than from vegetables and cereals has pushed up the demand for and supply of meat. This has stimulated the development of intensive livestock farming (poultry, pigs, beef feedlots) which tends to have a detrimental effect on soil structures as well as causing pollution through surplus manures. The knowledge that protein is obtained also from foods such as grains and pulses has not yet changed the excessive consumption of meat.[96]

A growing demand for meat helps to offset the inelasticity of the demand for food. Tudge notes that the more meat is demanded, the more cereals need to be produced to feed the growing number of animals.[97]

2.12 The Story of Maize[98]

The story of maize illustrates just about all problems of modern agriculture. Of the three principal crops grown in the world, maize, wheat and rice, maize has been expanding the fastest from a total of 220 million tonnes in 1960 to 636 million tonnes in 2003. In the 1920s American breeders discovered how hybrids could increase yields. By keeping two pure-bred and uniform varieties (resulting from a process of self-pollination) and crossing these, the hybrid offspring would be more productive. In the 1950s double-crossing was

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[95] M. Davis, op.cit., pp. 289ff. and 326ff.

[96] Tudge, op.cit., p. 135ff.

[97] ibid., p. 144.

[98] This section owes much to Christiane Grefe, Mais fur die Welt, *Die Zeit* , no. 35, Hamburg, 19 August 2004, Dossier.

developed, resulting in offspring off parents that are themselves hybrids (F1 hybrids). The new generation is very uniform. However, the generation bred from this hybrid stock loses the vigour of the first. This allows the seed companies to sell again a set of patented hybrids. In contrast, traditional maize farmers would select the best plants from every harvest and mix the seeds of these with those of other growers. The modern methods have concentrated on varieties of plants that grow closely to each other and have high yields. The latter have been doubled during the past 40 years and quadrupled in Europe.

Henry A. Wallace, founder of Pioneer Hi-Bred (taken over by Du Pont at the end of the 1990s), was the first to sell hybrids on a large scale during the 1930s.

At present US farmers of maize receive a subsidy for any surpluses, but have to accept the market price. To get by on the basis of high-tech machinery, they rent as much land as possible, thereby driving up the price. So as to maximise the production of maize, cattle is not run on farmland, but kept in feedlots. The feed consists of a mixture of maize and soya. Thus, two thirds of the US production of 257 million tonnes of maize is used as animal feed. The rest is used for human consumption as meat, eggs and milk. This is not a very efficient process since 10 grain calories are needed to produce one meat calorie. About 20 percent of the annual maize harvest of the US is exported at prices that may be from 13%-30% below the cost of production as a result of export subsidies. Such exports are much sought after in countries such as China where new rich middle classes prefer Western diets. In the States the large doses of nitrogen and phosphate applied cause run-off of phosphate and nitrates into streams, lakes and sea, where they contribute to dangerous algae blooms. To minimise this problem, farmers use machines governed by Ground Positioning Satellites for precision spreading of fertiliser.

Genetic engineering is another way of minimising environmental problems. In 2004 about 40 percent of maize grown in the US consists of GMOs that should deal with insects, viruses and weeds that have adapted to maize as a mono-culture. One introduced gene has the same effect as Round-Up pesticide (Round-Up Ready Plants). Farmers need to apply it only once. Biologists, however, worry about the effect on the soil when no other plants can grow beside maize. Soya has already developed resistance to Round Up and this could also happen to maize. The use of chemical pesticides has been rising again in recent years. Some farmers grow maize for pharmaceutical concerns that produce a substance against cystic fibrosis. The danger is real that such GMOs might cross-pollinate with other plants grown subsequently on the same fields.

Under NAFTA (North America Free Trade Agreement) the US insists on exporting maize to Mexico, where it is not suitable for traditional Mexican food such as tortillas. Instead it is used as feed in intensive livestock farms. Since no import tariffs are imposed, the price of all maize grown in Mexico has plummeted, causing thousands of small farmers to cease production and to cross illegitimately the US border in pursuit of jobs. Many landraces on

abandoned firms may be lost. Genetically modified maize has entered Mexico, despite a strict prohibition, probably via farmers buying maize from a store and using it as seed rather than food, following their age-old tradition. The effects of mixing genetically modified genes with normal ones in maize are unknown at this stage. A study on this vital matter by the environmental bureau of NAFTA was not allowed to be published by the USA.

Maize has become a key feed for the dairy industry around the world. It is used as an ingredient for ensilage. In some cases, such silage is fed throughout the year, so that the need to have the cows grazing outside is greatly diminished. In this way, productivity is increased. A Bavarian farmer reports that he had been able to increase his milk production from 4,000 litres per cow per year to 8,000 litres as a result. As happened during the 19th century, pests moved along with the migration of people from one country to another. One suspects that troops carried the feared corn-borer into Serbia during the 1990s. Since then it has caused major damage to harvests in Croatia, Hungary and Austria.

An excess of milk produced, resulting from the strong rises in productivity, must be sold in world markets, often at subsidised prices. Anticipating the end of subsidies the aforementioned farmer has been trying to enlarge his farm, at high costs, in order to be able to get by on lower prices in due course. At the same time, countries with large areas of fertile flat land such as the Ukraine, Brazil, India and South Africa, have been planting and exporting maize. In each case small farmers are forced to sell out and to find work in large cities at low wages. Under free trade conditions, therefore, over-production would not necessarily cease. It might rather be stimulated.

The introduction of maize in many areas of the world where it has never grown before has caused many problems. In Africa, where drought is not unusual, the plants may not develop well and poor farmers may not be able to afford the necessary fertiliser and sprays. As a result, the land loses its fertility and yields decline sharply. In 2002 during a period of drought the governments of Zambia, Zimbabwe and Mozambique refused to accept the genetically modified maize from the USA offered them as aid by the United Nations. They feared that they might lose export markets to those countries prohibiting the use of GMOs as well as being afraid of the consequences if GMOs crossed with domestic varieties.

2.13 Alternatives to Industrial Agriculture

During the past 30 years or so the growth of vegetarianism coupled with the advent of New Age and the outbreak of epidemics such as BSE, Foot-and Mouth-Disease, SARS and other viruses affecting poultry and swine-fever, not to mention scandals such as the Dioxin in animal feed in Belgium, and the growing incidence of obesity and Type 2 diabetes has raised interest in alternatives to modern industrialised farming. Aversion to such practices would have been intensified in some of these cases by their objective of capturing markets. Cows and sheep, for example, may not be vaccinated

against Foot-and Mouth-Disease because overseas customers' resistance (Ch 14).

These trends in society have contributed to the growth of biological farming in various forms, bio-dynamic farming (applying ideas of theosophist Rudolph Steiner) as well as to the movement that peoples should be able to feed themselves. The latter includes a group such as the French Confédération Paysanne (Ch 10.9). In most countries the general public is opposed to the use of GMOs in food production.

Biological farming, involving soils, microbes, plants and animals, has been gaining momentum also as the environmental problems associated with the use of chemical fertilisers and sprays, antibiotics and growth hormones, have become apparent, including pollution of water and air, deterioration of soil structures with a consequent loss of topsoil, decrease in animal welfare, dangers of mono-cultures, loss of biodiversity and effects on human health. In many countries certification schemes for 'organic' farming, with varying degrees of rigour, have been established, so that farmers are able to move towards acceptable standards of biological farming, which often involves the development of new techniques of pest control, quality control, fertilisation and treatment of animals. Often farmers are attracted to 'organic' options because of the higher price they can earn, although such a premium should compensate them for the extra costs incurred.

Whatever the motivation of biological farmers may be, the growth of biological farming should be welcomed as a move away from the prevailing technicism in agriculture (Ch 10). Although the present forms of such farming are often still mixed with elements of industrial farming, the wider biological farming is applied, the more comprehensive it is likely to become. Good results from biological farming as well as the impact of disasters and likely sharp increases in the prices of chemicals derived from oil and natural gas as the world approaches the times of 'peak oil' and 'peak gas' will continue to provide incentives for biological alternatives.

2.14 Conclusion

Since 1850 agriculture has developed towards highly industrialised large-scale farms supported by science and scientific technology and industry, with markets of supplies and end-products often far away from the producing farms. This has been at the expense of traditional agriculture run by means of family farms producing for towns and people in their own environment. Small farmers have been displaced and forced to migrate to cities. Farming rhizoids have become world-wide and open, subject to sharp competition.

Policies designed to protect farmers to ensure adequate food supplies have had the effect of increasing the profitability and productivity of large-scale farming in developed countries, resulting in subsidised exports with detrimental effects on traditional Third World peasant farming and also in severe environmental degradation. Both in the First World and in many Third World countries long established world and life views have continued to

influence agriculture, albeit in a losing battle with the scientific world view. This will be the subject of the next chapter.

CHAPTER THREE: CULTURAL PERSPECTIVES ON AGRICULTURE

3.1 Introduction

The literature on the history of agriculture describes how the state of agriculture has influenced political, economic and social life in various cultures. Thus, the peculiar nature of water control in the Nile river system is said to have led to a central even totalitarian state, in which the class of priests and the class of state officials, in particular the military, were used to keep the peasants in servitude.

The previous two chapters have shown how changes in society and in agriculture have been intertwined since the year 1000 to the present.

This chapter seeks to turn the question around to ask how agriculture has been considered in various cultures? To start this enquiry it might help to take the word agriculture literally, as a composition of two Latin words: *ager*, a plot of cultivated land and *culture*, the way of life of a group of people, often seen as concentrated in its cult, or worship life.

3.2 Four Types of Cultures

Schoon and Jochemsen have identified four main types of culture:

1. Culture of response. Cultural activities are shaped in response to God's calling. Created reality is perceived on the basis of the relationship between God and his people. The Mosaic law is an example of such a culture with specific institutions such as the sabbath year and the year of jubilee.
2. Mythical or culture of participation. Nature is appreciated as a divine institution. People worship divine powers of nature and aim to participate in them. One tries to be in tune or harmony with such powers. The Deep-Ecology movement and other New Age groups are modern representatives of such a culture of participation.
3. Culture of magic in which people do not merely subject themselves to nature, but also try to safeguard life by means of magic rituals.
4. Objectivising or technical culture. The existence of divine powers is denied. Nature is seen as a neutral mass of objects and to be used to advance life. Technology is used to master this world for purposes of human life. Despite this emphasis on 'facts', technology and markets are often deified in such a culture.[99]

This outline is based upon F. de Graaff's work.[100] De Graaff's analysis begins with the distinction between humans and animals. Animals are guided by

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[99] B. Schoon en H. Jochemsen, *Een ingrijpend Gebeuren; Het religieus-culturele karakter van techniek door de geschiedenis heen*, Instituut voor Cultuurethiek, Amersfoort, 1997, pp.5-7.

[100] F. de Graaff, *Als Goden Sterven; de crisis van de Westerse cultuur*, Lemniscaat, Rotterdam, 1969/1970, pp. 26-40.

instincts. By contrast, human's instincts are very rudimentary. Primitive people believe that animals are guided entirely by numinous powers and that, therefore, they are of a higher order than people, being close to the numinous. Yet, instincts can fail animals in situations for which they are not equipped. Because our human instincts are so weak, albeit by no means absent (we sleep), we have to rely on a larger brain. De Graaff hypothesises that instincts cease to be effective where humans experience an ur-distance between themselves and everything else. Whereas animals participate in existence, people are thrown back on themselves and are put in a position where they are confronted with the rest of what is.

The ur-distance should be seen as positive. In Israel's religion this signifies the distance between the Creator and humans, but in which, nevertheless, God speaks to humans and thus founds a relationship or covenant. Man, male and female, is created in the image of God, which means that he/she is put into a relationship. The Word mediates this relationship. It establishes a dialogue, which extends indirectly to all that has been created. In every encounter with God or with fellow creatures, God speaks and expects a response from humankind. We can hide from this Voice and will then experience guilt and anxiety, but where the dialogue is restored, 'angst' and guilt vanish. Since animals are guided by instincts they are not spoken to and are not answerable. They cannot resist, knowing neither the freedom of listening nor of refusing to listen.

De Graaff identifies three basic structures of culture, which may occur intermingled in various cultures:

1. Response, awareness of heart.
2. Participation, awareness of soul.
3. Manipulation, consciousness of brain.

Response. We hear the voice of the Creator where we are aware of the meaning or destiny, which God has put as divine possibility in every creature. Response or culture then unfolds where people realise this divine destiny. Thus, the creation becomes the kingdom of God. There is a second dialogue here as people address the creature by a name that calls forth its meaning or destiny. Genesis sketches this in Adam's giving names to the animals. Whenever we help to realise the true potential of a creature we speak to it. Thus, culture is a life of conversation or dialogue from heart to heart (God to man, male and female, and people to fellow creatures). Only love can work between hearts.

Participation or Sacral Culture. The crux of these systems is an attempt to become one again with the divine powers which guide animals through instincts and thus to remove the ur-distance. Cultic ritual must be performed to accomplish this, not once but repeatedly because the ur-distance is experienced time and again. Ecstasy is part of such cultic performance. The word means literally standing outside oneself. In this state humans unite with a numinous power, but never with the God who created heaven and earth. With Him only dialogue is possible. Nor can it be the power that guides

instinctive life, for if we became fully one with that power we would cease to be people (acting in history) and would become part of the animal kingdom. So what is the sacral relationship? It is characterised by a static symbol rather than the dynamic symbol of the word in dialogue. In a sacral culture there is not the trust of knowing that the Other One will answer if an answer is not immediately forthcoming. Whenever there has been an experience of a graceful encounter, one wants to be able to repeat it whenever required. Hence, the establishment of holy places and objects. The relationship can be fixed by means of an image of wood, stone or metal. The image should bridge the ur-distance at all times. Fixed cultic rites, sacrifices and dances may also have this function. The powers involved take possession of the cultic worshippers. They do not personally communicate to them. Ecstasy takes place through the soul, not the heart. So, people become possessed. The cult intends also to connect the rest of the world to the powers. The ploughing iron is seen as a symbol of the divine phallus. It turns the soil into a womb. A house connects heaven and earth. It is seen as a temple in many cultures.

In the Near East, the Baal culture, a fertility cult, was such a sacral cult. The ritual to be assured of a good harvest was to engage in temple prostitution to ensure that the divine powers of Baal and Astarte would thereby be encouraged to engage in sexual intercourse, so that the spring rains would fall.

Culture as Technique. The last paragraph indicated already a shift from a sacral to a manipulative or technical culture in which one uses ritual to manipulate the divine powers. The image becomes distorted to a human figure, as a human projection onto gods. Magic is, therefore, the forerunner of technology. The projection is not a reflection of the deepest possibility of created reality, but rather a means to control the world. Human subjectivity becomes ever more detached from divine guidance and thus hovers over nothing. Without exception history shows that every culture perishes if it changes the cult into a technology.

The four types distinguished by Schoon and Jochemsen do not appear one after another in history. All four types may be represented in modern cultures. In the so-called developing countries one might find sacral cultures as dominating types and the technical objectivising culture as a minority type in their modern sectors. Deep ecology or New Age movements in Western countries are examples of revived sacral cultures. In some forms of bio-dynamic farming touches of magic may be found.

Mazoyer and Roudart's history of agriculture, from the Neolithic agricultural revolution to the present is entirely written as an objective account of agricultural systems. They describe agriculture as follows:

> To increase the ecological power of the exploited species in order to increase eventually that of the exploiting species, such is at bottom the logic of the particular relationship between species that make up agriculture and animal rearing. The cultivation or breeding of a species, far from being an end in itself, is on the contrary but the prolonging and reinforcement of that exploitation by other means. Agriculture and animal rearing, therefore, are

> elaborate forms of mutualism, although an asymmetric mutualism in which the exploiting species needs to develop the exploited species, but in which it is also dependent on the exploited species for its own development.[101]

The truth of this statement and the problems it entails will be elaborated upon in Chapter 10 with reference to Dooyeweerd's theory of enkapsis.

Mazoyer and Roudart then develop the idea that farming in a particular setting should be seen as a complex interaction between two main systems. First, it is an organisation and functioning of a cultivated eco-system. Second, it entails the organisation and functioning of a technical, social and economic system. The aim is to exploit the fertility of the cultivated ecosystem in order to satisfy directly (self-consumption) or indirectly (through exchange) a community's needs. This particular approach is very worthwhile. It is also characteristic of Slicher van Bath's approach. However, it uses concepts and ideas derived from cybernetics and information technology typical for the objectivising culture of the West. It is true that in this way the past can be usefully examined, but such an examination takes the present as its criterion. It is not able to tell us whether people in past periods experienced or perceived success or failure in the same way.

3.3 Greek Mythology

A. P. Bos has based his view on the ground motive of Greek culture, meaning that which drives all its manifestations, on the old myth of a change of gods, as told by Hesiod (between 750 and 650 BC) in the poem *Theogonia*.[102] Ouranos had married Gaia (Mother Earth). They had 12 children. Ouranos had the temerity of keeping Gaia's children locked up in the earth, within Gaia. Gaia asked the youngest, Chronos, to end this predicament. Chronos then took a scythe and cut off Ouranos' genitalia and cast these into the sea. This gave birth to Aphrodite and wherever drops of blood fell, new life emerged. Ouranos called his ungrateful children Titans, a name which referred to their guilt and to the punishment that would be meted out to them. Chronos married Rhea but feared that Ouranos might take revenge on him. To prevent this he swallowed Rhea's first five children. Rhea, then, tricked him by giving him a stone wrapped in cloth as a substitute for baby Zeus, who was born on Crete. Zeus forced Chronos to spew out the other five children as well as the stone. Grateful for their deliverance the five brothers and sisters granted Zeus power over thunder and lightning. Zeus set up the stone in Delphi. A battle began between Chronos and the Titans on one side and Zeus on the other. Zeus won and locked up Chronos and the other Titans in the underworld.

In his poem *Works and Days* Hesiod gives an account not only of farming but also of the previous golden age when Chronos was in charge. In those days people lived like gods, free from hard work and exertion. It was a time of abundance. Since these people died, they have watched as good demons

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[101] Mazoyer and Roudart, op. cit., p. 27.

[102] A.P. Bos, *In de Greep van de Titanen; Inleiding tot een Hoofdstroming van de Griekse Filosofie*, Buijten en Schipperheijn, Amsterdam, 1991.

over the fate of the present generation by keeping evil powers at bay. However, this generation has to work hard for little reward on an unforgiving soil.

By drawing a parallel with Ugaritic myths about the change of seasons, Bos argues that the myth told by Hesiod should be interpreted as referring to the change of seasons. When spring arrives Zeus is in charge. Work on the land is hard and must be done with a clear mind. The name Zeus refers to the clear skies. The stone given to Zeus stands in Bos' interpretation for the stones used to mark the boundaries of a plot of land. The stone symbolises that Zeus draws a line between his reign and that of Chronos, who was associated with the rains and the germination of seeds during winter. On his arrival in autumn one would have a time of song, dancing and drinking. The stone in Delphi was called *omphalos*, or *navel*, an indication that it stood for the emergence of dry cultivable land from the birth waters of the rainy season. Bos concludes that, if he is correct, Hesiod did not draw a distinction between gods that stand for the worship of the powers of nature and those that guide human culture. One can only infer that the period of hard work under the regime of Zeus is valued less than the period of song and dance under Chronos.

Indeed, the Greeks and Romans believed that manual work was good for slaves and that intellectual and artistic pursuits were of a higher order.

Another aspect highlighted by Bos is that Hesiod portrays the imprisonment of Chronos and the other Titans as a final event, whilst Chronos' reign on earth is painted as a past golden age. The Titans had to suffer for their misdeeds. Thus, justice prevailed in the world of the gods. Since Hesiod describes his legal dispute with his brother Perses, he suggests that when people observe what is right, they might look forward to a return of a golden age.

Bos extends his interpretation of Hesiod's poem by suggesting that it alludes to a meaning perspective dominating Greek culture; a set of foundational beliefs or convictions and associated value judgements, which guide a whole culture and bind it together. As it constitutes human experience it can only be stated in terms of myths and metaphors. As an all-embracing framework of human experience it transcends human daily experience and, therefore, expresses faith.[103] Specifically, the Titanic meaning perspective entails the view that human beings are divine beings deprived of their divine nature because of the evil they have done and for which they are locked up in a type of underworld. Yet, restoration is possible. A new golden age may arrive, We might think of the ideology of progress, leading to a better future.

In order to give a taste of Bos' use of this meaning-perspective as governing Greek thinking, it may suffice to refer to his interpretation of Parmenides' poem. Human mortals are living in the darkness of ignorance and doubt, in a dark underworld. However, they are able to escape from this state of ignorance by journeying to the light of rational insight and knowledge. It is

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[103] Bos, op. cit., p. 24.

their own fault if they do not make use of this escape route. As the poem proceeds it becomes clear that the denizens of the underworld have committed the sin of believing that there are two types of Being: Light and Night. Each is presumed to be identical to itself and not identical to the other. This implies that the other is called forth from nothing. What is cannot be at the same time identical and not-identical. Hence, mortals have called forth a plurality of phenomena, by means of a logical error. We need to regain a higher divine type of knowledge than the everyday knowledge of many different and changeable phenomena. In other words, true being is one and indivisible. In contrast, the everyday world is changeable and fragmented. It cannot be truly part of Being. Only abstract theoretical thinking can help us escape from the dreadful condition of sticking to what we see and so enable us to regain access to the unity of being or to Being itself, and hence to rock-bottom knowledge. We need to escape from the fragmental and deceptive appearances of everyday life. We should not trust our senses or our daily experiences.[104]

Whether or not Bos's interpretation is the correct one, any interpretation of Greek philosophy will note its remarkable emphasis on strict logical and abstract theoretical thinking as one of its cultural heritages. It has stamped Western thinking to a major degree. Its contempt for the daily labour of artisans and farmers is reflected in present preferences for mechanisation and automation, also in agriculture. Our age too loves to have a good time of song and dancing (the entertainment industry). This Greek cultural perspective is still a driving force in the technical/objectivising culture of the 21st century.

3.4 The Roman Empire

For many centuries Rome was a society of agricultural tribes consisting of patricians and plebeians. The former owned land, whilst the latter had to work it. The conquest of the whole of Italy enabled the distribution of land also to the poor. After the Punic Wars (146 BC) when Rome became a colonial power it had to import food as its native agriculture began to decline. The moral decay and great wealth of a world power coupled with declining food production led to chaos. Tiberius Bracchus attempted to reform agriculture but failed. Eventually, the wide-flung state and its colonies became an empire under Julius Caesar and Augustus (63 BC-14 AD). Under the latter Rome enjoyed 50 years of peace, a golden age. During his reign the poet Virgil (70BC-19 BC) depicted the wonders of agriculture in his poem the *Georgica*, for many years read as a textbook on farming as well as an ode to Augustus. Indeed, once Augustus had restored some order to the Empire, his task was to revive agriculture. He found an enthusiastic and capable ally in Virgil, who was also the owner of a landed estate. Thousands of returned soldiers who had been rewarded with a plot of land could learn from the *Georgica* the art of cultivating land and livestock. In passing we may note a strong Stoic flavour in Virgil's poem, inasmuch as he wanted farmers to follow the laws of nature (Book One) in a rational manner.

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[104] Bos, op. cit., pp. 42-53.

Despite frequent wars and internal disturbances after the death of Augustus, the wealth of prominent Romans continued to increase. It had to come chiefly from the land. Nobles purchased land wherever they could. By 400 AD the main crop in Italy was wheat. Olives and wine were grown in parts of Italy, Southern Gaul, Greece and Spain. Egypt and Africa supplied cereals. Stock farming, however, was minimal. The lack of manure as fertiliser compelled farmers to plough very frequently. In times of war and drought famine could easily occur. Intensive farming activity required a great deal of manpower, which was often lacking as the supply of slaves became inadequate during the empire's decline. The major landlords then let the most infertile parts of their estates to coloni, on the basis of Egyptian examples. The relationship between lord and tenant was governed by a contract, under which the tenant had to supply labour at seedtime and harvest and to surrender part of the harvest. The major wars of the 3rd century forced the emperors to ease the burden of taxation. Landlords responded by reducing their tenants to the status of slaves. The larger lords attempted to withdraw their estates (latifundia) from the fiscal administration of cities and to become independent territorial units. Productivity on the estates, however, declined and unrest began to increase.[105]

The rise of Christianity during the Empire had led to a different perspective on the worth of agriculture. St. Augustine (354-430) wrote *De Opera Monachorum* in which he defended the importance of agriculture, especially against the monks, from the perspective of a culture of response to the Creator. He departed in this way from the Greek philosophers who despised manual work and farming.

The German tribes living across the North boundary of the Roman Empire were agrarian. Every tribe owned, communally, a plot of land and was governed by a king. As these tribes became involved in war the king was chosen from ancient families seen as related to the gods. They were kings by the grace of god. Under German custom the king was also owner of the temple on his territory. When they adopted Christianity they insisted on appointing the bishops over their territories.

3.5 The Middle Ages

The first dynasty of kings of Gaul, the Merovingians (400-650) extended this principle by granting important landed estates to the bishops in their territory. In the Middle Ages this construction was theologically underpinned by the idea that the exalted Christ is both King and Priest. The Pope would then represent Him on earth as priest and the king as king. The idea of the corpus Christianum was born. This entailed that Pope and King should work closely together. The Pope would appoint bishops, but the king would grant them land as independent sources of income.[106]

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[105] Joseph Vogt, *The Decline of Rome*, Weidenfeld, London, 1993, pp. 21ff.

[106] D.H. Th. Vollenhoven, *Het Calvinisme en de Reformatie van de Wijsbegeerte*, H.J. Paris, Amsterdam, 1933, pp. 164ff, with a critique of this construction.

As from the 10th century those who believed that the church should be free from domination by the state, the reform movement of Cluny, for instance, began to dispute the validity of this construction. This questioning encouraged also the emergence of a new power, chiefly economic, based mainly in the increasingly prosperous cities. Vollenhoven noted that such freedom for economic life was right in principle, since economic life should be acknowledged as being non-church life. However, since one identified church life and Christian life, matters economic were seen as divorced from the Word of God.[107] In practice this meant that economic life became subservient to the Mammon or the power of money.

In an economic sense, this freedom heralded the advent of the Renaissance in the 14th century. The desire for money spread from private life (the merchants) also to the leaders of States. In North Italian cities leaders operated according to principles of the later Stoa that above the realm of what can be calculated there is an area governed by Fortune, with an unpredictable future such that it stimulated their 'virtue' to hazard ever more daring enterprises.[108]

The Scholastic theology and philosophy of St. Thomas of Aquinas in the 13th century assigned the life of economics, including arts, crafts and agriculture, to the realm of nature and so sanctioned the freedom it had already acquired. If we connect this with the still hierarchical construction of Middle Aged Society and the 'thirst for money' on the part of feudal lords, including bishops and monasteries, then, the oppression of peasants in the 14th and subsequent centuries should not come as a surprise (Ch 1.3.2.2). The revival of business fortunes during the15th century fuelled rather than diminished unrest amongst peasants.

The religious struggles of the time fermented the unrest. In England, the Franciscan John Wyclif (died 1384) went back to St. Augustine's view of three church types (the church as the people; the church as the assembly of God's elect and the church as institution), but only by adopting the view that the church consists of the elect. In 1381 the peasants revolting under Wat Tyler had learnt from Wyclif that the state had to serve the church, but since he considered the church to be the congregation of the elect, those who were not part of the elect had an uncertain state also in the state. Hence, they felt justified in taking the worldly possessions of the rich as they undoubtedly were the non-elect.[109]

In a more strictly economic sense, the dissatisfaction of peasants with their lot appears to have been stimulated by the practice of merchants to purchase the produce, which peasants brought to town, at the city gate, so that they could sell it inside the towns at much higher prices.

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[107] ibid., p. 191.

[108] ibid., p. 202.

[109] Vollenhoven, op. cit., p. 228.

On the whole during the Middle Ages the Christian culture of response began to be married in various ways with the beginning of a technical/objectivising culture.

3.6 The Reformation

The Reformation of the 16th century led by Martin Luther (1483-1546), John Calvin (1509-1564) and Ulrich Zwingli (1484-1531), occurred during a socially and religiously very troubled period. From about 1450 peasants in German lands had been pleading their case for the abolition of serfdom and relief from the burden of taxes, especially the tithe payable to the church. They wanted 'divine justice'. When Luther started a movement for renewal of the church based upon the Scriptures, the peasants renewed their demands under the single heading of the universal law of divine justice. The Word of God seemed to require church and priests, bishops and monasteries to be poor rather than rich owners of landed estates. Should the Word of God not be obeyed? In 1513-17 there were revolts in Germany under the symbol of the shoe, a contrast to the riding booths of the feudal lords.[110] The movement was inspired by a wide variety of spiritual sources. The Anabaptist movement preached, for example a type of realised eschatology, which means that the kingdom of God had already come in its fullness, so that all impediments such as social and ecclesiastical hierarchies and institutions such as private property should be abolished forthwith. They were prepared to take up arms to bring this ideal state about. In 1525 throughout Germany a revolutionary mood took hold. In 1525 the peasants formulated their demands in 12 articles. They wanted the right to choose their own pastors, abolition of the tithe and slavery, free hunting, free use of the forests and freedom from villeinage. They supported these claims by quotes from the Bible.

Luther strongly resisted this revolutionary ferment on the part of the peasants, although he acknowledged that their social grievances were justified. He exhorted the princes of Germany to do justice to the rightful demands of the peasants. Accusing them of tyranny he warned them that the rebellion was a sign of God's wrath on them. He urged the peasants to refrain from violence and to avoid the shedding of blood. In order to deal with the grievances in a peaceful manner he suggested that a commission of wise men be convened to arbitrate the issues raised.

Bornkamm's note on Luther's state of mind early in 1525 appears to the point.

> Luther held the rural estate in high regard, especially in contrast to the uncanny money-mad business of the cities. Peasants, after all, represented the earliest form of work instituted by God himself at the dawn of human history. And when Luther liked to recognize peasants and shepherds, instead of clergy and scholars, as the type to whom God had entrusted his revelation, he praised them not really because of their piety but because of God's mercy,

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[110] For this section see Heinrich Bornkamm, *Luther in Mid-Career 1521-1530,* trans. E. Th. Bachmann, Darton Longman & Todd, London, 1983 (original 1979), pp. 355-399.

> which favors the poor, the wretched, and those tested by suffering. To him the unrest of the peasants was no novelty, but for a long time he let it lie on the edge of his horizon. When, for example, he addressed the Christian nobility (1520), his proposals for reform did not even mention the peasants. He put in a good word for the virtues of farming, yet this was only to underscore the pitfalls of business and usury.[111]

Bornkamm notes that Luther, albeit right in judging the consequences of the rebellion, missed a chance. There was no political power that could have subdued the mighty current of the peasants' revolt. The structures of the Roman Empire, to which German Lands were still subject, had become too weak to have a unifying and reforming influence.

> Medieval political structures provided only the framework of territorial states. Yet the peasants' plans for reform were far-sighted, over-arched by the idea of a strong emperor. Not since the days of Charlemagne had there been anything like it. Now reform should be founded on the gospel as the source of law and social righteousness, on equality in society, on a direct economy of production not dependent on trade, and on the requisitioning of church properties for the common good. The features of this model drew inspiration from a romantically transfigured past. Yet, in sharp contrast the territorial rulers were even then introducing the beginnings of the modern administrative or bureaucratic state.[112]

In other words the revolt provided a stepping stone towards the modern nation state. In England, of course, something like this happened when in 1536 the monasteries were dissolved. Anyhow, the resistance to trade must be seen in the light of the growing power of merchants in the 16th century. It was the time of the Fuggers. Large trading networks were built to connect the various parts of Europe with ports that acted as centres for the exploitation of overseas colonies. Trading enterprises, such as those under control of the Fuggers, integrated trade, manufacture and mining on the basis of their financial power. Prices rose very rapidly under the impetus of major influxes of gold and silver from South America and from the rich silver mines exploited by the Fuggers in South Germany. Until 1545 Germany's production of silver exceeded the combined production of the rest of the world.[113] The inexorable rise of prices was one of the causes of social unrest in the 16th century. People trained in scholastic and canonical law, including most of the reformers, were naturally suspicious of merchants, trade, lending at interest and monopolies. They had learnt that money does not give birth to money (Aristotle, Ch 9.5) and that the price of a good should reflect the value of labour spent on it.

Neither Luther nor Calvin was an Aristotelian in this respect, however. They envisaged situations in which interest could be justified, but were concerned about the social effects of the practice.

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[111] ibid., p. 364.

[112] ibid., p. 395.

[113] Z.W. Sneller, Economische Inzichten van Maarten Luther, in *Bijdragen tot de Economische Geschiedenis*, Het Spectrum, Utrecht, 1968, p. 66.

The French reformer John Calvin addressed some key issues regarding agriculture in his sermons and Bible commentaries.[114] First, he emphasised that what we call nature is the result of God's creation and, therefore, serves as a theatre of His glory. Second, creation is subject to His ordering. It is designed to provide fruits for humankind. In turn, humankind is charged to make it fruitful not for the sake of a few but for the benefit of all. In various places Calvin stresses that originally there would have been an economy of superabundance. There will be sufficient not only for the present generation, but also for a great many generations to come. Third, due to the fall of humankind into sin nature has become ambiguous inasmuch as it carries the signs of God's goodness and grace as well as the signs of His wrath. The latter should serve as messages to people to repent and trust in Christ in whom and through whom the whole of creation will be restored in full.

The earth is subject to God's laws. Calvin worked this out in two ways. First, the ordering has a political purpose. The fruits of the earth should be fairly distributed. Through its diaconate the church should correct the wrongs of the current (mal)-distribution. The Government should punish those who misuse their wealth and power, in part through the tax system. The Old Testament teaching of the sabbath year (every seventh year the Israelites were to let the land lie fallow and every fiftieth year original land-holdings were to be restored) indicates that the land should not be ruthlessly over-exploited for material gain. Sure, in other countries, less fertile than Israel, a fallow year might be necessary more frequently than every seventh year. The idea of restoring the original distribution of land and to restore the freedom of slaves emphasises the importance of solidarity amongst people. Thus, Calvin stressed that farmers have a great vocation as God's co-workers.

The Reformation can be seen as an attempt to bring about a renewal of culture in the sense of a culture of response.

3.7 The Spirit of the Renaissance: Francis Bacon and Descartes

Although the Reformers were by no means opposed to science, the spirit in which they wished to approach science was different from that of the Renaissance. The reformation appreciated science as a way of giving glory to God the Creator and acknowledged Him as the Lawgiver of nature. However, they would hold this for all fields of human endeavour, be it family life, arts, politics or business. By contrast, the Renaissance thinkers began to see science as an independent source of knowledge (Ch 4.3).

A key figure representing this new spirit, albeit influenced by the reformation was Francis Bacon (1561-1626). In his many labours, amongst others as Lord Chancellor, Bacon had also cause to concern himself with agricultural policy. Thus, in 1588 he introduced bills against enclosures and for the maintenance of tillage.[115] His main objection to enclosures was that they were leading to

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[114] André Biéler, op.cit., pp. 425-432.

[115] J.G. Crowther, *Francis Bacon; The First Statesman of Science* , The Cresset Press, London, 1960, pp. 193/94.

de-population, unemployment (requiring assistance for the poor), decay of tillage, subversion of houses, a decrease of charity and impoverishment of the state of the realm. De-population would result in a shortage of good soldiers. Hence a rational control of agriculture was called for. However, in 1612 he advised the king that one way to increase revenue from his lands was to retain control over the King's wastes and commons, as they were a potential source of much wealth through enclosure and agricultural improvement.[116] One can recognise in some of these points the arguments deployed in the 20th century to defend State intervention in agriculture.

The spirit of Bacon was said to have inspired some of the major agricultural improvers in the 18th century such as Jethro Tull. They certainly tackled the problems of agriculture in a systematic experimental fashion with a view to increasing human control over natural processes.

The approach of René Descartes to science was much more mathematical and deductive in character. More importantly, his view that animals and plants were no different from machines, being bodies we perceive by our senses, represented a major difference from the usual view of most people that plants are different from material things and animals different from plants. Descartes' mechanical picture of the world (Ch 4.4.1) has contributed to the development of a highly technical culture that tends to erase the distinctions between people, animals and plants, as witnessed, for instance, in the current genetic engineering of plants and animals.

It should be emphasised that people like Bacon and Descartes professed to be Christians. We have no reason to doubt their sincerity in this regard. Nevertheless, by considering one particular way of acting in the world or viewing the world, i.e. the scientific/mechanical/mathematical way as the only one that matters, they set the scene for the development of a world view that considers this way of viewing things as the only valid one, the only one able to lead people from darkness to light, to take up Bos's metaphor again.

During the 19th and 20th century this materialistic view has become the dominating way of viewing farming.

3.8 The Romantic Reaction to the Enlightenment

The strong focus on a rational ordering of life and society during the period of scientific rationalism and the Enlightenment (17th and 18th centuries) called forth a reaction on the part of Jean-Jacques Rousseau (1712-1778). He shared with the Enlightenment thinkers a belief in progress. In *The Social Contract and Discourses* he outlined a process from the happy state in which people were basically animals to a state in which they have some sort of mutual society and live in families in the wild as hunters and gatherers. Inequality becomes part of human society when people find out how to grow wheat and how to use iron. Such practices require that one person needs the assistance of others. It requires the institution of property. People who make

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[116] ibid., p. 242.

iron implements need the services of those who grow food and these need the implements of the artificers. The inequality in possessions and in relationships, accounted for many evils. Society and law had to be established.

> From society and the luxury to which it gives birth arise the liberal and mechanical arts, commerce, letters, and all those superfluities which make industry flourish, and enrich and ruin nations. The reason for such destruction is plain. It is easy to see, from the very nature of agriculture, that it must be the least lucrative of all the arts; for, its produce being the most universally necessary, the price must be proportionate to the abilities of the very poorest of mankind.[117]

The state of peasants in France during the 18th century was such that Rousseau's sentiments would not be seen as particularly outlandish. It was the time of the Ancien Régime, marked by an extreme form of feudalism. Peasants were part of the third estate (the first estate was made up of the privileged clergy; the second estate of privileged aristocracy). For centuries, the first and the second estate had cared very little for the peasants. They appreciated them only for their ability to pay a large variety of taxes, included a hated tax on salt. In addition, they were called upon to provide unpaid services on their estates even to the point of keeping the frogs quiet during the night. Risings and disturbances (known as *jacqueries*) were very frequent. Something of this spirit of resistance has remained a part of the tradition of French farmers. They still protest violently when they believe that their incomes are threatened by Government measures.

The nobility (less than 1% of the population but in possession of 20% of the land) lost interest in farming under the Ancien Régime in favour of serving at the court or in the army. Farming was neglected. The court's sources of income were the revenues of monopolised industries and the taxes extracted from the farmers. Money flowed from the countryside and the centres of commerce and industry to the court, but there was no similar return flow. Thus, prices rose and money became scarce. Those of the nobility still on the land impoverished and often joined their tenants in their protests.

3.9 The Physiocrats

In order to remedy these evils the physiocrats pleaded for a reform of the state based on agrarian restructuring. In their view the true wealth of a country lies in the soil. The products of the land can be consumed or serve as inputs into industrial activities. Commerce and industry are totally dependent on agriculture. In order to implement the reforms they had in mind, the land needed to be re-distributed, first, in order to enable intensive farming and, second, to allow farmers a socially attractive lifestyle. Had their reforms been carried out, then the king and the nobility would have been deprived of their

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[117] J.J. Rousseau, *The Social Contract and Discourses*, J.M. Dent &Sons, London, first edition 1750, p. 111.

financial income. Moreover, the lucrative (for the king that is) grain monopoly would have been abolished.

The physiocrats thought of the economic system of private property and free markets as *the natural order*. If prices for agricultural products were high, wages paid by industrialists would be high and such high wages would enable the purchase of food at the high prices whilst the farmers would be able to purchase the products of industry. The physiocrats opposed State intervention in competition and promoted free international trade. If farmers were free to grow what they thought best, they would be able to export part of their surplus. The wealth of a country was not to be found in a pot of gold acquired by unequal trading relationships or extracted from colonies.

French agriculture became a major issue for Government especially after 1870. After World War II the first Plan focussed on a revitalisation of agriculture so as to make it a source of export income. This policy has become foundational to the CAP of the European Union since 1962 (Ch 2.8.3). In this way a basic idea of the physiocrats has been retained to the present day, albeit in a much weakened form, inasmuch as French Governments believe it to be their duty to protect agriculture and to keep it viable as a major source of independence and income.

3.10 Adam Smith on Agriculture

Throughout his *An inquiry into the nature and causes of the wealth of nations* (Ch 5), Adam Smith refers to agriculture in very laudatory terms, even to the point where J.J. Venter believes that he expresses a quasi-romantic longing for *paradise* in the form of primitive rural life. In the early stages of the industrial revolution Smith may well have regretted the expansion of cities at the expense of rural life. At the same time he develops the idea of a symbiosis of agriculture and industry and, therefore, of countryside and villages. Farmers need supplies and implements made by a range of trades. In turn, such specialised trades need each other, so that they tend to settle in villages and towns. Overarching this idea is the concept of (technical) improvement. As society progresses the interaction between farmers, landlords and manufacturers becomes more intense. However, as agents of improvement Adam Smith favours the small freeholders (yeomanry) over the large landlords. Private ownership, combined with little wealth to start from is more conducive, in his view, to improvement than a large estate which enables a lord to live in luxury.

The romantic longing for *nature* has, in fact, never vanished. In recent years the onslaught of industrial large-scale farming on the country-side has led to changes in agricultural support policies which emphasise the multi-functionality of farming, inasmuch as landscapes, rare species of animals and plants and water quality should be cared for and preserved.

3.11 Marxism

In Marxism culture arises from the way in which the forces of production are organised. Karl Marx focussed, therefore, on the division of labour. People who are organised into a socially determined division of labour transform useful objects into commodities. Commodities can be exchanged for money (C-M-C) and money is used to buy commodities. The value that is exchanged is the value of labour: 'Thus the determination of the magnitude of value by labour time is a secret hidden away beneath the manifest fluctuations in the relative values of commodities.'[118]

This statement reminds us of the quest of Greek philosophers to find the unchangeable in order not to be fooled by the phenomena of change and decay in the world around us. In terms of Bos's rendering of the ground-motive of Greek philosophy, Marx aims to show how the deciphered secret can help us not only to understand the exploitation practised by capitalists but also how their system will evolve into one that is free from such exploitation. In the final stages when the capitalist system is about to collapse under the weight of its contradictions, a revolution will be called for to hasten the advent of the communist community. Thus, we need to move out of the underworld of slavery into the bright light of a communist society.

In general, Marx thinks of a contest between humankind and nature in which human labour tries to conquer nature. In farming this involves a process in which over long periods of time animals and plants are transformed from wild to useful 'things'. The physiocrats have simply forgotten this.[119]

Thus, there is no distinction between a capitalist producer who runs a farm and one who creates surplus value by manufacturing. Each, in his own way, employs labour and uses machinery to increase the creation of surplus value. Each will be subjected to the crises of capitalism resulting from its own success and eventually from its falling rate of profit. This lack of distinction between the two is common to both Marxists and neo-classical economists.

Although within the Marxist movements of the 19th and 20th century there was a preference for triggering the collapse of capitalism as a pre-condition for the establishment of communism by intensifying the class-struggle between workers and industrialists, Lenin and Stalin triggered the collapse of capitalist farming in a violent manner as part of a process of enforced industrialisation which required the conversion of peasants to workers in industry. Large State-run mechanised farms were substituted for family farms. This process was similar to the one Marx described in Book II of *Capital* in respect of England, Scotland and Prussia from the late 14th to the 19th century.

Marx's analysis of the exploitation of peasants is still very apt, considering the present displacement of peasants to form a reserve army of labour in Third World cities.

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[118] Karl Marx, *Capital,* vol. 1, J.M. Dent & Sons, London, 1930, Everyman's Library (original 1867), p. 45.

[119] ibid., p.174.

3.12 Individual Property Rights

Marx's analysis is supported by the general move towards individual property rights during European history. There has been no support for or interest in incorporating all the land in a co-operative system. Village communities featured basically individual ownership rights to land in addition to the common areas. Thus, the logical step was to move towards the more intensive farming of rotation systems without fallow land by removal of common lands in favour of privately owned land. Often those who had power in local communities such as local lords managed to acquire extra land for enclosure on the death of copyholders or by other means (Ch 1.3.2). New ideas, which had come to the fore during the Renaissance and the period of rationalism, favoured strongly private property rights of individuals on the assumption that the individual was born free and should be free to make contracts during his or her life. The State should protect and defend such rights. Underlying these ideas was the belief that people would be able to tame and control nature on the basis of scientific and experimental methods. These ideas had a growing influence on public opinion during the 17th and 18th centuries and so helped to blaze a trail for the new agriculture as well as for the new industries based on steam-power. One believed that private owners working in their self-interest would risk their capital and would be willing to experiment and make technical improvements.

3.13 The Treadmill Problem

By treating agriculture in the same way as other industries, however, a major problem has emerged due to the small price and income elasticities of demand, combined with the very high element of fixed costs (due to major capital assets and a large part of farm labour required to keep the farm going regardless of output) which lead to a completely inelastic supply curve, in an industry dominated world-wide by many small producers. Given world prices, an individual farmer believes that he can improve his profitability by increasing the productivity of his labour, animals and land. The resulting increase in supplies, however, depresses the price and compels farmers to raise their productivity again. This feature of modern agriculture has become known as the treadmill problem (Ch 2.4). It was first formulated by W.W. Cochrane and later on revised by Glenn L. Johnson, who pointed out the importance of fixed costs. Dale E. Hathaway has adequately summarised the discussion.[120] The US National Academy of Sciences Report on agricultural efficiency of 1975 also summarised the treadmill problem as a reason why the agricultural sector is in chronic disequilibrium.[121] The effects of the treadmill explain why farmers set up co-operatives (to prevent suppliers and processors from taking advantage of their vulnerability) and lobby Governments for protection.

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[120] Dale E. Hathaway, *Government and Agriculture; Economic policy in a democratic society,* The Macmillan Company, New York, pp. 107-130.

[121] National Academy of Sciences, *Agricultural Production Efficiency,* National Academy of Sciences, Washington D.C., 1975.

In the 1930s Government intervention took the form of protection against low prices (Ch 2.7). Van Rompuy, a Belgian economist, justifies the measures taken in a general sense, arguing that the Government should intervene in specific economic sectors such as agriculture if the unfettered working of private markets were to produce results contrary to the public interest or to specific Government objectives.[122] He then analyses the special position of agriculture in Western countries in terms of four characteristics:

1. In some important agricultural markets, equilibrium of production and demand is not assured.
2. The income of many farmers is lower than that of comparable professional groups, because incomes in agriculture increase more slowly than in other sectors.
3. The proportion of agriculture in GDP and hence rural populations is trending downward.
4. Prices of agricultural products are subject to large fluctuations.

Van Rompuy then points out that the underlying problems are structural and that, therefore, a structural policy is called for. The four characteristics are all based on the treadmill hypothesis, for which van Rompuy refers to W.W. Cochrane and W.W. Wilcox (1958). Since economic productivity in other sectors, according to Van Rompuy tends to be higher than in agriculture, especially in conditions of rapid general economic expansion and full employment, wages and prices of capital goods used in those sectors increase more rapidly than in agriculture.[123] A higher income elasticity of demand for those other products tends to reduce the relative price of agricultural products. Van Rompuy must assume here monopolistic or oligopolistic competition, although he does not specifically mention it. Thus, agriculture cannot compete on price for labour and capital with those sectors. The high fixed costs in agriculture (often including (family) labour) makes the relatively poor supply conditions worse, in addition to fragmentation of land holdings, poor education and training and worse social amenities in rural areas. Van Rompuy adds that the increase in the services contents of agricultural produce (packaging, processing, distribution) enjoys a higher income elasticity of demand, so that after subtraction of these elements the price received by farmers for their produce is even more depressed.

A structural policy should be flexible. Van Rompuy refers to American economists who pleaded for the use of guaranteed prices announced before the start of a new season. These should take into account the actual situation of demand and supply over the medium term. In addition, they advocated the use of special subsidies to encourage farm workers to re-school and move to urban areas. The Government's general policy of encouraging strong economic growth and full employment should be the best condition for achieving structural change.

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[122] V. van Rompuy, Sectorpolitiek, in: eds J.E. Andriessen en M.A.G. van Meerhaeghe, *Theorie van de Economische Politiek*, H.E. Stenfert Kroese, Leiden, 1962, pp. 381-421.

[123] ibid., p. 385.

However, the policies deployed in the USA and in Western Europe (Ch 2.8), have been predominately policies of price and income support. Such support systems, especially if accompanied by policies designed to increase physical productivity through the application of science and technology, tend to increase farm production because it becomes more profitable for individual participating farmers. Given prices they can increase incomes by producing more. Of course, suppliers of fertilisers, sprays, drugs and implements will benefit too. The danger is that technical productivity is increased regardless of consequences for the long-term fruitfulness of soil, animals or plants could lead to very high increases in production. Farmers tend to regard the natural resources with which they are endowed such as air, water and soil as free goods.

3.14 Industrial Agriculture

The treadmill problem is a reflection of an industrialisation of agriculture since about the time of the Enlightenment of the 18th century. Through a complex interaction of science, technology and the power of money, farming has ceased to be part of a culture of response or part of a sacral/mythical culture. Animals and plants are considered as factors of production to be exploited for financial gain. Farmers are forced to jump on this bandwagon. They are dependent on the supplies manufactured by business corporations. They produce for anonymous world markets. They have lost their autonomy as people who are able to bear responsibility for the way in which they care for plants, animals and people involved in their farm operations. Many are unable to make a living from farming alone. Many sell out to larger farms. The advent of genetic engineering will increase the dependence of farmers on the internationally operating business corporation.

3.15 Is there a Way Out?

In order to step off the treadmill, it will be necessary to gain a new cultural perspective on agriculture. A return to mythical and magical cultures is not, in my opinion, an adequate answer to the crises of industrial agriculture (monocultures, loss of population, loss of biodiversity, surpluses). I would seek an answer in terms of Schuurman's metaphor of a garden-city (Ch 8.10).[124]

[124] E. Schuurman, *Faith and Hope in Technology*, trans. John Vriend, Clements Publishing, Toronto, 2003, pp. 151-213.

3.16 Conclusion

Mythical/magical cultures used to predominate around the world. They involved the use of ritual or magic to ensure that one would not disturb the forces governing the earth's fertility. In Greek culture the mythical approach was supplanted by the development of abstract theoretical reasoning. The Stoics secularised the mythical approach by arguing that agriculture should follow nature's directions. In Western Europe the rational/technical approach gained the upper hand. Christian attempts to conduct agriculture in response to the Creator's laws and for the benefit of people have had a marginal influence only.

People practising agriculture in terms of mythical/magical culture have been either displaced or marginalised by the Western scientific/technical culture. This will be elaborated in Chapters 12 and 13.

Since the period of the Renaissance Western agriculture has increasingly been founded upon a scientific-technical basis in the context of a free-market economy. Agriculture has been seen as no different from other industries. This view has led to major problems due to specific characteristics of farming so conceived as a world industry operating under free-trade rules. Technically, this is the treadmill problem (Ch 15 provides some empirical data for the New Zealand Dairy industry). The intervention systems set up in Europe and the USA, especially after World Wars I and II, have been unable to overcome the problems of structural over-supply. If a new direction for agriculture is to be found, then, the problems caused by an objectivising culture should be tackled first. In other words, a new paradigm for agricultural development should be found.

Nevertheless, other forms of culture that consider nature as sacred in some sense or that belief that humankind should work in tune with the forces of nature such as New Age have not disappeared. They resist the advances of industrial agriculture in various ways. Nor has the culture of response vanished entirely. The direction of agriculture is, therefore, becoming a matter of growing conflict.

Part II will focus on the sources of the objectivising technical culture and will also consider a different perspective based upon a culture of response.

PART TWO: PHILOSOPHICAL PROBLEMS RAISED

Introduction

Should culture, including agriculture, be directed by nature or should nature be exploited by humankind to satisfy its needs and wants? If the latter is the case, would nature be transformed into an image of humankind, reflecting its rationalism, technology and economics? These are the issues raised by technicism and economism. In combination, these two see the whole of life and the world exclusively as a technical/economic system. We have become so used to being dominated by its demands that we are hardly aware of its existence. One reason for this is that it has its roots deep in the Western history of philosophy. If we are to understand the nature of the crises facing modern agriculture, then, we should be aware that it has been shaped by this system at least since the 18th century. This is the reason why this part features a fairly long discussion of philosophic developments and their bearing upon modern science and economics as well as upon an important cultural sector such as agriculture. It is hoped that an awareness of this historic background will assist in finding an alternative way of practising agriculture. The basis for such an alternative is what Schuurman has called a growing in wisdom, an acknowledgement that:

> rationality is embedded in a given supra-subjective and non-arbitrary normative structure for reality itself, which suggests a way out of the crisis of agriculture, without having to forgo science, technology and the use of scientific-technical approaches.[125]

For these reasons, Part II begins with a brief survey of the history of philosophy since the Renaissance, using the results of Vollenhoven's historiography as a guide. Since Descartes there has been a technicistic trend in philosophy, so that nature has become an object for scientifically thinking people to be taken apart, theoretically as well as by means of technology, with a view to being used as a source of technical objects and raw materials for the production of capital and consumer goods to be sold in exchange for money.

This thinking has also influenced the development of economic theory. A fascination with automatically working systems is noticeable in the philosophic concept of Adam Smith (Ch 5). By means of the self-adjusting price mechanism, under the impetus of self interest, the economic system would always gravitate to equilibrium. As the industrial revolution unfolded during the 19th century, the networks of mines and factories needed markets to purchase labour as well as land and other natural resources and capital (factors of production). Polanyi showed what a major change this was, a great transformation. It could not cope, however, with the financial and economic

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[125] E. Schuurman, *Crisis in de Landbouw; een reformatorisch-wijsgerig perspectief*, Agricultural University Wageningen, 1987, page 27 (my translation, PS). (the publication has been translated as Technology and Harvesting the Earth: Crisis in Agriculture-a philosophical perspective on the relation between Agriculture and Nature, *Research in Philosophy and Technology*, vol.12, pp.191-211, JAI Press Inc., 1992).;. quoted hereafter as Inaugural Wageningen.

crises that emerged during the first half of the 20th century. From a long period of economic freedom the pendulum swung to State intervention, aided theoretically by Keynes' theory. The latter assisted with the stabilisation of national economies during their reconstruction after the Second World War. Since the 1980s the pendulum has swung back to neo-liberalism, however.

Chapter 7 shows that there is an intimate link between a neo-liberal economic order and the free trade doctrines derived from neo-classical economic theories. Modern economists and politicians are now saying that there is no alternative to free trade if we want to maximise economic welfare for all people (on average). They appear to believe that the abstract mechanical system of the theory is an accurate reflection of the real world. Hence, the nature of economic rationalism should be discussed as well.

Thus, the scene is set for a discussion of technicism and economism in Chapters 8 and 9. Since each is closely related to theoretical scientific thought, they involve the use of science in conjunction with the technical and economic functions of human culture as determining the direction of the whole of culture. We ask, therefore, what the meaning of this complex of three dominating functions is, especially in relation to business corporations. Problems are bound to arise, since other functions are repressed or seen as subservient to them.

Chapter 10 returns to agriculture and ask what it is, how farms relate to soil structures, plants and animals? Basically, these natural subjects retain their own nature, albeit modified by human intervention over the centuries, as already remarked by Karl Marx. Science, technology and economics are servants that should help farmers in their stewardship of nature. In Dooyeweerd's philosophy agriculture involves a set of enkapses, with science and technology only being humble servants of farming and the natural subjects under their control. Under technicism and economism, however, farmers are only able to function as such on account of science, technology and markets. Soils, plants and animals are reduced to machines or factors of production. This has major consequences for the sustainability of agriculture and the environment.

Is it possible to arrive at a truly sustainable practice of agriculture by restoring the servant functions of science, technology and economics? This requires a comprehensive heuristic framework of normative principles which should allow us to find the right approach rather than a legal definition of sustainability. In such a framework all functions of human culture come into play to define an agricultural practice that is guided by the love of neighbour and which seeks to preserve the integrity of land, microbes, plants and animals with an intrinsic worth as creatures. In this respect a suggestion is made for a new commons to manage land and water as public goods. This approach I believe is in sympathy with Schuurman's metaphor of the garden-city as a guide to cultural development.

CHAPTER FOUR: CONTROLLING NATURE

4.1 Introduction

H. Dooyeweerd provided a major critique of the Humanistic ground-motive of *nature and freedom* as arising from the religion of the free autonomous human personality and the science ideal evoked by it, and directed to the domination of nature.[126] In Schuurman's view Dooyeweerd confined his critique mainly to the realm of theoretical thought, where the absolutised freedom of the scientific thinker would call forth an absolutised science, but he believes that he would have agreed that the dialectic applied also to culture as a whole, especially in the sense of scientific-technological control and human freedom. Do we become free people by applying science and technology? Without recognising limits to science and technology we are soon enslaved to them and fail to appreciate the peculiar character of all that is not science or technology.[127]

As people are using science and technology to control the whole of reality in order to obtain freedom from material constraints they must sooner or later also control human beings themselves. Out of reaction to such a restriction of freedom the motive then swings to the pole of freedom. State powers are circumscribed and all types of authority questioned and rejected. The resulting 'chaos' then pushes towards the pole of control again.

Although this pattern is shown by the history since the Renaissance, the approach is too global to trace the roots of the problems of modern agriculture. If we see these problems as part of the dialectic between nature and freedom, as it emerged in the 17th and 18th centuries, we should be aware that it has been shaped not only by a variety of *Zeitgeists*, but also by a variety of philosophical concepts. The interaction between the spirit of a particular period and leading philosophical concepts particularly calls for attention. After 1850, for example, neo-Kantianism came to the fore during the period of the Neo-Aufklärung and strongly influenced the development of neo-classical economics. The latter has been influencing the spirit of our present age despite Keynes' attempt to break lose from it during the 1930s.

For this reason, I am using the results of the methodology of D.H.Th. Vollenhoven to trace the history of philosophy since the time of the Renaissance. This method involves an interaction between the spirit (*Zeitgeist*) of a period and philosophical concepts. The question I am asking is whether this will provide a historic perspective on Schuurman's diagnosis of our age as a technicistic age and whether the advent of modern industrial farming has been stimulated by philosophical concepts that bear the imprint of technicism? In general, the answer turns out to be affirmative also with regard

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[126] Herman Dooyeweerd, *A New Critique of Theoretical Thought*, Paris/Presbyterian, Amsterdam/Philadelphia, 1936/1953, vol. 1, pp. 36 and 63.

[127] E. Schuurman, *Het conflict tussen de industriele landbouw en de biologische landbouw*, speech January 2006 to Association for Reformational Philosophy.

to the way in which economic theory and, hence, our understanding of agriculture as an economic sector, has been shaped.

4.2. The Place of the Law

Time periods in history differ from each other depending on what the dominating shakers and movers believe to be the key to a good life, the source of all meaning and order, justice or peace.[128] Historians try to mark where and when something new appeared that initiated a new period. Throughout history there has been a battle about what or who should determine the law for cultural development. What should be the norms for life?

When we talk about economism or technism or socialism, then, we are referring to patterns of living or world-views that are dominated by a belief that the meaning of life or the law for life is to be found in matters economic, technical or social. Since these are then understood as the source of meaning, everything else should be sub-ordinated to them. Another way of putting this is that an economistic culture acts as if everything in life and in the world is economic in character. This last sentence indicates that there must be circles, rulers or institutions and communities that are able to turn a whole culture into an economistic, technicistic or socialist direction.

Vollenhoven understands the succession of historic periods as struggles for the place of the law in culture. What is the criterion for truth? In his classification of time periods in the history of philosophy, however, there are no periods known as economism or technicism. He characterises, for instance, the whole period of 1600-1830, as early rationalism, meaning that people believed that rational theoretical thinking was the key to the meaning of life. Whilst all thinkers during this period had this in common, they also shared a particular view of the world, even though their ontologies differed. During the period of rationalism people thought of the world as a mechanical instrument, especially as a clock. Indeed, if time periods are to be distinguished on the basis of differences in the *place of the law*, then it would be surprising if they would not be connected with wider cultural movements, including particular forms of economism or technicism. It seems to me, therefore, that Vollenhoven's time periods need to be supplemented with the particular world-views typical for their culture.

In order to investigate this issue, I propose to survey briefly the time periods since the Renaissance, as in Vollenhoven's classification, to discern any connections with technicism and/or economism.

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[128] K.A. Bril, *Westerse Denkstructuren*, VU Uitgeverij, Amsterdam, 1986 provides a detailed survey of D.H.Th. Vollenhoven's method of characterising a philosophic conception by its time period and type. The former indicates how in various periods the source of law, norms and values is seen. This affects all types of philosophy in such a period. The type refers to the ontology of a particular philosophy, especially how it conceives of the relationships between lower and higher, for example, between matter, life, psyche, consciousness or the relationship between body and soul.

Vollenhoven saw the whole history of philosophy from the Greeks to the present as marked by three broad periods.[129] The first was the time of paganism, when philosophers had not heard the Word of God and, consequently, based their thinking on what they found in the cosmos. They saw the law as either outside or behind the cosmos (Plato, for instance) or inside the cosmos. When the Gospel became known and believed, philosophers attempted to connect concepts of the philosophies they had learnt with the Christian faith as based on the Word of God. They attempted a synthesis. This period of synthesis lasted until the Middle Ages. The concept of St. Thomas of Aquinas was a great example of such a synthesis, as already shown in the key words nature and grace. As the synthesis ceased to satisfy, a process of unravelling began that is still continuing. The period of Renaissance, Reformation and Humanism was the first period marked by this dissipating synthesis. Each of these movements represented another way in which the synthesis began to unravel. The idea of an unravelling synthesis implies that many key thinkers during the past 400/500 years have been influenced to a greater or lesser extent by a Christian view of the world. Such influence would be waning the closer we come to our own time. It is also possible that new attempts at synthesis are made from time to time. Anyhow, the idea of an unravelling synthesis suggests conflict and confusion.

4.3 The Renaissance (1520-1600)

The crucial significance of this period is expressed in the term Renaissance itself. It means a rebirth. It is not a rebirth of antiquity, but a rebirth of humanity itself through its own efforts. It is possible that the horrors of the plague and the 100 years war between England and France had prepared the ground for the belief that people had to stand on their own two feet if they wanted a better life. The battle lines were drawn against Christianity, as represented by the Roman Catholic Church, which had turned rebirth into an affair of the church and the Reformation which ascribed rebirth to the redeeming Word of God. The emphasis on a rebirth meant that in terms of philosophy the Renaissance had little time for realist conceptions, with their emphasis on being and becoming.

Being a period of transition, the Renaissance was a very complex movement with a number of intertwining strands. Technical innovations such as gunpowder, block printing from movable type and the compass contributed to changes that undermined the feudal system (castles lost their significance) and the authority of the church. Learning became divorced from the institutions of the church. The rich literature of Greece and Rome became accessible again. Voyages of discovery opened vast areas of the Americas and the East Indies to colonisation and new commercial ventures. Colonial powers competed for new sources of spices, gold and silver. The colonies required the construction of ocean-going ships.

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[129] As documented in K.A. Bril, op.cit.

The dynamism that was so unleashed could not but affect people's thinking and the ordering of society. The static hierarchical society of the Middle Ages with the three orders of the clergy (First Estate), the feudal lords (Second Estate) and the artisans, farmers and labourers (The Third Estate) had to give way to a much looser ordering, which John Hale discusses under the heading of civility.[130] The key element in the notion of civility was 'the imposition of rational principles of nurture on an originally untamed nature.' Thus, society became seen as split between two orders, those who were civilised and those who were not or not yet. It was a distinction reminiscent of the Greek contempt for the barbarians outside their civilisation. Civility had the following features:

1. Sound education.
2. Polite manners, decorum, disciplined rational behaviour, structured language.
3. Belief in a higher being and organised religious observance.
4. Awareness of right and wrong.
5. Firm Government and respect for law, in contrast to living in a savage state.
6. Respect for merchants and bankers, with a sophisticated use of trade and money.
7. Preference for life in towns, with architecture seen as a major art (the taming of nature as an urban-based process).
8. Rational exploitation of human labour.

This idea of civility could be accommodated to a dualistic scheme of thought such as nature/grace as well as to the new approaches of Reformation and humanism.

During the prosperous 16th century the accumulation of houses, furnishings, gardens, clothing, books etc. became important as a sign that one had left barbarism behind. Such interest in material welfare fostered also the development of capitalism (investing money for making money profits) as a means of conquering nature. Despite the importance attached to civility, 16th century society was socially very unsettled with frequent outbreaks of violence, partly caused by large groups of unattached young men, and partly by an increasing inequality of wealth. Criticism of these trends appears to have been a motivation for the writing of Utopias, by Thomas More and Francis Bacon, as calls to rethink the values of civility.[131] Often, the denizens of Utopias looked like monks in appearance and customs.

The taming of nature extended to the exploration of nature and the study of technical processes.[132] As Hale puts it:

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[130] John Hale, op.cit., pp.355ff.

[131] ibid., p. 414.

[132] ibid., p. 560.

> Meanwhile, throughout the sixteenth century, technological processes were improved by trial and error among craftsmen responding to market demand, for more accurately bored cannon, for instance, and improved firing mechanisms for sporting guns and military pistols. Water-powered ore-crushers and trip-hammers, wire-drawing and paper mills were developed to increase productivity. So were multiple looms and knitting frames, though their prototypes met with such resistance from piece-workers that their use was postponed.[133]

Whether nature could be tamed without harming it and, thereby, diminishing its usefulness for humankind, was not considered.

4.3.1 Francis Bacon (1561-1626)

Francis Bacon was keenly interested in the discovery and mastery of nature for the benefit of humankind. His motivation in this regard was inspired by the Calvinistic concept of the two books through which God reveals Himself to us: the Bible and the Book of nature. Bacon called his project *The Great Instauration*. Humans fell into sin in the Garden of Eden, by acquiring knowledge too dangerous for them. After the fall he had to labour in the sweat of his brow. The sweat, however, could be mitigated by invention. Such inventions and their application should be under social and moral control to ensure that they would truly advance people's restauration or to 'relieve the inconveniencies of man's estate'. To this end science and technical inventions had to be methodically organised so as to improve human health and the comforts of life. Personally, he pursued the phenomenon of heat. In his utopia of Atlantis the House of Solomon is a house of scientists. They engage in research and development. His method for acquiring and extending useful knowledge involved getting rid of idola or systematic obstructions to such acquisition such as tribal thinking and prejudices. One should not start from revelation or pre-conceived ideas, for example that the planets follow circular movements, because circles are divine, but rather proceed on the basis of observation and experiment. By means of induction one should then arrive at propositions, which, in turn, should be tested to make discoveries. The *Novum Organon* of co-operative scientific research should lead to the Great Instauration, which Crowther believes should be understood as the conquest of the universe.[134] Bacon's optimism about the *Great Restauration* shows that he either misunderstood or ignored the radical nature of the fall into sin. Readers of his books might ignore the biblical basis and perceive nature and its conquest as independent from the other Book, the Bible. Hooykaas appears to have over-estimated the Biblical component of Bacon's thought, although he correctly calls him 'the advocate of the new natural-historical empiricism'.[135] In this regard Crowther observes that towards the end of his life Bacon narrowed his earlier benevolent concept of science to a view of

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[133] ibid., p. 563.

[134] J.G. Crowther, op.cit., p. 21.

[135] R. Hooykaas, op.cit., pp. 39, 40.

science for profit.[136] The ideas of both scientific socialism and a science-based capitalism, therefore, can be found in Bacon.

4.3.2 Johannis Kepler (1571-1630)

Kepler, a Lutheran, was one of the greatest scientists in the time of the Reformation. He had great expertise in optics. He invented, for instance, a telescope with two positive lenses and made major scientific contributions to the development of astronomy. He accepted Copernicus' view that the earth revolves around the sun. Using the precise observations of Tycho Brahe, he found three key laws of astronomy. More importantly he developed a dynamic theory of the motion of the planets. Up till then, astronomy had been concerned solely with motion as such, not with acceleration or the principle of attraction. Dijksterhuis points out that in 1623 Kepler added a note to his work of 1596 *Mysterium Cosmographicum* to the effect that the cause for the motion of the planets is not the *anima (soul)* of these bodies but rather their *vis* (power or force). Thus, a mechanistic way of viewing things was substituted for an animalistic one.[137] In his own words, written at a later stage, he thought of the cosmos as a watch rather than as a divinely animated body. Thus, he abandoned the Stoic idea that intelligent spirits located inside the heavenly bodies govern their movements.

Summarising Kepler's achievements, Dijksterhuis noted that these consisted above all in a method, which displayed the following characteristics:

1. Rejection of all arguments, which are merely based upon tradition and authority.
2. Physical research should be independent from all philosophical and theological doctrines.
3. The mathematical way of thinking should be persistently applied in the formulation and elaboration of hypotheses.
4. Results derived from hypotheses should be rigorously tested on the basis of the most accurate empirical methods.[138]

The first point betrays the influence of the Reformation on Kepler's thinking. Point 2, as Dijksterhuis observes, implies that philosophical ideas should not play a role in the determination of results or conclusions of scientific work. However, non-scientific ideas and concepts always play a role in shaping the direction of thought. Kepler, for instance, was strongly influenced by Platonic-Pythagorean ways of thinking, although his scientific empirical work led him to the conclusion that the planets do not move in circles but rather in ellipses.

4.4 Scientism: the Seventeenth Century

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[136] op.cit., p. 40.

[137] E.J. Dijksterhuis, *De Mechanisering van het Wereldbeeld; De geschiedenis van het natuurwetenschappelijk denken*, Meulenhoff, Amsterdam, pp. 343ff.

[138] op. cit., p. 355.

In Vollenhoven's approach this is the period of rationalistic system-builders such as Descartes, Hobbes, Leibniz, Spinoza, Newton and Locke. It might also be called the age of the natural law philosophers. The religious split of the sixteenth century worked through, violently during the Thirty Years war. Although in 1648 the nation-state became a reality, the way of governing such states has remained a subject of debate until today. Nation-states continued to compete commercially under the Mercantilist system (Ch 1.3.1). They were equipped with growing bureaucracies and armies. Each fostered an interaction between economics and technology so as to enable the state to gain a competitive edge on its rivals.

Hans Sachsse considers this period as the beginning of technicistic philosophy. As technology had been extending people's grip on the world, the thought came up that all problems could be solved by means of technology, a point of view that is virtually identical to that of Egbert Schuurman (Ch 8). Sachsse put it like this:

> During the course of the new age a faith emerges that does not confine itself to consider technology as a valuable and excellent tool, but that goes beyond it, believing that all of life's problems can be solved by means of scientific-technical changes of the world.[139]

Sachsse then demonstrates this with respect to philosophers such as Descartes, Bacon, Kant, Fichte, Hegel, Feuerbach, Marx and Marxism right down to Mao-Tse-Tung.

Sachsse sees the origin of this technicistic thinking in the rapid development of machinery since the 16th century. The construction of such machines, including guns, could be mathematically calculated. Mechanics and mathematics could be precisely matched in practical engineering practice. He quotes Leonardo da Vinci as saying that mechanics is the paradise of mathematics.[140]

The story of Robinson Crusoe, as told by Defoe, provides a good example of the spirit of the age of rationalism inasmuch as Robinson is compelled to survive, on his own, guided by the light of his reason and experience, using his technical and organisational skill to wrestle a way of civil life from an inhospitable nature. The 'taming of nature', as part of civility, came to be seen as a systematic activity. Philosophers had to address the question: what is nature? And, what is the law of nature?

4.4.1 Galileo Galilei (1564-1642)

Galileo Galilei wrestled with the Aristotelian heritage in the physical sciences. Aristotelian physics was a matter of qualities rather than quantities. In studying how objects fall and move he stayed within the old ways of thinking, but nevertheless opened ways to a new understanding based upon quantities

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[139] Hans Sachsse, *Anthropologie der Technik, ein Beitrag zur Stellung des Menschen in der Welt*, Friedrich Vieweg, Braunschweig, 1978, p. 180.

[140] ibid., p. 182.

rather than qualities. Indeed, Galileo made a much greater use of mathematics in his mechanical studies than his predecessors. Metaphysically, he believed that the structure of the cosmos was mathematical.[141] Strongly influenced by Copernicus, he spent a large part of his scientific endeavours to prove that the heliocentric view of the earth was correct. To this end he made grateful use of a telescope (made of two lenses, one positive and one negative). His discovery of four moons around the Planet Jupiter proved, in his view, Copernicus' theory.

De Graaff makes the point that instead of proving a theory Galilei showed that his relationship to the planet was different from that held by the people of the Middle Ages. The latter had a direct non-abstract relationship, whereas Galilei had a much more abstract subject-object relationship. He then asks what the point of this instrument is and answers 'The instrument is the embodied representation by which the subject reduces being to object.'[142]

The instrument reduces reality to an object. It eliminates what is not useful to the subject. Thus, the mystery character of the creation is removed because it cannot be understood. Moreover, the more we objectivise the creation by means of instruments, the more we are able to manipulate and control all that is. Thus, scientific instruments become a representation of the will to power. Galilei was at the beginning of this process. This is also born out by his view, expressed in his book *Il Saggiatore (1623)*, that the so-called secondary qualities of colour and taste are mere names and are only part of our mind, rather than being part of the objects in the world around us. Later on, this view was adopted by Descartes and Locke and remained part of the rationalist tradition until well into the 20th century. Secondary qualities are secondary precisely because they cannot be quantified. The more technical instruments are put between us and nature the less nature speaks to us. A farmer who scans his ewes to determine the number of lambs he can expect, uses a technical object to gauge primarily his likely profits.

4.4.2 René Descartes (1596-1650)

Descartes' starting point is that everything can and should be doubted except that it is I who doubt. The I is a subject that carries out the act of doubting. The question then is how a fixed point is to be found from which reliable relationships can be established.

> But immediately upon this I observed that, whilst I thus wished to think that all was false, it was absolutely necessary that I, who thus thought, should be somewhat; and as I observed that this truth, *I think, hence I am*, was so certain and of such evidence, that no ground of doubt, however extravagant, could be alleged by the sceptics capable of shaking it, I concluded that I might, without scruple, accept it as the first principle of the philosophy of which I was in search.[143]

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[141] Dijksterhuis, op. cit., p. 399.

[142] op. cit., p. 209.

[143] R. Descartes, *A Discourse on Method* (the edition used has also the other works cited), J.M. Dent &Sons, 1637 (1953), pp. 26/27.

In Descartes' view of the world, God is the Supreme Lawgiver. In Part V of his Discourse on Method, he says '...but I have also observed certain laws established in nature by God..'.[144]

He calls God also the Author of all that is and the cause of all that is. Since the human mind is a thinking substance, we are able by the light of reason to gain knowledge of the physical laws of the created world. Matter incorporated in bodies is the only other substance. These extended objects are able to move and to act causally upon each other. In his publications Descartes professes a fascination with geometry, mechanics and medicine. The mechanistic inclination is shown also in the comparison of God with the maker of a clock.[145] The earth is called a machine.[146] After a long exposition of the circulation of blood he notes that the laws of mechanics are also the laws of nature. The human body is indeed a wonderful machine and animals are machines, different from humans only in that they lack rational souls.[147]

In his *Discourse on Method* Descartes formulates a method of four steps to solve problems:

1. Don't act on prejudice;
2. Divide each difficulty into its smallest parts;
3. Starting with the simplest objects, ascend step by step to the knowledge of the more complex;
4. Don't omit anything.[148]

This method has proved to be very powerful. It is still used by mathematicians and engineers. Thinking along these lines, Descartes observes that it is better to start from scratch than to work with a given state of affairs so as to reconstruct it, no matter whether one is dealing with the constitution of states or the sciences.[149] Using this method and the laws of physics the thinking I discovers that we are rendered 'the lords and possessors of nature'.[150] No doubt, Descartes intended such lordship to be for the good of humankind. What the human mind knows distinguishes us from savages and barbarians.[151] *In other words, the Renaissance idea of civility is put on a scientific rational basis.* In Descartes's view the thinking I analyses 'nature' into its smallest component parts and, then, reconstructs reality in such a way that new products help humankind to master the problems of ill health, famine

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[144] ibid., p. 33.

[145] op.cit., *Meditations on the First Philosophy,* p. 138.

[146] op.cit., *The Principles of Philosophy,* p. 214.

[147] op.cit., *Discourse,* pp. 43-45.

[148] Descartes, op.cit., p. 16.

[149] ibid., *Discourse,* Part 2.

[150] ibid., p. 49.

[151] ibid., *Meditations,* p. 148.

etc. The world external to the I is reduced to objects. On the whole it is a deterministic approach: find out how things function according to the given law, using mathematical/mechanical principles.[152]

4.4.3 Thomas Hobbes (1588-1679)

Like Descartes Hobbes was fascinated by mathematics, especially geometry, mechanics and by methods to acquire rational knowledge. His ontology starts from the premise that all is matter in motion. Physics (bodies natural) is the foundation for ethics (the dispositions and manners of men) and ethics, in turn, forms the basis for politics (the civil duties of subjects). The cosmos consists of moving bodies. People are individual bodies moved by desires. Unlike other bodies, however, they are endowed with reason. Consequently, they aim to extend their desires by reason as a result of which they come into conflict with each other. In a state of nature, individuals compete, fight and fear each other. To improve upon this, contracts are necessary, provided they can be enforced. This is only possible if individuals are prepared to surrender their liberty to an assembly of men or a state. As this is a rational way of improvement, given the individuals' desire for security, civil society emerges as a means of securing peace and stability.

In the Introduction to *Leviathan* Hobbes states that the Commonwealth or State is a Leviathan or an artificial animal. He does this by pointing out that life is but a motion of limbs. Automata (engines that move themselves by springs and wheels as does a watch) have an artificial life. The heart of the human body is a spring and the nerves are strings. And so:

> *Art* goes yet further, imitating that rational and most excellent work of Nature, *Man*. For by Art is created that great Leviathan called a Common-Wealth, or State, (in latine Civitas) which is but an Artificiall Man; though of greater stature and strength than the Naturall,...[153]

Venter has pointed out an inconsistency in earlier works of Hobbes (*De Homine* and *De Cive*). On the one hand, in the state of nature there are competing individuals (the smallest parts in a machine), but on the other the individuals enter into a compact to be secure. Thus, in the former Hobbes uses a mechanistic view and in the latter an organismic one.[154] Hobbes overcomes this inconsistency through his three laws of nature:

1. Each man uses his power to preserve his own life, using the best means available. Every man will seek peace, but if there is no peace, he will use all means to get it even by war.
2. To secure peace every man is prepared to surrender part of his liberty to retain as much as he is prepared to let others have against

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[152] J.J. Venter, Early Modern Conceptions of "Natural Law", *Acta Academica*, 2001 (2), UFS-SASOL Library, Bloemfontein, pp. 12-16 (Descartes).

[153] Thomas Hobbes, *Leviathan*, London, J.M. Dent & Sons, 1914 (1959), originally published in 1651, p. 1.

[154] J.J. Venter, Mechanistic Individualism versus Organismic Totalitarianism: toward a Neo-Calvinistic Perspective, *Ultimate Reality and Meaning*, vol. 20/1, 1997, pp. 41-60.

him, for which he invokes the golden rule of the Gospel (basis for contracts).

3. Men perform the covenants to which have agreed.[155]

Each of these laws is founded in reason. The first law says that people live naturally in a state of competition or war. Reason may prevail, however, if only by agreeing to contracts in order to survive. *In terms of the Renaissance's concern for the establishment of civility,* Hobbes is arguing that the competing individuals should transfer some of their power to one of them who will exercise absolute power (a monarch) because the state of nature cannot be relied upon. The monarch, of course, might avail himself of mechanical systems of control to maintain peace.

> For the use of Lawes, (which are but Rules Authorised) is not to bind the People from all Voluntary actions; but to direct and keep them in such a motion, as not to hurt themselves by their own impestuous desires, rashnesse, or indiscretion; as hedges are set, not to stop Travellers, but to keep them in the way.[156]

Within the confines of the state competition may be acceptable, provided it is properly hedged about. Whether such competition would then still be called natural is a matter of debate.

Anticipating utilitarianism, Hobbes thinks of individuals as having a basic desire for pleasure and an aversion to pain, due to a vital motion of their blood. The economics of the Leviathan is also considered in terms of circulation. The state will import what it needs but does not have within its own territory either by exchange, just war or labour. Gold and silver are like blood that circulates through the body. Colonies or plantations are like the children of a commonwealth.

In this way Hobbes justified absolute state power that would extend trade by means of colonies and seek to acquire a positive trade balance. The tension between, on the one hand, competing free sovereign individuals, and on the other, a powerful state, has become a dialectic in Western societies until the present time. Periods in which the power of the State to regulate economic life is emphasised are followed by periods in which free competition between individuals is given free reign. Often, States must use their powers to engineer free markets against interests that have done well out of State protection and control.

4.4.4 Isaac Newton (1642-1727)

Newton managed to encompass the development of mechanics over the preceding centuries into a set of axioms. In particular he succeeded in formulating the general principle of gravity to the effect that any two bodies exercise equal forces on each other, the strength of which is directly

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[155] Hobbes, ibid., pp. 66-71.

[156] ibid., p. 185.

proportionate to their mass and inversely proportionate to the square of their distances. Dijksterhuis called this effort one of the highpoints in the history of thought.[157] It now became possible to calculate with mathematical precision all movements in the universe, whilst weight could be considered as a special case of general gravity. This set the scene for the development of (Newtonian) classical mechanics for the next two centuries. Thus, many phenomena could be reduced to the operation of a few active principles of motion.

Newton wrote his *Principles* in part to demonstrate that faith and physical science do not exclude each other, but rather that the results of science should strengthen faith. Nevertheless, he expounded also a view reminiscent of later Deism that the Creator had to intervene from time to time in the working of nature to prevent major disturbances. Newton was indeed a complex man. He had to hide, for instance, his work on alchemy and the occult. In this regard he stood in the tradition of Hermetistic Neo-Platonism, going back to Plato's *Timaeus*. This strand in his thinking led him to the concepts of absolute space and time. However this may be, those who were inspired by Newton were inspired by his mechanics.

The discoveries of Newton had a great impact on both the economic thinking of Adam Smith and on the philosophy of Immanuel Kant in the 18th century. Adam Smith borrowed the metaphor of gravity to explain how market places tend to the natural price (Ch 5). Since that time most economic theories of equilibrium (the price mechanism) have been inspired by Newtonian mechanics. In politics this metaphor inspired the concept of the balance of powers, for example in Kant.

4.5 Aufklärung (Enlightenment) and Idealism (1730-1830)

The rationalists of the previous period were like spiders weaving their webs entirely from within their own minds. This could not entirely satisfy, as the practical demands of life require insights into the real world that cannot be produced merely by mathematical reasoning. The thinkers of the Enlightenment were more like engineers who use materials, tools and senses in order to re-construct life. Thought needed to be applied. The Enlightenment was not only much more practically orientated than the scientialism of the 17th century, it placed also a much greater weight on ethical or moral issues. One question raised in this respect was how sub-rational tendencies such as passions and bodily desires could be controlled by reason?

As science had become an important way of perceiving and controlling nature, people equipped with reason, a divine gift or property, should be able to deal rationally with such matters. In practice, however, such taming of nature proved difficult to achieve. Th. Hobbes and later J.J. Rousseau sought the solution in a strong state exercising control. Turgot, Adam Smith and Immanuel Kant found a different way by seeing humankind as gradually approaching the ideal through history. An ideal state would emerge eventually

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[157] op. cit., p. 524.

in a type of future golden age. Progress along this way would be fostered by competition between individuals, itself a natural feature of human relationships, and nation states.[158] Such thinking could easily degenerate into elitist approaches whereby, for instance, colonising Western powers would consider native inhabitants of 'their' colonies as inferior or worse as savages hindering their progress. Thus, Indian tribes in the Americas and the Aborigines in Australia were hunted down and killed.

John Locke (1632-1704), a forerunner of the Enlightenment, had already provided some important clues for such progressive thinking, especially in his labour theory of property. The development of this theory provides also an instance of the unravelling of the Middle Age synthesis. In his *First Treatise of Civil Government* (both Treatises were published in 1690), for instance, Locke adduces Scripture (Genesis 1, in particular) to refute Sir Robert Filmer's defence of absolute monarchy in favour of the individual's right to freedom and private property. By the gift of reason individuals are directed to care for themselves (self preservation) by means of the gifts of nature. In the Second Treatise this is elaborated along the lines of a theory of private property rights to be defended by the State. The *Treatises* should be read as a synthesis between Christian principles and natural law doctrines. Locke's own view on the labour theory of private property (what we call our property is what we have added to nature by our labour) is not critiqued, for instance, by Genesis 2:15 where man is charged to cultivate and care for the garden. Locke's emphasis is upon the freedom to subdue and control, which he bases upon Genesis 1: 26. In a state of nature all people are free to acquire property and everybody has the right to punish transgressors of somebody's property. This could be interpreted as meaning that those who had progressed further on the road towards the ideal state and who had, therefore, succeeded in developing a scientific control of nature, were better able to take advantage of nature's gifts than native people. However, Locke hedged his theory of property about with some restrictions aimed at preventing those who had nothing from starving. The Christian elements of Locke's theory were quickly forgotten by imperial powers. Similarly, they play no role in the present small state ideology that underpins globalisation.[159]

Later Enlightenment thinkers invoked Scripture too, but tended to be much more Deistic in their approach, thinking of God as the Engineer or Clockmaker who could leave the mechanism of creation alone after its creation.

The emphasis on nature, by Hobbes, for instance, continued during the Enlightenment but was placed in a Stoic framework of living according to nature. In a number of thinkers this went so far as reducing people to animals.

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[158] J.J. Venter, Reason, Survival, Progress in Eighteenth Century Thought, *Koers* 57 (3) 1992, pp. 319-344.

[159] A discussion of Locke's theory of property is given by Ulrich Duchrow and Franz J. Hinkelammert, *Property for People, Not for Profit; alternatives to the global tyranny of capital*, trans. E. Griffiths et al., Zed Books, London, 2004, pp. 43-76.

Perhaps this stream of thinking was like an underground current, represented by people like Bernard Mandeville (1670-1733) and the Marquis de Sade (1740-1814). Mandeville, in fact, derides the Enlightenment's emphasis on moral behaviour. The economic system prospers because people like to indulge in vices such as luxury, comfort, pleasures and envy, which may induce them to work harder and thus create work and income. He also noticed that people should have an incentive to work. Luxury is good for a few, but not for the majority. Keep workers as poor as possible and do not pamper them, because once they have plenty, they cease working. Similarly, the workers should learn just enough to be able to work, but nothing more, otherwise they waste their time on education and learn to look down on simple labour. Crimes should be punished severely by way of deterrent and to keep people working rather than stealing.

Mandeville points out that in a society which enjoys a degree of wealth on the basis of private property the rich will spend their money on more luxurious houses, for example, which will provide employment for wage workers. Without such spending, tradesmen will be unemployed. Those who are only able to work must yearn for people who are prepared to spend and invest money.

Mandeville was concerned to show that a rational religiously motivated society might not spend enough to keep everybody productively employed and hence able to live. To be materially prosperous people should be free even to engage in morally dubious pursuits. Casting his argument in present day terms, it means that GDP grows in real terms also on the basis of accidents, disasters and pollution. If people work so hard that they get heart diseases, the operations and medicines help to grow GDP as well. In recent times people try to gain wealth by investing and trading in property on the basis of borrowed money.

De Sade goes a few steps further than Mandeville and argues that one should not try to assist the poor in any way, because that would only make society more equal. The poor are part of nature. Without poor people there would not be any incentive to work in order to become rich. Moreover, the poor breed and this constitutes a problem in its own right, inasmuch as they create too many useless eaters. De Sade maintains the right to private property, but adds that this indicates that one should not try to punish theft. A thief tries merely to extend his private property. One should rather punish him who has failed to prevent the theft of his property. Needless to say that De Sade has little time for women and children. They are weak and prone to have compassion on others. This is undesirable as a negative feature of nature. Following Aristotle he argues that they represent nature, and should be treated as such, whereas men are bearers of culture and should be cared for and supported by women. Both Mandeville and de Sade portray a society divided into a wealthy leisure class and a class of workers. Both authors foreshadow already the (mechanistic) idea of an invisible hand, inasmuch as the system of the society they have in mind compels people to invest, to spend and to work. I. Kant made the same point in an essay about general

history.[160] Ambition, lust for power and greed would force people to develop their powers and talents to prove themselves and problems created by such application would engender a further development of power and talents, so that eventually a moral society would emerge. In another essay (*die Aufklärung*), however, he takes a different tack. Urging all people to be rational (use your own brains), he realises that if a large number of people would do so too early anarchy might arise. Kant, therefore, did not resolve the tension between nature and reason.

Although views such as these were part of the Enlightenment ethos, key figures such as Adam Smith (Ch 5) held a more moderate view, albeit also one based on self-interest.

4.5.1Jeremy Bentham (1748-1832)

Jeremy Bentham deeply believed in progress and in achieving the goal of happiness by the rigorous application of reason. Each autonomous individual would try to become happy by a rational calculation of self-interest. For society as a whole, where society was basically seen as a large number of individuals living in the territory of a state, happiness could not be achieved unless the liberty of each individual were curtailed somewhat. Politics had to ensure that such interference was reduced to a minimum, so that the greatest happiness of the greatest number would ensue. Utilitarians, as these thinkers were known, considered that the state had the right to interfere if the result of its actions increased utility or a greater happiness for a greater number of people. Bureaucratic state management could be justified if it met this criterion. This contrasted with those liberals who believed that people were endowed with natural rights to private property and liberty. The latter believed that the task of politicians was to comply with the pre-established natural order. If one deviated from this path, there would be problems.

> Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all we think: every effort we can make to throw off our subjection, will serve but to demonstrate and confirm it. In words a man may pretend to abjure their empire; but in reality he will remain subject to it all the while.[161]

We can recognise in this quote Kant's dualism of on the one hand an ethical realm of freedom and on the other a realm of nature governed by cause and effect. Yet, where is freedom in this view? Are we not completely ruled by these two masters? In this regard Bentham believes that the government should have the role of fostering the happiness of the subjects by increasing utility. Indeed, he denied the existence of 'any divinely implanted moral

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[160] I. Kant, *Idee zu einer allgemeinen Geschichte in weltbürgerlicher Absicht*, 1784, quoted by Kurz, op. cit., pp. 67/68.

[161] Bhikhu Parekh, *Bentham's Political Thought*, Croom Helm, London, 1973, p. 13.

consciousness or divinely ordained moral norms'.[162] People are driven by 'self-regarding motives', which in the progress of civilisation could be slowly compensated for by social motives. In this respect Bentham believed that Governments could devise measures which indirectly would constrain people to actions beneficial to the happiness of all, including propaganda, education (his proposed curriculum for secondary schools featured science and technology), the promotion of non-alcoholic drinks to counter drunkenness and the provision of public works to suppress unemployment. Thus, rather than relying on an invisible hand mechanism Bentham believed in the Government being the arm that would bring welfare to all.

An active state would be called for, therefore, to tame human nature and to secure happiness for all. To allow effective policy-making, Bentham developed a technique for the calculation of pains and pleasures. He hoped thereby to become the 'Newton of the Moral World'.[163] In essence it was a matter of entering pains as debits (minuses) and pleasures as credits (pluses), so that they would sum to a net gain or loss. Moreover, in order to properly compare pleasures and pains he introduced money as yardstick:

> Money therefore is the only current possession, the only current instrument of pleasure. When a legislator then has occasion to apply pleasure, the only method he has of doing it, ordinarily speaking, is by giving money.[164]

The point Bentham made here is that power and reputation are matters of comparison between people. Money, however, makes everybody happy. The more money we have the more pleasure we enjoy. However, whilst Bentham concedes that logically one could take away money from the rich to improve the lot of the poor, he lists adverse second and third order effects of such a redistribution such that the overall effect would be a reduction in wealth. The rich would not be prepared to accumulate wealth if it were to be taken from them in tax and the poor would shrink from working if they were handed money taken in tax from the rich.[165]

Bentham did not apologise for measuring everything in terms of money. Money is an instrument like a thermometer or a barometer. If people don't wish to use the instrument of money to measure pain and pleasure they had better bid farewell to politics and morals.[166] If a social/economic object designed to facilitate buying and selling is to be the measuring rod for ethics and politics, areas that are not economic in nature, then, we are dealing with an instance of economism. Money, in Bentham's way of thinking is more than an instrument inasmuch as it should determine pleasure and happiness as administered by politicians.

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[162] John Dinwiddy, *Bentham*, Oxford University Press, Oxford, 1989, p. 113.

[163] A. Kouwenhoven, *Vrijheid en Gelijkheid*, Stenfert Kroes, Leiden/Kok, Kampen, 1965, p.47.

[164] Parekh, op.cit., p. 119.

[165] Kurz, op.cit., p. 78.

[166] Parekh, op.cit., p. 123.

The system advocated by Bentham, then, becomes a system for accumulating money in a rational manner. The emphasis on the greatest happiness for the greatest number, as measured in money, causes him to pay particular attention to security. In the real world, there will be those who want to disturb the wonderful world of happiness by stealing or loafing about. This problem should be addressed by education. The principles that lead to the greater happiness of all should be inculcated by sound education so that individuals will internalise them and exercise them mechanically.

Bentham's ideas influenced British policy-making in the 19th century and even thinking today. The idea that social welfare encourages 'welfare cheating' is distinctly utilitarian. Hence, one proposes work-for-welfare schemes. Cost-benefit studies to determine whether infrastructural projects will yield a net benefit (in money terms) or utility to the nation is another example. Such techniques have the same difficulty as pleasure-pain calculations, namely how one assigns monetary values to such matters. In practice, controversial projects are seldom resolved through such calculations. Governments keep groping towards what might be considered greater happiness.

As part of a mechanical view of the world, thinkers of this period tended to consider people as mechanical objects or clockworks, despite their belief in the intrinsic freedom and autonomy of the individual. This inner tension in the liberal world-view comes to the fore in Bentham's proposal for the construction of a *panopticon*, a building in which the inmates would be taught basic disciplines and would be watched constantly by watchmen in the centres without being aware of such supervision. Bentham called this construction 'The Inspection-House', and provides a detailed account of its workings and properties.[167] Nothing would be lost. In this regard, the author opposes the death penalty, because it would deprive the 'aggregate of happiness and utility' of labour. The inmates should work. The treadmills, common to prisons in those days, should drive a number of useful machines. There would be also a machine for the administration of punishment. It is through the working of such institutions that society should feel secure. It is possible that the workhouses, common in Britain in those days, served Bentham as a model for his panopticon. Kurz ends his story of Bentham's system with a quote from Miller to the effect that the panopticon was a beautiful splendid and transparent temple of reason.

Finally, Bentham is an example of a secular thinker who was not specifically influenced by Christian ideas.

4.6 Idealism (1735-1830)

The period of early rationalism ends with the Idealism of Kant, Fichte and Hegel. Kant in particular was the key thinker. His solutions and propositions have had an influence on all subsequent philosophies right to the present time.

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[167] Kurz, op. cit., pp. 82ff.

4.6.1 Immanuel Kant (1724-1804)

Kant's basic outlook on life and the world was strongly influenced by the Enlightenment. This comes through especially in his smaller works such as *What is Enlightenment (1783)*, *The Idea of a General History in World Civil Perspective (1784)* and *The presumed beginning of the history of man (1786).*[168] All three were published quite late in his career. General ideas are that humans are animals, but equipped with reason. Nature is full of potential and also a taskmaster as well as a type of god. In a state of nature people are ruled by instinct. Gradually, as they make progress, they are ruled by reason and in this way enter a state of freedom. Nature drives people along to a state of perfection achieved when the world consists of a set of states living together in a League of Nations. Progress takes place via human dispositions such as covetousness, greed, envy and discontent. Such progress is basically material/technical in nature, although it may include also the peaceful ordering of a state. Kant gives the example of a forest. As each tree must strive for light against the attempts of adjacent trees to achieve the same, the trees grow straight. However, an individual tree grows in all manner of strange ways, as it is not constrained in any way.[169] Thus, competition brings about a greater good. States that face the threat of war from neighbouring states likewise are compelled to improve their defences. For our subject it is noteworthy that Kant (*Presumed beginning of human history*) refers to the beginning of agriculture by saying that the final step taken by reason is to make humans aware that they are the telos of nature and that nothing on the earth can compete with them. Animals are not co-citizens of this world, but rather are means and instruments in the hand of his will. In a state of society this would apply to all equal people jointly.[170]

Sachsse too has emphasized the continuity between Kant's views and the spirit of the Enlightenment. Like Bacon Kant sought a method to obtain knowledge. In his *Critique of Pure Reason* thinking is a technical performance. The senses provide only the materials, which by means of transcendental forms are ordered to perceptions which, in turn, provide material for thinking. This means 'acting instead of receiving'.[171] Thus, Kant philosophises on the basis of the spirit of the emerging technology of the Industrial Revolution. Sachsse wonders whether humans are up to the task of using the whole of the creation as material for technical human performances? Kant considers that Reason will guide humanity through its regulative principles and by means of an ethical categorical imperative. The latter, however, is a purely formal, methodical, criterion.

Of course, there are tensions in Kant's basic view such as instinct versus reason, nature versus culture, control versus freedom or free will versus nature's determinism. Venter shows in a diagram that nature-instinct-slavery

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[168] J.J. Venter, *Immanuel Kant: Samelewing en Vooruitgang: Drie Traktate,* Potchefstroomse Universiteit vir Christelike Hoer Onderwijs, Potchefstroom, 1992.

[169] ibid., p. 28.

[170] ibid., p. 42.

[171] Sachsse, op.cit., pp. 192/193.

are a 'bottom' consideration and that nature through competition leads to equilibrium and culture, whilst slavery via conflict leads to peace and freedom, with culture being free through reason.

Kant's theory of knowledge begins with the belief that things in themselves are unknown to us. We perceive only phenomena. All knowledge depends on perception. Since the mind receives a jumble of perceptions from the objects outside us, the question is how these are processed into knowledge. According to Kant knowledge is possible because the mind is equipped with a priori forms for the ordering of perceptions: space (geometry) and time (arithmetic). Space and time are implied in every perception of things. Therefore, they cannot be derived from the study of things. We begin with them, because they are a priori. It is thanks to them that we form pictures of things. Add to these the 12 categories of reason such as causality, then, we construct our own rationally ordered world, according to our will.

Kant split reality into two parts. On the one hand is the realm of nature, in which things are connected by cause and effect and in which theoretical reason applies and, on the other hand, the realm of freedom, in which practical reason experiences freedom in human acts. Kant attempted to overcome the dialectical relationship between these two realms and two motivations of nature and freedom.

Ethics was the core of Kant's philosophy. Pure practical reason would determine the criteria for what is good. Humanity should produce a will that is good in itself and the meaning of life would be realised if one did what this will prescribed as duty.

Thus, the distinction between the two realms returns in a different form as that between 'Sein' and 'Sollen'. The realm of nature exists as such. It is full of facts and processes that take place independent of our will. In the realm of 'Sollen', the realm of freedom, we exercise our free, autonomous will. This should not be done in an arbitrary manner, but rather according to the categorical imperative: act in such a manner that you use humanity both in your own person and in that of another as end and never as a means.

Although this is a very noble sentiment, it is rarely observed in practice. The reason why people are so often treated as means owes much to the dialectic of nature and freedom (following Hale's treatment of the Renaissance we could also say; nature and civility or culture). Kant provides an insight into this in the *Preface to Second Edition of Critique of Pure Reason (Bxiii)* where he argues that experiments should be technically designed by reason in order to cross examine nature. The answers that nature provides should enable the formulation of laws. This being the case, it follows that as humans we can take advantage of these laws to control nature. As human beings, however, we are also part of nature. Hence, we can also be controlled by people who apply the results gained by understanding nature. In this regard, it should be noted that Kant put a quote from Francis Bacon's book *The Great Instauration* on the back of the title page of the second edition, even though he does not talk about the use to which experimentally gained knowledge might be put.

Modern enterprises and bureaucracies of various types do control people (called human resources) for their own ends. Modern farmers are forced to comply with the instructions, products and processes imposed by suppliers and processors. The effects of such on their animals, pastures and soils are determined by the results of scientific/technical experiments conducted by the former. Traditional knowledge garnered over centuries about nature is, thereby, lost, despite the wisdom it may have contained. Nature's providential guidance and prodding, therefore, seems to be ambivalent at times.

In terms of political theory Kant had a view of a system of relationships (part of nature) working as an invisible hand to bring about culture, as explained above. He saw this as the work of a wise creator rather than the hand of an evil spirit.[172] Kurz sees this as a theological justification by Kant. Indeed, in an essay about the beginning of human history Kant argues that God included the bad such as conflicts and passions in His creation for the sake of the common good. As in the case of Francis Bacon, Kant failed in this way to reckon with the radical nature of the fall. The common good resulting from ambitions (human nature) is at best very fragile and at worst may trigger spirals of destructive behaviour with dramatic effects on the state of nature (climate change, pollution). Kant's own view was the very optimistic one that through the mechanisms of evil (human nature i.e. the part not under the control of reason) humankind would eventually bring about a peaceful and prosperous moral society. He could not possibly prove it. Following Kant, Darwin and Karl Marx would develop this same theme.

Kant's invisible hand idea suggests that technical production for profit takes place of itself because it springs from peculiar features of human nature. The implication is that one should not interfere with the working of this human nature if one wants its desirable fruits. In this respect De Graaff has drawn attention to a remarkable statement in Part 7 of the Introduction to the *Critique of Pure Reason:*

> By way of introduction or anticipation we need only say that there are two stems of human knowledge, namely, *sensibility* and *understanding*, which perhaps spring from a common, but to us unknown, root. Through the former, objects are given to us; through the latter, they are thought.[173]

De Graaff wonders why Kant did not inquire into the nature of this unknown root and he surmises that he was perhaps reluctant to do so because it confronted him with the dark spirit of subjectivity. He then refers to Mephistophelis in Goethe's *Faust*, whose typical character traits are sensibility and reason (understanding). Is Kant suggesting that enlightened humanity is engaged in a contest such that given objects and objects thought are both to be used, in an on-going interaction, to advance whatever cause we want to pursue?

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[172] Kurz, op. cit., pp. 67/68.

[173] I. Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith, 1933/1976, Macmillan, London, pp.61/62 and De Graaff, op.cit., p. 271.

4.6.2 Goethe's Faust

At this stage, we may remember the poem *Faust* written by Johann Wolfgang von Goethe (1749-1832), one of Germany's greatest poets. Goethe believed that nature as such is good, even divine. Good and evil are not so much basic contradictions, but two sides of the same coin. People should be able to overcome evil by their own efforts, aided by their reason. Faust has made a covenant with the devil (Mephistopheles), who is able to carry out all the assignments set by Faust, including, as the last such act, the reclamation of land from the sea. Humankind is unable to live without technology and science. Importantly, the devil is able to provide all needs and all wants. Yet, despite the devil's prowess and evil intentions, Faust strives to let the inventions serve human purposes. The devil wants to close off this world against all influences from another world (God's creation). Nevertheless, Faust keeps remembering the world's and humankind's divine origin.

It is remarkable how technology, science and economics are intertwined in Faust in the sense that together they serve to provide the materials people need. Thus, in Part II, the Emperor is provided with paper money as a substitute for gold. We also learn how a small type of human being is reared in a glass tube (a homunculus). Why did Faust want to gain land? Basically, he thought that the ceaseless working of the tides was a waste of energy, as it left the land dry and barren at low tide. So he wanted a dike to keep the sea away from the land. A free people should then be able to live on the land. The stratagem of Mephistopheles is for Faust to enter a war on the side of the old emperor, to win it, and then to be given the sea as a present, so that he can set about reclaiming it. Yet, once the great work is accomplished, Faust is not happy. He wants the simple hut (chapel) of Baucis and Philemon, pious folk, who had found the very rapid building of canals and dams very unnatural (it required human sacrifice). To build his palace on the old land, he wants them to shift to a new house in the polder. His helpers threaten the poor old folk, who drop dead from fear, and set fire to the place when somebody comes to the rescue of the old and is slain.

In the end Faust escapes from the clutches of the Devil, because he has not found the moment that will enthral him forever. His last words are about his great project's unfulfilled vision:

> I long to see that multitude, and stand with a free people on free land!
> Then to the moment I might say: beautiful moment, do not pass away!
> Till many ages shall have passed
> This record of my earthly life shall last.
> And in anticipation of such bliss
> What moment could give me greater joy than this?[174]

F. de Graaff has noted that at this final juncture Faust is still concerned with the salvation of humankind and not prepared to forget his divine descent and future. He is not prepared to become just a part of the world with all it has to offer him. All this is pointing heavenward. Chaos becomes the womb of a new

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[174] J.W. Goethe, *Faust 2*, trans. David Luke, Oxford University Press, Oxford, 1994, p. 223.

creation, just as God brought forth light from chaos (Genesis 1:1-3). The subjective spirit (people's scientific logical approach to the development of technology as a means of mastering the world) is a very destructive force even when it aims at doing good things. We cannot avoid this spirit anymore. We can only try to avoid becoming its slave.[175] Modern people seek healthy fruits by means of science, technology and economic systems but instead keep finding bitter fruits. The dream, however, compels us to keep searching. Only when all memory of what would be good fruits has disappeared would darkness overtake us completely.

The search for wholesome fruits by means of science, technology and economics, as in Faust's dreams about the land to be reclaimed from the sea, is a search for what ultimately brings order and well-being to our life. In this sense it is religion.

De Graaff was right, in my view, in drawing attention to the statement quoted from Kant's *Critique of Pure Reason*. Goethe, who lived during the period of Aufklärung and Idealism appears to have grasped why Kant was so reluctant to trace the unknown common root of objects given and objects thought.

The period of Enlightenment and Idealism opened a relentless drive towards mastery of 'nature' (objects given) by means of objects thought (technology) purely for humanity's designs noble and otherwise. From this point onward it is virtually impossible to discuss scientific technology (technicism) in isolation from economism, understood as a world-view derived from a picture of the world as a treasure-trove to be accessed through competitive markets driven by the profit motive (Ch 9).

4.7 Late Rationalism (1830-1914)

After Kant and Hegel, people became tired of speculative systems and metaphysics. Instead, attention was switched to scientific methods and to the observation, classification and analysis of facts. Positivism became the dominating characteristic of this period. Philosophically, it expressed the mood of the times. The Industrial Revolution which had commenced in Britain during the previous century was now becoming prevalent in Europe and via the modern communication and transport systems also in overseas territories. People (excepting the working poor), scholars as well as business men were optimistic and confident that civilisation was advancing through the application of scientific methods in modern technology. Hobsbawm articulates this sense of euphoria, as follows:

> 'Positive' science, operating on objective and ascertained facts, connected by rigid links of cause and effect, and producing uniform, invariant general 'laws' beyond query or wilful modification, was the master-key to the universe, and the nineteenth century possessed it. More than this: with the rise of the world of the nineteenth century the early and infantile stages of man characterised

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[175] F. de Graaff, op.cit., pp. 259-270.

by superstition, theology and speculation were over, Comte's 'third stage' of positive science had arrived.[176]

Auguste Comte (1798-1857) was indeed a key figure in the positivist movement. His key concerns were the organisation of a new scientific ordering of society and the ordering of scientific disciplines. He distinguished 6 basic disciplines, each with a method of its own and ordered hierarchically in increasing degree of complexity from mathematics to sociology. Mathematics was the most fundamental, followed by astronomy (using mathematical methods), physics (assuming mathematics and astronomy), chemistry, biology and sociology. The task of philosophy was to investigate the various methodologies as expressions of the human spirit. Knowledge of nature, as acquired by the sciences, should be used by society to subdue nature for the benefit of human society. Within society there should be room for the worshipping humanity. Practically, such a religion should overcome individualistic egoism by communal love.

Although socialism and communism have attempted to foster such communal love through the powers of the state, they have failed to eliminate egoism and individualism. Nor has Comte's insight been followed that each discipline applies a distinct method, so that one should not reduce one scientific discipline to that of another. Modern economics, for instance, often assumes that only a mathematical/physical method should be able to discover certain knowledge and regularities. Comte believed that humankind was on the road towards a 'golden state' moving through the stages of theology, metaphysics and positivism. Such progress was predestined. This being the case, one wonders why humankind should be organised so as to bring about such progress.

The idea of history displaying a deterministic movement through stages towards a glorious future was shared by Karl Marx as well as by various thinkers in the German historic school. Charles Darwin expressed a similar idea, albeit without distinct stages in his theory of evolution. Thinkers affected by the positivistic spirit of this period all emphasise the need for positive methods.

Vollenhoven considers David Ricardo (1772-1823) as part of the positivistic sub-period of late rationalism (1830-1850), even though he died just before the start of that period.[177] In actual fact he was a late representative of the 17th century rationalistic system builders. He applied a deductive method of economic reasoning to practical problems of his time such as the poor laws, the rent of land and the price of bullion. Assuming, like Smith (Ch 5) that society distributes necessaries, conveniences and luxuries and that labourers can only afford necessaries, he posits a mechanism of market wage and natural wage. If the former exceeds the latter, labourers expand their families (marry earlier, for example) and such increase in supply lowers the market wage again. In the opposite case, marriages are deferred and the number of

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[176] Eric Hobsbawm, *The Age of Capital 1848-1875*, Abacus, London, 1975, p. 314.

[177] Bril, op.cit., p. 150.

children declines. By paying poor relief the Government interferes with this mechanism, and finds that the poor stop working and this, in turn, reduces the amount of taxes from which the relief is to be paid. It would also impede progress. Thus, Ricardo reduced people to automatons. Karl Marx would have a field day lampooning such 'mechanisms'.

Rather than Marxism or socialism, however, it was liberalism, as formed in the 17th and 18th century by Hobbes, Locke, Kant and Adam Smith that determined the views of leading industrialists, politicians and economists during the 19th century. They applied the liberal view of humankind and society, however, in a positivistic manner. Rational methods had to be applied in technology and in market economies in order to achieve prosperity. The theory of the invisible hand, which would bring about the welfare of society through the relentless pursuit of self-interest was intrinsically believed in. Each enterprise should aim at maximising profits by keeping the costs of wages down and pushing production to the limit by the installation of steam power, mechanisation and efficient organisation. Employees were reduced to the state of virtual slaves. Children had to work long hours in appalling circumstances. Cheap labour was available as England reduced import duties on wheat, so that farm labour became redundant.

4.7.1 Antoine-August Cournot (1801-1877)

As a disciple of the *École Polytechnique* Cournot received a rigorous training in mathematics and mechanics. Indeed, this famous school had its origin in the Enlightenment. Its basic idea was that the best scientists should teach there in order to let the light of reason shine brightly not only to master nature but also to control social nature. On the basis of this ideology, Cournot attempted to apply mathematics and science to economic problems. He wrote a number of economic books as well as studies on astronomy and philosophy. According to Maréchal Cournot aimed at a complete mechanisation of economics.[178]

As Galilei and Newton found the laws of motion, which enables them to deduce how the apparent relative movements of the planets were due to real and absolute motions, so economic theory should show the source of apparent fluctuations in wealth. He believed that the greater the extent of commerce, the closer one would be able to approximate the underlying causes of changes in wealth. Exceptional cases would have a lesser effect and variations in prices would move within smaller margins. Cournot believed that it was impossible to grasp the true nature of wealth (comparable to the 'Ding an sich' of Immanuel Kant). All we can know is how things relate and how they vary over time. We cannot know an absolute (economic) value, only booms and busts in value. In the theory of demand, for instance, there is no point in asking what the value of the good demanded is. All we need to do is to specify how the demand varies when small changes in price occur. In this Cournot assumed that the demand function would be smooth and continuous (law of large numbers). The next question is then how supply reacts to such

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[178] Jean-Paul Maréchal, *Le Rationel et le Raisonnable; L'économie, l'emploi et l'environnment*, Presses Universitaires de Rennes, Rennes, 1997, pp. 53-56.

changes. Assuming entrepreneurs aim at maximising profits, Cournot derives the various forms of competition such as monopoly, duopoly and pure competition. In this way, Cournot reduced economics to a mechanical or physical (natural) theory.

4.7.2 Alfred Marshall (1842-1924)

In Vollenhoven's scheme of late rationalism, positivism is followed by neo-Aufklärung and Neo-Idealism. In reaction to the rather cold approach of mathematical-physical methodology, characteristic for positivism, attention is focussed again on specific human concerns. Around 1870, the marginal approach of neo-classical economic theory, which sees the economic process as guided by the demand (utility) of consumers, is developed (Chapter 7). Alfred Marshall, who became one of the leading economic theorists in the late 1800s and had great influence till well into the 1930s, is a typical representative of the spirit of this period.[179] His economic theory generalises the classics, especially Ricardo, by determining equilibrium prices on the basis of both demand and supply factors. The importance of marginal changes in both demand and production is emphasised especially with reference to Cournot and von Thünen. Equilibrium prices come about particularly through changes in supply factors. Whether or not such change is possible depends on the period of time available. On a day market, for example, no factor can adjust, so that demand has a greater impact on price. In the very long-term all supply factors can change so that the equilibrium price is determined by both demand and supply. Competition is assumed to trigger substitution of efficient for inefficient producers (as part of a search for higher profits), so that progress ensues. This reflects Marshall's basic view that organisation and knowledge will increase humankind's power over nature.

Recognising the complexities of adjustment processes, Marshall analyses such adjustment for one industry at a time, assuming that it is too small for it to be able to trigger changes in macro-aggregates such as the money supply and that no changes occur in any other industries (partial equilibrium). The influence of Smith and Ricardo is expressed in a hierarchy of goods ranging from necessaries via conventional necessaries to the superfluous. The middle group allows a comfortable standard of living. Although such goods may be dispensed with they are preferred by the majority. In this respect Marshall is somewhat ambivalent. On the one hand progress, as embodied in wealth and knowledge, engenders new wants, for which people want to work. On the other hand, if people start living extravagantly, new wants that so emerge will reduce savings and thus impede progress.

Marshall uses biological metaphors throughout his book. The division of labour is seen as a division of functions within a growing body. Growth leads to a higher degree of interdependence and hence requires also a growing 'intimacy and firmness of the connections between the separate parts of the industrial organism' (241). To ensure such stability, progress should be slow

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[179] Alfred Marshall, *Principles of Economics*, Edition published by the Royal Economic Society, Cambridge, 1961 (first published 1890), (references between brackets).

(249). In the struggle for survival knowledge and organisation are applied to subdue nature. As this process advances, the more the conventional becomes a necessity and the superfluous a convenience. In this regard he observes that higher wages are likely to result in greater efficiency (pp.510-530). Yet, Marshall also refers to the modern organisation of labour as a caste system (245). Thus, he foreshadows the idea of Henry Ford that when labourers are well paid they will also be consumers and, therefore, able to buy the products they manufacture, albeit at the price of having to do tedious work.

In the long run progress means an increasing command over nature. To ensure stability checks should be applied to the growth of populations, even in the form of eugenics (248). Otherwise, progress cannot be disseminated to the world at large. With regard to the social question of his day, Marshall did not believe that laissez-faire would be able to maximise welfare for society as a whole. He favoured fairly high taxation to deal with the *'evils of inequality'.*[180]

Despite the major use of the biological metaphor of evolution (*natura non facit saltum*) Marshall also invokes the mechanical metaphor of the pendulum and the force of gravity to illustrate the nature of stable equilibria (the demand price being just above the supply price for small amounts just less than the equilibrium amount (345)). The latter condition is well known from cybernetics (negative feed-back loops). In other words equilibrium is a mechanical concept. The use of long periods of time might offer a way of escape from mechanistic thinking, because they make it possible to consider alternative uses of resources.

4.8 Irrationalism (1915-present)

The period 1871-1900 was generally a period of great optimism about the course of progress. Technical inventions, including the application of electricity, changed life in many ways. Machinery capable of mass production was installed in many industries. The generation in charge during these three decades has been called the 'generation of materialism.[181] The influence of Christianity on public life, especially in education, was rolled back (secular education). In the social/political sphere the battle between liberalism and socialism was prominent. Social Darwinism influenced many to the point of a eugenic movement in the USA and parts of Europe. It was also the age of empire, with all major powers attempting to acquire, expand or hold on to colonies.

This optimism was shattered by the outbreak of World War I in 1914. The Great Depression of the 1930s along with the rise of fascism and World War II, followed by a Cold War until 1989, added to a sense of confusion and a need for re-orientation.

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[180] J.A. Schumpeter, *History of Economic Analysis*, George Allen and Unwin, London, 1954, p. 765.

[181] Carlton J.H.Hayes, *A Generation of Materialism 1871-1900*, Harper and Row, New York, 1941.

The dissolution of the Middle Age synthesis between the Graeco-Roman world-view and the Christian one took another turn. During the Renaissance one retained the idea that human beings are very special (a Christian heritage) or even close to being divine, as in the Hermetic Kaballah which influenced Pico Della Mirandola (1463-1494) and in Lessing (1729-1781).[182] As the centuries wore on, however, most philosophers identified reason or rationality as our highest function. On the other hand, the nature part of the Middle Age synthesis developed into technical thinking or mastery of nature through science and technology. The classicism of the 18th century strengthened this approach. During the 19th century it tended to take the form of rational humankind applying technical/scientific methodologies to subdue nature including human society. The new technologies tended to develop in a deterministic autonomous fashion, being driven by the scientific method (the clock metaphor) to the effect that humans had to adapt to technology rather than the other way round. Darwinism tended to reduce humans to parts of nature or to the strongest species of nature. Nature had to be explained in terms of nature.

The wars of the 20th century cast doubt on the optimistic expectations of progress engineered by reason. Various irrationalist philosophies, including neo-positivism, vitalism, pragmatism, existentialism, New Left and New Agewhich assigned to reason a much more modest place. In various ways they entailed a more critical view of rational/technical culture. Nevertheless, the naturalist view which sought new life through science and technology continued unabated, going from strength to strength so to speak (transport, nuclear power, computers, genetic engineering, micro-engineering). Large business corporations in conjunction with universities and Government institutions were instrumental in driving technical progress. The effects of untrammelled production and consumption on the environment, however, have reinforced Green movements, New Age and post-modernism. In the deep ecology movement the spiritual intuitionism of the Hermetic Kabbalah has emerged again, albeit in the form of New Age and the theosophy of Rudolph Steiner. They tend to equate nature with the supernatural. At the beginning of the 21st century the question is still: what is a human being? Is it a very special being, entitled to have its dignity protected in the form of human rights and in charge of his or her own destiny or a being that is completely natural and, therefore, in need of the guidance of the (spiritual) supernatural or the technocracy of the State (as an example of autonomously working structures) or science (ethics should follow the lead of what is technologically possible)?

Social scientists and organisation specialists tend to think along the lines of Mazlow's psychology, believing that the most basic needs of human beings are material and that spiritual needs can only be satisfied once the material are taken care of. This allows the technical/economic system to be the most basic one for the peace and coherence of society. The special place of

[182] Bril, op.cit., p. 313.

humans is then expressed in the form of freedom of choice and democratic rights.

Science, economics and technology have ceased to be spheres of culture in their own right pursued by people with a peculiar vocation to work in these fields. The large business corporation aims to capture and increase market share by means of technical innovations and clever seductive advertising. Instead of seeking to improve the lot of humankind, their purpose is to make monetary profits for shareholders and senior management. To maximise profits technology should be deployed to eliminate the human factor in production and to reduce costs per unit of output. Wages should be as low as possible. Whether or not such practices cause unemployment, pollute the environment or involve dangerous work environments is of no concern to the owners. They tend to argue that the Government should care for such matters. Of course, if the Government does understand its task and imposes constraints in the public interests, business will complain bitterly. In order to prevent such adverse public action, business lobbies members of parliament, propagate dubious scientific opinions or makes strategic financial donations to political parties.

Politicians who ignore economics, that is to say who forget how crucially important business is for life as a whole, will face extinction at the polls. Indeed, the concepts and language of business have penetrated into all areas of life. Notions such as efficiency, cost effectiveness, input and output and, last but not least, markets and marketing (also known as communication strategies) are found everywhere. Universities only offer courses that attract a maximum of students, rather than offering a wide spectrum of courses such as the seven arts in the Middle Ages. Commerce, science and technology tend to form the core of university life. Thus, the realm of business flourishes and dominates the rest of life to the extent that many worthwhile areas of human culture atrophy.

During the 20th century this tendency occurred in all types of Western countries, including their colonies. The movement of state capitalism in the Soviet Union and the countries under its control from 1917-1989 was firmly based upon the materialism of science, technology and economics. On the other hand, fascism in Italy and National-Socialism harked back to pagan ideologies, but used science, technology and economics to further their ends. They established their own values, including racism and eugenics and believed that they could do so because they had the power to do so.

Post-modernism appears to be modest with regards to any claim on truth (one should accept differences flowing from a variety of views of life and the world), yet post-modern thinkers would not question the importance of modern technology and economics.

In order to capture the time spirit of the 20th century it appears necessary to go beyond the world of philosophers and inquire into how the 20th century civilisation saw the place of the law as a source of norms and values. This is

best be done by analysing the two industrial revolutions that occurred during this century.

4.9 Second Industrial Revolution (1900-1970)

The second industrial revolution involved the rationalisation of production processes known as fordism, after Henri Ford, who had introduced the assembly-line, as a means of manufacturing cars. Kurz emphasises the significance of the motor-car as it linked capitalist production to consumption. The workers employed in the large car assembly plants would be paid sufficient to be able to mass-consume motor cars. Production would generate consumption. The mechanised and utterly rationalised production systems turned human beings into mechanical instruments themselves. This became apparent during the Great War of 1914-1918, when large armies fought by means of mass produced tanks, artillery, machine guns and mustard gas. It was the first industrialised war. Robert Kurz called it the continuation of competition in a different form.[183] The slaughter was unbelievable.

The inflation set in train to finance the War went completely out of control after the War, resulting in a complete monetary collapse in Germany. The Government had pushed an enormous amount of money into circulation, for which there was no tangible output available to citizens. This phenomenon became widespread during the 1920s albeit via the intermediary of the banks creating liquidity for speculation in assets such as shares and real estate. When the latter collapsed, many banks had to close their doors and economic life contracted into a major deflation, coming to an end only because of preparations for the next war.

J.M. Keynes has shown that the technical/economic system created by the second industrial revolution is inherently unstable, because not all income received is spent and capital investment may be either insufficient or too large to keep output in balance with demand at the level of full employment.[184]

Business corporations, as bearers of the industrial system, concentrate merely on maximising business profits, in the interests of managers and shareholders, by producing at the lowest possible costs. Costs not expressed in money values such as environmental degradation, unemployment, industrial accidents and diseases are externalised and brought to bear upon society in general or on future generations. Private property rights have precedence over the rights of commons, which are seen as the concern of the State. Business lobbyists, however, will try to minimize the latter.

An important part of fordism as applied in the second industrial revolution is the scientific management of labour as developed by Frederick Winslow Taylor. By means of precise measurements obtained by time and motion

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[183] Kurz, op.cit., p. 337.

[184] J.M. Keynes, *The General Theory of Employment, Interest and Money*, MacMilllan St. Martin's Press, for the Royal Economic Society, 1973 (original 1936).

studies it eliminates any inefficiency in the use of human labour. In the industrial system of the second industrial revolution, based primarily around the car, human labour is a quantity similar to any other material input. It should be used economically at the lowest cost. By tying production, consumption and money flows close together, the system is eminently reflected by the theoretical general equilibrium model of Walras. Similar to this 'pure' system, it has become an autonomous system that hurtles over the world oblivious to the costs it imposes.

4.10 The Third Industrial Revolution (1970-Present)

The inventions of the computer during the 1940s, the transistor in the 1950s and in particular the micro-processor in 1971 have set the scene for a revolution of telecommunications and computerisation. The Internet, as a universal communications device became available for business use in the late 1980s and 1990s. Business corporations were now able to disperse their production systems around the globe, as they could manage the whole system from headquarters, using the new systems of communication. This meant that large pools of labour in Third World countries could be employed at low wages, or forced into unemployment by cheap imports from the richer economies.

Such cheap imports tend to be the modern equivalent of the necessaries that economists since Adam Smith have been referring to as those goods without which one cannot survive. Once one enjoys a somewhat higher income conveniences may be obtained to make life comfortable. Those on yet higher incomes or those able to borrow may enjoy what Smith called 'the elegancies of life', the luxuries including expensive holidays, executive mansions etc. The rich in society are always able to spend on luxuries because their incomes and wealth are adequate. Since they are always in a minority, the capitalist system needs to ensure that the poor and the middle classes have access to money to buy not only the basics, but also the conveniences and some of the luxuries. As technology advances, new products can be turned out in larger quantities and sold at lower prices. Modern gadgets such as personal computers, mobile phones, DVDs, motor cars etc. are cases in point. We might also add functional foods to this list. Since business wants to maximise profits it wants to automate its production processes to save on wages. To compensate for the ensuing loss of income of the unemployed workers, the financial system makes credit available, using computerised systems. Alternatively, the State supplies money through the social welfare system. The ever growing stream of new conveniences and luxuries makes access to money imperative. Money becomes the highest need. This desire is fostered through lotteries, gambling facilities, TV quizzes featuring large amounts of money to be won for little effort and, above all, through the casinos of the stock exchanges and the housing markets. One may become rich by borrowing for investment and trading in such asset markets. Since the system is highly unstable, entrepreneurs are always on the look out for new markets in areas hitherto outside the commercial system.

The higher the level of production, which an economy is able to churn out, and the more unequal its distribution of income is (meaning that it is more dependent on the expenditure on luxuries by the rich), the more unstable it is. As the late 1980s and 1990s have seen the implementation of a small state ideology à la John Locke, with less social welfare and a more unequal distribution of income and wealth, the system has become much more dependent on the private creation of money. Money is a good (the highest good?) rather than a means of exchange. This is exactly how Keynes analysed it. However, control of the money supply has become a great deal more difficult in a global environment controlled by TNCs and private property rights. Central banks are only able to manipulate short-term interest rates with a view to preventing price inflation. In the process, however, changes in interest rates may lead to major changes in wealth and in the distribution of wealth.

4.10.1 Hannah Arendt: Labour and Work

In 1958 Hannah Arendt wrote *The Human Condition*.[185] It served as an eloquent description of the problems arisen during the second Industrial Revolution. Fundamental to her view on these problems is the distinction between labour and work. *Homo laborans* is engaged with preparing and acquiring the means of subsistence such as food, washing clothes, educating children and cleaning the house. She believes that humankind is able to produce a surplus in this respect sufficient to ensure the reproduction of the human species. *Homo laborans* is fertile. Karl Marx called this fertility productivity.

By contrast, *homo faber* is working in the sense of producing durable objects such as works of art, furniture, houses, machines and medical instruments. *Homo faber* reifies the world by creating a world of things. The Greeks employed slaves for the tasks of labouring, because they believed that people were enslaved by necessity. Slaves had to exclude labour from the conditions of human life, so that they would be free to work. Arendt makes the point that John Locke, Adam Smith and even Karl Marx all equated labour and work. Locke saw labour as the source of all property; Adam Smith as the source of all wealth and Marx as the source of all productivity.

From the 17th century onward political theorists had to account for a process of accumulation of objects.[186] It was a process in which scientific advances interacted with the development of technology. Instruments were needed to carry out physical or chemical experiments. The resulting knowledge could then be used again to advance scientific theories. In the first and second industrial revolutions capital equipment produced new instruments, tools and consumer goods in a process very much akin to labouring. This endless process of making and labouring was experienced by the thinkers of the 17th and 18th centuries as a natural process. Understanding this 'process' was not

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[185] Hannah Arendt, *The Human Condition*, The University of Chicago Press, 1958, second edition 1998.

[186] ibid., pp. 105ff.

easy within equilibrium models, since the 'balance' always moves to equilibrium, which means standstill. It is a stop-start approach. Apart from that, the geometrical representations included only two factors (labour and capital), and focussed on the moment (synchronicity).

I note here that substituting a biological/organismic approach for a mechanistic equilibrium approach is much more difficult to deal with in quantitative economic models. Since the 18th century thinking on economics has been vacillating between the idea of the price mechanism, equilibrating supply and demand, and the idea of a spontaneously growing organism, featuring networks of suppliers and customers.

The concept of process, strongly emphasised by Karl Marx, became a standard model in the 19th century through the development of the theory of evolution. At the end of the 19th century, the equation of fertility (labour) and productivity was taken over by the various types of life philosophy, as Arendt put it:

> The difference between the earlier labor theories and the later life philosophies is chiefly that the latter have lost sight of the only activity necessary to sustain the life process. Yet even this loss seems to correspond to the factual historical development which made labor more effortless than before and therefore even more similar to the automatically functioning life process. If at the turn of the century (with Nietzsche and Bergson) life and not labor was proclaimed to be "the creator of all values", this glorification of the sheer dynamism of the life process excluded that minimum of initiative present even in those activities which, like laboring and begetting, are urged upon man by necessity.[187]

The issues raised are far-reaching. How do we know that a market or a social organisation is in a state of equilibrium? Alternatively, is it developing in a dynamic sense with or without its growth creating problems that at some stage might cause it to fall back into a state of disorder? Would such problems create opportunities for creativity that otherwise might not emerge? The latter possibility would be envisaged by vitalism.

In this context we recall that Kurz points in his historic analysis of capitalism to the biologisation of the world-view at the beginning of the 20th century. Darwin's work had fertilised so to speak the preceding naturalisation of social relationships as found in Hobbes, Adam Smith and Malthus. As capitalism became an international force within the context of European empires, competition between large corporations was appreciated as similar to the survival of the fittest in nature. If we call this a 'biologisation' it should be understood as representing this simplistic idea of competition in the struggle for survival. However, this is not quite what Hannah Arendt had in mind. She referred rather to what Kurz admirably analyses in his study of the second industrial revolution. A huge organism or system had been established that would spew out consumption goods in large amounts and which would reduce human beings to parts of this organism so as to extract from them a maximum

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[187] ibid., p. 117.

effort for the lowest possible cost.[188] In contrast to producing objects designed and formed by people not constrained by necessity to do so, this system would produce objects as consumption goods, by people labouring to survive.

By contrast to the *homo laborans*, the *homo faber* works in the sense of making durable objects. First, this was done by arts and crafts. Second, the first industrial revolution, based on the power of steam imitated the work of arts and crafts in factories. The second industrial revolution, however, brought electricity into play and this elementary force has enabled manufacturing to 'become a '"continuous" process, the process of the conveyor belt and the assembly line'.[189]

Quoting Heisenberg, Arendt notes that the world of machines has become a substitute for the real world, so that human beings begin to look like turtles, as the apparatuses we handle all the time are like the shell of a turtle.[190] Preceding this quote, Arendt discusses the distinction between nature and the world of machines. In nature there is no distinction between the process through which something comes into being and the end product. The seed and the tree are, in a sense, identical, as the seed grows into the tree and the tree produces seed. It is a process that moves by itself. When production processes are automated, the distinction between the production process and the objects to be produced is erased. Once the (automated) production process is started it yields a pre-designed stream of objects. If I understand her correctly, then, Arendt likens the automated production processes of the modern world to natural processes. They work by themselves. They are not meant to prepare a lasting home for us, like a castle in the Middle Ages, but rather to make life easy for us. Cars, for example, have become a human attribute. We cannot live without them. They have become part of (human) nature.

The question to be asked is where the line should be drawn between the processing labouring person and those that are designing and making? Where would we put a brain surgeon?

Kurz's analysis of the second industrial revolution moves along the same lines as Arendt's, especially as he describes the car as the core of that revolution. It has required the construction of motorways, the reorganisation of cities and places of work. Cars must be fuelled, requiring a major extraction of fossil fuels and an associated pollution of the environment. Kurz notes that at least 17 million people have died in car accidents during the 20th century.[191] The tourism industry is based upon motorised transport of cars, planes and ships. People need, in Arendt's terminology time to recover from the labouring process by leisure activities, themselves part of labouring as activities necessary to survive.

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[188] Kurz, op. cit., pp. 273-329 and 330-512.

[189] Arendt, op. cit., pp. 148/149.

[190] ibid., p. 153.

[191] Kurz, op. cit., pp. 555ff.

The views expressed by Arendt and Kurz come very close to describing the economic/technical production system of our time as so demanding and dominating everything that it looks like nature. It propels our world in ways that are difficult to fathom. It has many unpredictable consequences. It may even destroy the world. Political leaders have become followers rather than masters of the system's processes. If their economies cease to grow in terms of real GDP per capita they are in trouble. Real living standards, so measured, should continue to increase.

Arendt's and Kurz's analyses of life in the late 20th century show a mixture of organismic and mechanical approaches. Whilst an organism may be able to grow in a way which is determined by its genes, its environment and the supplies it receives from that environment, an automated system, process or organisation also works under its own steam provided those who control it provide it with a benign environment of sufficient inputs and ways of correcting its workings if necessary. Indeed, since the Renaissance there have been few thinkers who had a completely mechanistic approach. Most allowed also for natural processes even when they assumed that nature was subject to a movement towards a telos that was good in some sense.

Both Arendt and Kurz point to ways of liberation from the exacting demands of the modern capitalist system. Arendt focuses on the need for action, especially political action to escape from the predicament she has analysed. However, she believes that virtually the only ones able to act, to move beyond the 'system' are artists and scientists, despite the fact that the rationalism and scientism of the modern age have been at the root of the problems.[192]

4.11 Conclusion

During the Renaissance the idea arose of taming nature so as to create civility. The mechanisation of the world picture which had started after the Middle Ages and which became pronounced from Copernicus to Newton, according to Hooykaas, had a stimulating effect in this respect.[193] The book of nature was believed to be written in the language of mathematics. This provided impetus to a systematic scientific exploration of the design of the world using rational/empiricist methods. Christians liked it because it dispensed with the mythological explanations of movement and development as if, for example, the planets were living bodies. Over the centuries the new methods led to a spiralling interaction between science, the design of technology and the application of new technology in a further exploration of the world. In the social sciences, especially economics, natural law thinking valued the economic system as a mechanical system (the price mechanism) that worked like nature. The idea of nature as an organism, however, also continued to play a role. Adam Smith, Alfred Marshall and F.A. Hayek alluded to the organic growth of market economies. Socialism, communism and

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[192] ibid., page 323/324.

[193] R. Hooykaas, op. cit., p. 13.

fascism have tended to emphasise organismic approaches to society. Kant had the view that nature would ensure that as people made adjustments to their behaviour after a mechanical fashion, trying to outwit others, the telos of nature and society as a whole (the organism) would eventually be achieved.

The idea of controlling and subduing nature through social systems, science and technology has remained paramount. At present, the question whether nature strives towards a telos of some sort excites very little interest. It has vanished under the influence of positivism and pragmatism. Richard Dawkins refers to the blind forces of physics and to natural selection as the blind watchmaker.[194] On the other hand, New Age thinkers appreciate nature as a living organism that should override human interests as a type of supernature. Deep ecologists and greens are alert to the major dangers of an untrammelled progress of a technical/economic system that is driven solely by the desire of making profits, being controlled primarily by large TNCs and Governments that comply with their demands. The effect of this is that no boundaries are acknowledged to a process which turns all human relationships into market-based monetary relationships. Animals and plants are turned into means of production.

Francis Bacon described his project of experimental science as a great restauration. So, four centuries later, what is the score card? Although dramatic advances have been made in medical science since his days and scientifically based inventions have changed Western culture beyond recognition, new diseases and threats of new epidemics, resulting partly from modern technologies such as intensive industrial agriculture keep emerging.

Sachsse's question with respect to Kant as to whether humankind would be up to the task of technically changing the whole world should be a major cause for reflection. At the end of his chapter on the technicism of the modern age he notes that we have made 'change' into an all encompassing criterion for what is right. Modern business corporations have change managers. They feel obliged to restructure their operations on a regular basis. Traditions don't count. What is new takes precedence over what is old.

The idea that in the course of history scientific technical and economic progress will deliver humankind from all problems is still an active motivation of the early 21st century. Problems of pollution, global warming, depletion of crude oil reserves and of other important natural resources will be solved by science and technology through the beneficial working of free markets, or so one believes. However, this view is now part of a pragmatic/positivistic set of beliefs. One trusts that the old approach will continue to work and to prove useful.

Particularly since the first industrial revolution the scientific technicistic way of thinking has been combined with an economistic belief in the importance of economic growth and economic/material welfare.

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[194] Richard Dawkins, *The Blind Watchmaker*, Penguin Books, London, 1986/1991, p. 5.

The formula for economic growth is: change in population augmented by the rate of productivity growth and the latter is basically understood as technical change. The formula does not include any limits to this process. Governments keep searching for growth, without asking whether there are any limits to it. The idea of sustainability has been perverted in various ways: sustainable growth, sustainable rates of profit growth, sustainable consumption etc.

In the light of this overview I conclude that E.Schuurman's diagnosis of our age as technicistic rests on sure historic foundations. This technnicism has become intertwined, however, with economism. Modern industrial farming is the result of both.

The thinkers of Renaissance and Enlightenment had no idea of the problems to which the practical application of their ideas would lead. Despite the obvious problems, however, modern thinking remains marked by their beliefs. The predominately mechanistic approach of Adam Smith remains at the core of modern political economy. An exploration of Adam Smith's views seems in order, therefore.

CHAPTER FIVE: ADAM SMITH

5.1 Introduction[195]

Adam Smith (1723-1790) is generally regarded as the founding father of economic theory as a separate discipline. However, the University of Glasgow appointed him as professor of Logic in 1751, moving him to the Chair of Moral Philosophy in1752. This chair had been occupied by Prof. Francis Hutcheson from 1730-1746. Moral philosophy covered subjects such as natural theology, ethics, jurisprudence and political economy. There is evidence that Smith was already working in Glasgow on notes that later became the subject of the *Inquiry into the Nature and Causes of the Wealth of Nations (WN)*. Anyhow, in 1759 he published the first edition of the *Theory of Moral Sentiments (TMS)*. In 1790 the 6th (revised) edition of this substantial study was published.

Smith's views on economics should be understood in the light of his total philosophic concept. This chapter attempts to elucidate this concept and its consequences for his views on economic relationships.

5.2 The Zeitgeist

Since Smith lived during the 18th century, the general spirit of that period would have affected him in many ways, the more so since he had close contact with a philosopher such as David Hume, whilst during a stay in France from 1763 to 1765 he met Quesnay, Turgot, the elder Mirabeau, all physiocrats, as well as other philosophers and literary figures, including Voltaire. Back in England he went to London and wrote the WN, which was published in 1776, at about the time when the Industrial Revolution began (between 1760-1770). It was also a time of economic boom.

The Enlightenment, which marked the 18th century, was a complex movement. It featured not only a strong emphasis on Reason, but also a fascination with sentiments and passions. Division was another major theme. It was believed that everything could be partitioned and divided into smaller elements. Even feelings could be divided.[196] At the same time the classics of Greece and Rome influenced the arts, architecture and scholarship. Learned

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[195] The following three sources are used, with references to abbreviated title and page numbers in brackets in the text:

Adam Smith, *The Theory of Moral Sentiments* (TMS), eds D.D. Rafael and A.L. Macfie, Liberty Fund, Indianapolis, 1984 (original edition 1759).

Adam Smith, *Essays on Philosophical Subjects* (EPS), eds W.P.D. Wightman and J.C. Bryce, Liberty Fund, Indianapolis, 1982 (original edition 1795).

Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (WN), J.M. Dent & Sons, London, 1964 (original edition 1776).

[196] J.H. van den Berg, *Leven in Meervoud; een metabletisch onderzoek*, Callenbach, Nijkerk, 1965, page 165. Van den Berg quotes a novel (*Pamela*) in which a girl could doubt in 20 different ways.

men such as Adam Smith were intimately acquainted with the philosophies and literature of the Greeks and Romans.

Ph. De Vries has characterised the spirit of the 18th century as sceptic, inasmuch as thinkers of this period reacted sceptically to the systematic rationalistic world-view of the 17th century. Their personal interests and sentiments became prominent, although they often clothed these in general discourses about reason, society and the world. Until 1775 words such as nature, philosophy, citizen, common sense and human understanding were commonly used but with a variety of meanings.[197] Since previous centuries had done away with world-views dominated by a relationship between God and people/world, philosophical movements from antiquity such as scepticism and stoicism became attractive and influenced many thinkers. The physiocrats, Montesquieu, Adam Smith and Immanuel Kant were all influenced by stoicism.

Smith quotes stoic authors such as Seneca, Cicero and Epictetus. When describing the systems of moral philosophy he spends a few paragraphs on Plato (*The Republic*) and on Aristotle (*Nicomachean Ethics*), but many pages on the doctrines of the Stoics. Various concepts in TMS are clearly Stoic, for example, the importance of self-command and of acting with propriety. Smith, however, is not a Stoic. He marries Stoic ideas with Christian notions. The impartial spectator and sympathy, key concepts in TMS that should rule our relationships with others, are not Stoic. Smith takes pains, for example, to argue that his concept of sympathy differs from that of the Stoics.

Venter has pointed out that the Enlightenment involved a dialectic between Reason and Nature, such that through history humankind would progressively be able to subdue nature and move towards an eschatological state of complete rationality.[198] He points out that this way of approaching nature and reason came into fashion around the end of the 17th and the beginning of the 18th century and constituted a significant departure from the vertical ontology of previous centuries. Naturally, the full implications of this 'turn', took time to unfold. Thus, Smith's predecessor, Francis Hutcheson, identified virtue with the Christian idea of benevolence. Smith himself has a much more 'horizontal' idea of ethics.

It stands to reason that the various representatives of the Enlightenment differed in terms of how they constructed this dialectic between reason and nature. The task of this chapter is to find out how Adam Smith perceived this dialectic. What was his philosophic mental construct? Applying Vollenhoven's methodology, I shall interview Smith by asking him for his views on a number of key problems such as the nature of the Origin, the cosmos (nature), human beings and human society.[199] The sources of Smith's concept are his early

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[197] Ph. De Vries, *Tussenspel der Redelijkheid; schets van de cultuurgeschiedenis der 18e eeuw*, Querido, Amsterdam, 1948.

[198] J.J. Venter, 'Modernity'; the historical ontology, *Acta Academica*, vol. 31, No.2, August 1999, The University of the Orange Free State, Bloemfontein.

[199] See reference in Chapter Four, Introduction.

philosophic works (EPS) and, above all, TMS. Once we have an idea of the concept we should inquire whether the concept of WN is the same and, if not, how it differed from TMS.

5.3 Nature

In a number of philosophical essays published after his death, including a history of astronomy (EPS), Adam Smith discussed issues such as the senses, imagination and how we perceive things. Right through these articles he assumes that we are considering or contemplating a world that consists of objects. These objects are linked in terms of causes and effects and it is the task of science to work out how. We should seek to discern a system by reason and experience. We are led into such inquiry through Wonder, Surprise and Admiration, 'What is new and singular, excites that sentiment which, in strict propriety, is called Wonder; what is unexpected, Surprise; and what is great or beautiful, Admiration'(EPS, 33).

Once a coherent account of a problem is obtained we experience the sentiment of admiration. Thus, Smith can think of nature as a theatre. It may appear chaotic and strange to us (surprise and wonder), but when we sea reason at work our imagination is able to admire plausible and coherent accounts of observed phenomena. Philosophy becomes the science of the connecting principles of nature (EPS, 45).

When we ask where this theatre originates, the answer is:

> The idea of an universal mind, of a God of all, who originally formed the whole, and who governs the whole by general laws, directed to the conservation and prosperity of the whole, without regard to that of any private individual, was a notion to which they were utterly strangers (EPS, 113, they being people in the 'first ages of the world').

A statement such as this reflects Smith's Deism, the view that the Creator made the world like a clockmaker a clock and then left it alone, because it would be able to work in accordance with the principles of its built-in design.

Despite Smith's view that the Creator subjected his creation to his laws, he does not give a specific account of the relationship between such law-giving and that which was subjected to those laws. Instead, creation is reduced to what he calls nature. This concept covers not only what we call the natural world of things, plants and animals but also parts of the human world, for example, the natural course of things when farmers produce a surplus for sale to city people who, in turn, help to improve agriculture, so that eventually they venture into foreign trade (WN, 336). In TMS this concept of nature is very wide, even to the point of having personal features. For example, Nature is said to exhort mankind to acts of beneficence (TMS, 86). Smith foreshadows here the idea of natural law.

In general, there is a close relationship between the stoic idea of universal reason and what Smith calls nature or the theatre of nature. We discover and then admire nature when we have figured out how reason works in this

theatre. The strong emphasis of Smith upon contemplation and admiration, however, differentiates him from stoicism. We are bound to ask who the admiring and contemplating person is. It must be somebody endowed with the means of understanding reason and of finding out the works of reason in nature and, therefore, not part of nature himself.

This split between the contemplating reasoning human spirit and a world it contemplates is found also in both TMS and WN.

TMS is a treatise on moral philosophy, dealing in particular with moral feelings or sentiments such as concern, esteem, contempt, indignation, approbation, shame, anger, revulsion, jealousy, love and joy. In a variety of ways the study goes beyond the strict confines of ethical considerations and offers Smith's views on world and society as well.

5.4 Origin

Smith describes God as the Deity or the Author of Nature, the great Judge of the World or the all-seeing-Judge of the World. Other expressions are: the all-wise Architect and Conductor of the universe and the great Superintendent of the universe. It is the author of nature who has equipped us with sentiments such that we can by reasoning judge actions to be meritorious or worthy of resentment. The great judge of hearts has put these sentiments beyond the limits of every human jurisdiction (TMS, 105).

Since actions alone are accessible to us, society is protected against the violence people might perpetrate were they to act on what they believe people's intentions are. Smith links this to what he calls providence:

> But every part of nature, when attentively surveyed, equally demonstrates the providential care of the Author; and we admire the wisdom and goodness of God even in the weakness and folly of men (TMS, 105/106).

Yet, it should not be thought that Smith's Deity is identical to the Deity as understood by the Stoics. Rather he connects it with Christian notions. Thus, our behaviour is judged by actual people, by a semi-god inside us (the impartial spectator), who may well disagree with the former, but who might yet err, in which case there is an appeal to the Great Judge of all in our after-life. In this connection, the mortifications of monks are unlikely to be judged of equal worth to the achievements of people such as statesmen, poets, philosophers and those who 'have invented, improved, or excelled in the arts which contribute to the subsistence, to the conveniency, or to the ornament of human life' (TMS, 134). This statement is noteworthy on two accounts:

1. It reminds us of a major belief of the Enlightenment in God, virtue and immortality (Voltaire, Kant).
2. It strikes a chord that forms a theme in WN. According to that study there is a natural progression from subsistence, as provided by agriculture, to conveniences and, then, to luxuries. This idea of

progress is again another major Enlightenment theme. Leibniz, for example, rendered it in terms of a *telos* or happy end state of nature.

In contrast to Smith, the Stoics thought of deity as an always working breath that permeates the whole world or as an artistically creative fire or the reason and soul of everything. They did not see the deity as being outside the world, but rather as immanent in the cosmos. Associated with this view is a cyclical view. It is fire that forms the world through a series of transformations from higher to lower and, then, back again into fire. This process is controlled by absolute necessity. One can also say that every being is part of the deity in the form of a seed of reason that forms the core of one's being. In contrast, Smith holds to an eschatological view of linear progress towards a great final state of the world.

Smith's references to the Judge are only understandable if we see them as part of the Christian belief that God is the Creator and Judge. When Smith uses the word nature, it is not always clear whether he means creation or a Stoic idea of nature.

> Nature, when she formed man for society, endowed him with an original desire to please, and an original aversion to offend his brethren.... Nature, accordingly, has endowed him not only with a desire of being approved of, but with a desire of being what ought to be approved of or of being what he himself approves of in other men (TMS,116/117).

In this quote nature has Stoic connotations. By contrast, in the following one we have a more Christian version:

> But upon the tolerable observance of these duties (justice, truth, chastity and fidelity) depends the very existence of human society, which would crumble into nothing if mankind were not generally impressed with a reverence for those important rules of conduct. This reverence is still further enhanced by an opinion which is first impressed by nature, and afterwards confirmed by reasoning and philosophy, that those important rules of morality are the commands and laws of the Deity, who will finally reward the obedient, and punish the transgressors of their duty (TMS, 163).

This is a very strong statement on the importance of ethics for the coherence of society. This is absent from WN, which emphasises much more the importance of legal contracts in relation to private property.

In TMS Smith urges us to seek happiness by co-operation with the Deity. We do this by acting according to the dictates of our moral faculties (TMS, 166). Such happiness is Stoic again inasmuch as the Stoics believe that happiness is the purpose of the good. In general, Smith's views in TMS are characteristic of English natural theology of the 18th century.

5.5. The Impartial Spectator: the Man within the Breast

People are able to relate to others via what Smith calls sympathy. It is our fellow-feeling with any passion whatever (TMS, 9). Primarily, however, our

sympathy arises from situations that excite the passion of our fellows. We do not become angry when we see that somebody is angry. We sympathise with his misfortune when we know why he is angry. The question is then whether our passions are pitched at a level that is appropriate to the cause that excites them.

In this regard Smith invokes the idea of an impartial spectator. We act on the basis of how spectators would view our actions. We may be very ambitious and spectators would not mind that. However, if we jostled others, they would take a dim view of that. Thus, the thought of what the spectator might think, restrains us. In a sense the impartial spectator is like our conscience. We should learn to restrain our passions, certainly in our public behaviour on the basis of the views or judgments of others as represented by the impartial spectator (also known as the man within the breast or the man within, or the demi-god). This raises the question whether the impartial spectator will always employ the same standards? As society evolves, the impartial spectator's ideas will change as well. We appear to be dealing here with a self-referential system. In our time the media act as the impartial spectator, although they also have the tendency of acting as Judge.

Fashion is a good example of the working of this spectator. Our disposition to admire the rich and the great allows them to set the standards for fashion, without invoking the strictures of the man within the breast (TMS, 64). Smith's justification for the introduction of the 'inmate of the breast' is that we perceive our own interests as of much greater importance than they really are from the perspective of society, and, conversely, that we minimise the concerns of our neighbour. Thus, the impartial spectator's role is to correct for this built-in error of perception (TMS, 135). This is indeed a correction of self-love (TMS, 137). Although there is certainly a great deal of truth in this, the question remains as to how the standards deployed by the impartial spectator are set. In this we should remember, as mentioned above, that Smith allows for the possibility of a conflict between the judgments of the impartial spectator and what the tribunal of the heavenly Judge might believe. The latter would have to prevail, perhaps in the life hereafter. Over time, however, people might forget or deny the existence of such a tribunal. Smith certainly is aware of the problem when he says that it is the purpose of all systems of morality to direct the judgments of the inmate (TMS, 293). This, of course raises the question how people who adhere to a variety of moral systems should live together.

Asking how it is that those who are generous are prepared to sacrifice their own interests to the interests of others? Smith gives an answer that reveals most clearly the nature of the impartial spectator:

> It is reason, principle, conscience, the inhabitant of the breast, the man within, the great judge and arbiter of our conduct....It is not the love of our neighbour, it is not the love of mankind, which upon many occasions prompts us to the practice of those divine virtues. It is a stronger love, a more powerful affection, which generally takes place upon such occasions; the love of what is honourable and noble, of the grandeur, and dignity, and superiority of our own characters (TMS, 137).

The stress on the man within the breast, a demi-god, reminds us of the Stoic belief that every person carries a part of the godhead within his reason. The Stoic god, especially in the versions of the Stoic authors during the time of the Roman Empire, thought of the godhead as ordering and controlling and as a judge of mankind. What is not clear is how Smith, or how a society he has in mind, would get an impartial spectator able to distinguish between precepts of reason and precepts given by divine commands.

When discussing the system of the Stoics, Smith noted that in their view man has been given a little department in which he may manage himself, but without any regard to the outcome of his actions. Not so, Adam Smith. In his view we are restrained by the real or impartial spectator, the authority of the man within the breast (TMS, 292).

I conclude that the impartial spectator is actually an institution characterised by reason. It comes close to the invisible god within of the Stoics. The affinity to Stoic concepts should, however, not tempt us to denote the impartial spectator as Stoic. The Stoics regarded human beings as autocrats, unperturbed by the opinions of others. They would operate according to their own understanding of nature and, if events made that impossible, would commit suicide. An impartial spectator who keeps restraining individuals does not fit into this scheme.

5.6 Sympathy

In the first section of TMS Smith introduces us to a world in which there are people who experience feelings and sentiments. The question is how such people can live harmoniously in society? One principle in our nature is that of fellow-feeling or sympathy with the sorrow of others. We may use our imagination to experience what others are going through. In other words, it is through empathy that we understand other human beings and also learn to control ourselves. Mutual sympathy is an important sentiment that keeps society together. In this regard, reason comes to the fore inasmuch as there should be a correspondence between the cause that excites passions and the degree of these passions. Are affections expressed proportionate or disproportionate to the cause? We can only judge this by the correspondent affection in ourselves. In this context, Smith introduces the figure of the impartial spectator, which we have just discussed. Given that sympathy is related to love, Smith refers to the law of Christianity that we should love our neighbour (TMS, 27) as ourselves, but adds that:

> ..so it is the great precept of nature to love ourselves only as we love our neighbour, or, what comes to the same thing, as our neighbour is capable of loving us (TMS, 25).

This is actually quoted from the Bible, where it is part of the summary of the Commandments, but where it is stated somewhat differently as 'You shall love your neighbour as yourself' (Matth. 22:38). Thus, we are called upon to act, regardless of what others might think, and we should love whoever happens to be our neighbour. This neighbour may even be an enemy. That we love

ourselves is taken for granted. This all-demanding commandment is issued by the Lord God Himself and is not somehow part of nature. In contrast, in the quote from TMS there is again a hint of the spectator who may or may not approve of our actions ('capable of loving us').

Smith then discusses the various types of passion and the way in which as neighbours we relate to them. Lower passions such as those involving the body should be restrained by prudence within the bounds prescribed by temperance (TMS, 28). In general, we need to have a disciplined nature.

The idea of sympathy is obviously of great importance to Smith's mental construct. Sympathy brings about a correspondence between people in all types of relationships, since everybody seeks to behave so as to be respected by others. It is the glue that holds society together.

The impartial spectator makes a rational moral judgement about the behaviour of others on the basis of sympathy or the ability to understand others. The word empathy might be closer to what Smith intended than sympathy, because he describes it as a form of role-playing. We try to put ourselves in the situation experienced by others and then determine whether we can sympathise with them or not. We may also do this with respect to our own conduct by viewing it from the point of view of somebody else 9TMS, 109/110).

Sympathy, therefore, serves as a major constraint on the pursuit of self-interest. In WN, competition fulfils a similar role. Greed would be punished by the actions of competitors. Importantly, like the impartial spectator, sympathy is not easily reconcilable to an overall Stoic view of the world. In Stoicism sympathy expresses the intimate connection of all parts of the world. Although this idea plays a part in Smith's concept of sympathy, he mixes it with a Christian concept of love.

A critical question is whether human relationships as analysed by Smith in terms of sympathy are different from human relationship governed by monetary considerations as analysed in WN. In TMS Smith appears to be still under the influence of his predecessor Frances Hutcheson who believed that society is held together by benevolence, even though he takes issue with him by arguing that the virtue of benevolence is too exalted for human beings to be of much use in the hustle and bustle of life where often we need to be motivated by self-love and regard to our own private happiness and interest 'The habits of oeconomy, industry, discretion, attention, and application of thought, are generally supposed to be cultivated from self-interested motives,..., which deserve the esteem and approbation of every body' (TMS, 304). Benevolence is rather a quality of the Deity (TMS, 305).

Although Smith had started work on WN when he was still lecturing in Glasgow, he completed the work after his stay in France where he had been in touch with and had read the books of authors such as Quesnay who believed that people should be free to pursue their self-interest since this would bring about a natural rational order. The question this raises for us is

whether human relationships conducted through the intermediary of money and contracts are reconcilable to those governed by sympathy? Would the rich be happy to part with a significant part of their wealth out of sympathy with the poor? Smith does not answer this question. He remains in the sphere of contemplation and observation.

5.7 Higher and Lower

TMS features a division of the world into higher and lower parts. Reason acts on the lower passions in order to moderate them and so to make life in society tolerable. Life diverges, therefore, into a higher part, the realm of the man within the breast, and a lower area marked by passions and desires which needs the bridle of reason. Even lower than the passions are matters of the body. We can enter into the passions and emotions of others through the imagination, but we cannot do so when it comes to the body (TMS 27-29). We have an aversion for all the appetites, which take their origin from the body (TMS, 28).

In terms of economics Smith believes that the disposition to admire the rich and powerful and to neglect persons of poor and mean condition is the great and most universal cause of the corruption of our moral sentiments (TMS, 61). He even casts doubts on the human inclination to better our condition, because the wages of the meanest labourer can supply the necessities of nature such as food, clothing, shelter and a family. Those who have more spend it on conveniences, which may be regarded as superfluities (TMS, 50). In another place he describes to what length an ambitious but poor young man goes to become rich to discover in old age that wealth and greatness are mere trinkets of frivolous utility (TMS, 181).

In the same vein, he expresses contempt for the conveniences and luxuries of life. They are trifles. Nevertheless, it is this deception of riches that keeps the industry of mankind going (TMS, 183). Such sentiments could have been expressed by the cynics.

5.8 Macro-Cosmos and Micro-cosmos

In WN the distinction between higher and lower is much less pronounced and appears to contradict TMS in some respects. Thus, in WN the desire of bettering our condition is said to be in-born and to stay with us till the grave (WN, 305). Yet, the means through which this desire works is described as 'the most vulgar and obvious' namely by augmenting fortunes through saving and the accumulation of capital (principle of frugality) (WN, 305). Nevertheless, this process is kept going through the praiseworthy efforts of the three orders of people, those working for wages, rents and profits. Together they increase the country's opulence, only to be thwarted in their efforts by the success of those engaged in unproductive labour (courtiers, clergy, civil servants, defence forces) to extract part of their savings in the form of taxes (WN, 306). In recent times neo-liberalism has encouraged people to resent any expenditure by the state as a waste of taxpayers' money.

Having pointed out this difference in outlook between TMS and WN I hasten to point out also a similarity. In both works Smith expresses a preference for the poor, in contrast to the prevailing theory of his days, which argued that lower wages would cause the poor (the lower classes) to work harder. If most people are poor a society cannot be flourishing and happy. It is no more than equity that those who work for the welfare of others have a proper share in the fruits of their own labour (WN, 70).

The reference to equity makes us wonder how or who would determine whether actual wages are equitable? Smith's answer is that if wages are determined through competition between employers the market would provide an equitable wage. High demand for labour would cause wages to rise, leading to a higher survival rate of children and larger supply, whereas low demand would have the opposite effect. This is tantamount to ensuring equity by means of a mechanical device (negative feedback). Naturally, an expanding and improving society would be more desirable than a declining or stationery one, because 'The progressive state is in reality the cheerful and the hearty state to all the different orders of the society' (WN, 72).

In other words, the more a society expands and refines the division of labour, impelled by an innate 'propensity to truck, barter and exchange one thing for another' (WN, 12), the better the lot of the poor, the higher the level of subsistence and the more scope there is for conveniences and luxuries. Subsistence consists of food, clothing and lodging, these being the three great wants of mankind (WN, 147). Interestingly, whereas the desire of food is limited, the desire of conveniences and luxuries 'seems to have no limit or certain boundary' (WN, 150).

However, in an advanced state of such dynamic progress, the poor employed in factories where they can only accomplish some routine jobs, will become dull and stupid, in contrast to the agricultural worker whose mind is extended by a variety of tasks he must accomplish. Hence, Smith advocates a system of basic State education.[200] In other places, the concentration on one activity as a result of the division of labour is said to increase productivity (WN, 7). This contradiction remains unresolved in WN.

In general, both in TMS and WN Smith draws a distinction between a society as a whole, at a macro-level and the way it works at a micro-level. The former is admired as a well-functioning machine or system. In TMS society is held together by sympathy and the work of the impartial spectator. In WN the emphasis is upon improvement through competition, given private property rights enshrined in commercial contracts. The latter leads to an expanding society. From the micro point of view we observe mechanical systems which keep society functioning. Indeed, in both TMS and WN there are no hierarchies, as was customary during the Middle Ages, but rather orders of people who together are functioning within the cosmos.

[200] Gertrude Himmelfarb, *The Idea of Poverty; England in the early Industrial Age*, Faber and Faber, London/Boston, 1984, p. 57, with a reference to vol. 2 of WN.

It is in this light that the comments on the invisible hand should be seen.
The idea of the invisible hand has attracted much comment. In EPS Smith makes already a comment about the invisible hand of Jupiter by contrasting the proclivity of polytheists to ascribe irregular events to the agency and power of their gods and the invisible hand of Jupiter that was behind those matters (EPS, 49). However, once subsistence ceases to be precarious people become more curious and more desirous of discovering the 'chain which links (all such frightening events) together' (EPS, 50). For Smith the metaphor of an invisible hand flows from his view that 'philosophy is the science of the connecting principles of nature' (EPS, 45).

Reason discovers these connecting principles and admires them. Throughout TMS and WN there are statements where systems and machines are lovingly described. They must be seen as examples of connecting principles. In TMS, the invisible hand is introduced in terms of an unfeeling landlord who would love to consume himself his vast harvest, but is prevented from doing so by the limited capacity of his stomach. He has no choice but to distribute what he cannot consume himself to the whole retinue that serves him. Thus, the rich:

> are led by an invisible hand to make nearly the same distribution of the necessaries of life which would have been made had the earth been divided into equal proportions among all its inhabitants; and thus, without intending it, without knowing it, advance the interest of the society, and afford the means of multiplication of the species. When providence divided the earth among a few worldly masters, it neither forgot nor abandoned those who seemed to have been left out in the partition (TMS, 184/185).

So, Smith has discovered an instance of a connecting principle in the relationship between rich and poor. It is nature that produces equity! In a moral society there is harmony even when on the surface of things there is conflict. Similarly, in WN the invisible hand indicates that apparently conflicting interests of individual producers, of manufacturers and farmers, of country and city, of rich and poor, are in reality all connected and working towards the good of all, provided producers and merchants do not attempt to prevent the working of competition.

The macro-cosmos is visible to the eye of the rational human being who has found the connecting principles. We are left with the question as to whether the moral society that is held together by sympathy is the same society that keeps improving as a result of competition on the basis of private property and the price mechanism? Where does the one begin and the other end? In WN the producing orders are potentially in conflict with those engaged in unproductive labour. The latter do not appear to be motivated by sympathy or checked by the impartial spectator. Smith's note on the in-born drive to bettering our (material) condition may lead to a widening of the sphere ruled by competition and contracts and to a dwindling of the sphere ruled by sympathy. In the present globalised world economy this has clearly been happening.

Another possible interpretation is that the macro-cosmos of moral sentiments (virtues in particular) working through sympathy is of a higher order than the

automatically functioning economic cosmos. Smith's depreciatory comments on the rich (including the comments on merchants who will always try to thwart the game of competition), on the lower passions of the body and on the ineluctable drive to bettering our condition via self-love seem to point in this direction.

On the other hand, Smith's predilection for universal systems that work like machines and as by invisible hands in nature as well as in human society can be understood as an organic view of the world. His preference for the poor bears this out as well. However, invisible hands must be allowed to work and this indicates a small state approach in which the authorities ensure that society is able to function as automatically as possible. Free trade and free competition should be encouraged, even though it is an inherently immoral or evil device as the French thinker Quesnay would have it.

This idea of a beneficial invisible hand was not original to Adam Smith. Another Aufklärung figure, Ch. de Montesquieu (1689-1755), proposed a similar beneficial correspondence between the pursuit of private interests and the interest of society.[201] In Smith's later work on WN the invisible hand makes, of course, another appearance as an equilibrating force in a system of private competing interests.

However, there are also other ideas in TMS about matters economic. His discussion of the effects of prosperity and adversity upon the judgement of humankind with regard to propriety of action is particularly interesting because he argues that spectators find it much more amenable to admire and sympathise with those who are prosperous than with those who are poor and wretched. So we make parade of our riches and conceal our poverty (TMS, 50). The rich attract attention. Greatness is the object of envy and compensates for all the toil and anxiety which must be undergone in the pursuit of it. We admire those of high rank and despise those of low rank. The ordinary person should not make himself conspicuous but excel in modesty, plainness, probity and prudence (TMS, 55). Indeed, the respect, which we should give to wisdom and virtue we prefer to give to the rich and powerful (TMS, 61/62), whereas contempt is bestowed upon poverty and weakness. In a way Adam Smith is already alluding here to the idea of conspicuous consumption as a stimulant to economic activity. As such the differences in wealth stimulate activity and hence should lead to a lessening of inequality and, hence, to a more coherent less divided society. This would come about as a result of in-built (natural) moral sentiments.

The overall impression is that the world and society are both ordered like a mechanical system in which all parts fit beautifully together. All one need to do is to let it work according to its natural design. Sympathy (empathy) will yield a pleasant moral society and the invisible hand of competition will do the same in the realm of economics.

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[201] Referred to by Peter Ulrich, *Integrative Wirtschaftsethik*, 2.Auflage, Verlag Paul Haupt, Bern, 1998, p. 171 with reference to *L'Esprit des Lois* (1748).

5.9 Smith's Philosophy of History

Although Smith did not provide a detailed view on history, the indications are that he shared the Enlightenment's optimism about eventual progress, provided people have sufficient incentives to compete. In WN's opening pages (WN, 1-3) he draws a contrast between 'savage nations of hunters and fishers', where all able bodied men are working, but the whole society is nevertheless miserably poor and civilised and thriving nations which employ a large proportion of those who consume. The more skilled people are employed the more such societies thrive. The more capital they have, the more people they are able to employ. The deployment of capital stock appears to set civilised nations apart from the savage ones. Capital stock, of course, embodies technology. By means of science and technology more capital can be developed and this will raise the level of advancement or progress. Competition plays a key role in this process.

When discussing the relationship between country and town, Smith argues that land should be tilled first and when a surplus of food is achieved the needs of townsfolk can be met. Capital earned from subsistence farming will be invested in towns where people will make things that fall under the heading of convenience and luxury. Once manufacturing is established, foreign commerce will be contemplated (WN, 340).

Problems arise when his natural order is inverted, as happens frequently, The Roman Empire came to grief as a result, partly because they depended on latifundia and, partly, because they depended on slave labour. Slaves are naturally interested in eating as much as possible and working as little as possible. Only when people own a property they can oversee and improve can progress be expected. Smith follows John Locke in this respect. Countries such as the North Americas whose wealth is based on agriculture make faster progress than others (WN, 370). Foreign trade will have the effect of extending the division of labour. If sales can be increased beyond what the home market can consume '...,it encourages them to improve its productive powers, and to augment its annual produce to the utmost, and thereby to increase the real revenue and wealth of society' (WN, 392).

Thus, if everybody is allowed to deploy his capital to best advantage, the annual revenue of the society will be enhanced as by an invisible hand (WN, 400). For, this reason Smith advocates free trade, but cautions that sudden changes to protection should be avoided.

5.10 The Mental Construct as a Whole

The human mind contemplates or surveys the world and life from on high so to speak. The invisible hand will do its work and the impartial spectator (the word spectator indicates an indirect influence) will keep the emotions under reasonable control. It is for this reason that Vollenhoven characterises Smith's concept as ennoetic. In this concept the thinking mind is merely contemplative, albeit in the sense of being fully aware or conscious of what it

is contemplating.[202] Assuming that the world and humankind have their origin in one principle (monism), ennoetism accounts for diversity within the cosmos by assuming that this principle diverges into a higher and a lower part, with the higher part taking priority. In anthropology, the psyche influences the body and its functions, but the higher thinking spirit only contemplates and merely evaluates that which is lower. Although Adam Smith confessed himself to be a Deist (God as the Author of Nature) he was in fact a monist with an ennoetic view of the world. With regard to history, ennoetism allows Smith to view how Over time people move from uncivilised people to rationally thinking and acting people.

It is also true that Smith's view of the world and life is strongly informed by the teachings of the Stoics. As noted above, this can be described as part of the spirit of the age understood as the source of the law that should set the direction for civilisation. The Aufklärung combined a rationalistic view with a high regard for 'nature' and feelings or sentiments. Smith fused this with the Stoic ideas of the little god within and the importance of virtue (prudence, temperance etc.). Nevertheless, the inventions of the impartial spectator and sympathy are significant departures from Stoic doctrine. The impartial spectator, who is also the man within the breast, is a type of lawmaker as well as a disciplinarian. He represents universal reason, but is also the controller of the lower parts (an active function). His particular place is in the higher part of ethical or moral life.

Adam Smith, as a representative of the Aufklärung, sees the law as located within the human mind and in particular he identifies it with the rational contemplating mind (the impartial spectator). In other words, Stoicism influences the way in which Smith represents his ennoetic views, in particular the way in which the higher controls the lower.

The ennoetic concept becomes clearly apparent in Smith's view of economic life. The major divergence of higher and lower can be restated as a divergence between the contemplating thinking spirit and the rest. The rest too diverges, namely between the ethical (moral) and the lower parts dealing with the body and all that pertains thereto, including the realm of economics. The ratio is able to contemplate the working of the invisible hand in this field as an expression of the rational natural world order. There is no point in interfering with the working of this hand, because that would upset the working of the machine. The passage on the invisible hand, quoted above, suggests that there is a mechanical system at work in which all parts are ordered and related together. Once it is in motion, it will do its work and bring about the best possible result. Similarly, people are ordered like stars. It is an ordering which is maintained by sympathy.

5.11 Test of Smith's World View in the Wealth of Nations

[202] D.H.Th. Vollenhoven, *Schematische Kaarten; Filosofische Concepties in Probleemhistorisch Verband*, eds K.A. Bril en P.J. Boonstra, Stichting Vollenhoven, 2000, p. 365.

WN was published in 1776 and quickly became a very popular and influential work, for many not dissimilar to the place the Bible used to have.[203] Rather than analyse the whole work in detail, these notes seek to highlight its key notions in order to provide a check on the sketch of Smith's overall view of the world.

The study opens with an analysis of the division of labour and the benefits it brings by allowing people to specialise and concentrate on the things they do best. The extent of the division of labour is then seen as being limited by the extent of the market. The wider the scope of markets, the more refined the division of labour can be. Concentration and specialisation is likely to stimulate innovation and efficiency. Asking how the division of labour comes about Smith notes:

> It is the necessary, though very slow and gradual consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another (WN,12).

He notes that he is not sure whether this propensity is a matter of nature or of reason and speech. I note a hint of the so-called invisible hand in the passage quoted, although there is only one explicit reference to this concept in the whole book. In civilised society people will always have occasion for the help of their fellow men (WN, 13), but they should not expect this to be given from their benevolence only. Treaty, barter and exchange are the normal means, even beggars use these, rather than depend entirely upon the benevolence of their fellow men. Thus, the famous statement is made that 'It is not from the benevolence of the butcher, the brewer or the baker that we expect our dinner, but from their regard to their own interest' (WN, 13).

Smith has highlighted here the importance of the societal inter-individual relationships between people and between people and organisations in society. We form contracts as free individuals. We meet people in a wide variety of ways, for instance, as fellow passengers on a bus, as members of a co-operative, as patrons of a pub, and so on. Economic relationships are an important sub-set of such inter-individual relationships. In various places Smith refers to networks of relationships, in the symbiosis of town and country for example (WN, 336ff).

Once the foundation of the division of labour is laid, Smith moves on to establish the importance of money as a general means of executing transactions. Similarly, he must then discuss the terms on which exchanges are made, that is the theory of value and price. In this respect he states the so-called labour theory of value and draws a distinction between the natural price and market prices. In a way the difference between the two gives rise to a negative feedback mechanism. When market prices rise above the natural price, then, supply is increased. In the opposite case, supply is reduced. Smith works this out in terms of what he calls effectual demand or the demand of those who are willing to pay the natural price of the commodity.

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[203] A view recorded by G. Schmolders, as quoted by A. Kouwenhoven, op. cit., p. 42.

Although he does not say this explicitly, he seems to imply that those who make up the effectual demand may not know what the natural price is. Hence, the market price will differ from the natural price (which remunerates labour, capital and rent according to their proper contributions). Thus, 'The natural price, therefore, is, as it were, the central price, to which the prices of all commodities are continually gravitating' (WN, 51).

Competition plays a major role in this process. When supply exceeds demand, there will be a buyers market. When demand exceeds supply, buyers will compete and drive up the price. Processes will then be triggered to adjust the supply to the effectual demand, as revealed in the market. The natural rate of labour is the rate necessary to keep the workers alive. In other words, the natural rate of wages acts as a fulcrum in the system. Competition acts as the second anchor to ensure that the system stays in long-term equilibrium.

In regard to wages Smith identifies a similar mechanism. The rate of wages depends on the revenue and stock (capital) of the country. It is the national wealth. The higher it is the higher wages will be. Similarly, if the country's wealth is rising rapidly, wages will rise rapidly. If, however, the funds for the maintenance of labour are decaying (WN, 64), then, the ranks of the lowest wage-earners will be supplemented with the unemployed, who used to earn higher wages. If competition for employment were to drive down wages to the most miserable subsistence level, want, famine and mortality would increase and reduce the population to a level consistent with the national wealth. In general, the lowest rate is the rate consistent with common humanity (WN, 65). Thus, he could say that a continuous increase in the demand for labour would raise its price and this would encourage the marriage and multiplication of labourers. Demand would create its own supply. Conversely, if wages were less than necessary to supply the demand for labour, a shortage of labourers would soon raise the price and correct the deficiency. Excess supply would lower wages and so restore equilibrium:

> The market would be so much under-stocked with labour in the one case, and so much over-stocked in the other, as would soon force back its price to that proper rate which the circumstances of the society required (WN, 71).

As we would expect Smith puts great store on trade, especially, foreign trade, to widen the scope of the market and hence the extent of the division of labour. Book IV (Of Systems of Political Economy) contains an ode to free trade. The chapter on the progress of cities and towns in this Book outlines the important demonstration effects of superior foreign goods.

> A taste for the finer and more improved manufactures was in this manner introduced by foreign commerce into countries where no such works were carried on. But when this taste became so general as to occasion a considerable demand, the merchants, in order to save the expense of carriage, naturally endeavoured to establish some manufactures of the same kind in their own country (WN, 359).

Smith trains his guns especially on all those (mercantilists) who believe that a country should endeavour by regulation of trade to build up a large trade balance. He harks back to his concept of effectual demand as the regulator of the quantity of every commodity which human industry can either purchase or produce naturally (WN, 381).

Smith advances a theory of progress (we would say economic growth) by means of foreign trade, inasmuch as it provides an extension to the market system and, therefore, an extension of the division of labour and this, in turn, improves society's productive powers (WN, 392).

However, the risks of foreign trade are such that merchants will always try to balance these by having the support of a home market. The way in which he phrases this truth is again reminiscent of astronomy:

> Home is in this manner the centre, if I may say so, round which the capitals of the inhabitants of every country are continually circulating, and towards which they are always tending,...(WN, 399).

The role of Government is to secure free trade, albeit with two exceptions. The first is the interest of the defence of the country. The act of navigation serves to provide England with sufficient sailors and ships. Smith regarded defence as of much more importance than opulence (WN, 406-408), despite seeing it as a tax on savings. A second exception is when a direct tax is imposed upon a domestic industry. To encourage such an industry a similar duty should be imposed upon the import of equivalent foreign produced goods. In Smith's view such a duty would preserve competition and the natural division of labour (WN, 409).

In this connection, Smith pleads for the abolition of the privileges of corporations, a repeal of the statute of apprenticeship and the repeal of the Act of Settlements on the ground that they encroach upon natural liberty (WN, 414). Yet, he does not believe that the freedom of trade should ever be entirely restored to Great Britain (WN, 414). The prejudices of the public and the private interests of many individuals would stand in the way of such an 'Oceana' or 'Utopia' (WN, 414).

5.12 Conclusion

Adam Smith considered economic life as a natural/rational and mechanical system regulated by competition. The less this system is interfered with, the more benefits the division of labour (itself a technical system) will render to society. Self-interest is the counterpart to the division of labour inasmuch as it motivates the trading that is necessitated by the division of labour. Adam Smith accepted this system as an eminent way of dealing with the lower bodily and material needs of society. The moral, higher part of the world and society, is regulated by sympathy. Sympathy and competition are equivalent regulators, the former for the higher moral relationships between people and competition for the latter or commercial society. All this is contemplated and comprehended by the universal reason of enlightened thinkers like Adam

Smith. In terms of Vollenhoven's consequent problem-historic method he represented a monistic ennoetic philosophical type during the Enlightenment period.

Adam Smith deeply believed that the division of labour should be extended as far as possible. He did not foresee that ruthless competition between countries could lead to permanent unemployment and economic anarchy, because in civilised countries, the set of which he calls a mercantile republic (WN, 389), labourers would be rewarded sufficiently to maintain themselves through time, even though there could be temporary dislocations. On the whole free trade would permit the national wealth to increase, leading to higher real wages. The havoc caused by the imposition of free trade on colonies, including the slave trade, fell outside Smith's purview. Indeed he welcomed Britain's trade with the Americas as extending the division of labour (WN, 393) and berated the Portuguese and the Dutch for having monopolised the trade with the East Indies (WN, 394).

He considered economic life as a mechanical system of nature, which is not subject to any specific economic norm, which human beings and human society should strive to obey. As noted above, Smith did not contemplate a precise line of division between the ethical and the economic sphere. Where does sympathy end and competition begin? In recent times the sphere of economics has been encroaching upon areas such as education and even parent/children relationships via media advertising campaigns.

The tradition of considering economics as a mechanic system has continued until the present day, especially in the prevailing neo-classical theory. This will be the subject of the next two chapters.

CHAPTER SIX: POLANYI: The Great Transformation

6.1 Introduction

Adam Smith not only provided a strong impetus to the development of economic thought but also on subsequent policy-making up to our own time. He has had a formative influence by contributing to the habit of economic theorists and practicians to consider economic life as if it were a mechanical system, as witnessed by phrases such as *the price mechanism.* One has been inclined to forget that the theory is set forth in abstraction from social relationships. This feature was the theme of Karl Polanyi's book *The Great Transformation*, published in 1944 as an attempt to come to grips with the problems caused by the Great Depression of the 1930s.[204] The misery of unemployment and depression was due, in his view, to the implementation of the thoughts of thinkers who considered economic life as a self-regulating market system. Of late this work has attracted renewed attention from commentators who are critical of the liberal economic market system which many countries have been endeavouring to put in place, often prodded by the IMF. This market system requires for its implementation the absence of the State other than as a watchman to ensure private property rights are secure, monopolies are not established, taxes are low, labour markets flexible and Government budgets balanced, at least over the duration of a business cycle.

A good example of such a commentator is John Gray.[205] He refers to the modern interpretation of the liberal economic market order as the Washington consensus or 'the dogma that minimum government and free markets are achievable and desirable throughout the world'.[206]

This chapter aims at outlining what, in Polanyi's view, the *Great Transformation* entailed and how it is relevant to an understanding of modern agriculture

6.2 Polanyi's Thesis

Polanyi refers to the free market system as a system of self-regulating markets. His key thesis is that in order to achieve such a system it was necessary to bring labour, nature (land) and money into the orbit of the market system. The widespread use of machines in the Industrial Revolution changed the way in which markets functioned. Prior to this event people brought the wares they wanted to sell to the market and bought what they wanted. Now,

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[204] Karl Polanyi, *La Grande Transformation; Aux origins politiques et économiques de notre temps,* trans. Catharine Malamoud and Maurice Angeno, Éditions Gallimard, Paris, 1983 (original title *The Great Transformation* published in the USA 1944 and in England in 1945) with a preface by Louis Dumont and a biographical note by the author's wife I. D. Polanyi in 1970. References to this book are put between brackets in the text.

[205] John Gray, *False Dawn, The Delusions of Global Capitalism*, Granta Books, London, 1998.

[206] ibid., pp. 22/23.

the manufacturer had to sell at a price which would at least cover his expenses on wages, rent, raw materials and interest on capital borrowed. Money prices for these matters should be determined in markets. Hence, labour should be treated as a commodity like pepper or salt. Land and other natural resources should be able to be bought and sold through the market and money should also be a commodity, subject to supply and demand. Thus, the system would always be in equilibrium and beyond the control of the state, apart from the Government having to maintain monetary equilibrium. Under the gold standard deficit countries, for example, would have to deflate, by raising interest rates. Thus, markets started to dominate economic life and society rather than being an enabling instrument for it (109). Typical for the change in attitude was Adam Smith's view of people, from earliest times onward, as endowed with a 'propensity to truck, barter, and exchange one thing for another', despite a lack of evidence for such a universal propensity (321).

Although Polanyi does not state it in these terms, the system is supposed to work automatically like a steam engine or a machine governed by means of a negative feed-back loop. The use of a mechanical/technical metaphor to describe an economic system is typical of a civilisation dominated by technology. Polanyi, however, is not concerned with the issue of technology in our civilisation.

Rather, he wrote at a time when the Great War (1914-1918) had led to serious social and political convulsions and, in particular to the rise of fascism. He argued that the rise of fascism was bound up with the demise of the 19th century liberal economic market order. Attempts made after the First World War to restore this system had failed. In his penultimate chapter he distinguishes three post-war periods, namely:

1. 1917-1923. Fascist groups, often led by former army officers and supported by landed gentry and farmers in many European countries, were welcome insofar as they helped to restore law and order, an essential prerequisite for the functioning of a market system. At the same time, leading countries such as Great Britain and the USA aimed to reintroduce the gold standard and tried to get markets functioning again.
2. 1924-1929.The market system was operating and fascism ceased to be prominent. By 1926 the gold standard was functioning from Moscow to Lisbon (313).
3. 1930s. The system developed a deep crisis after the crash of Wallstreet in 1929. Within a few years fascists were in power in many countries, notably Germany and Italy, whilst Great Britain first and then the USA and other countries abandoned the gold standard. In 1934 Germany left the League of Nations and repudiated its foreign debt. Yet, England and others believed that Germany would return in due course to the liberal market order and, therefore, lent it their financial support.

Polanyi believes that Germany had no intention to return to the system of self-regulating markets operated by sovereign countries by means of the gold standard. On the contrary, Germany could not wait for the collapse of this order and aimed to secure for itself the benefits of such a collapse. It wanted to achieve economic self-sufficiency and did not hesitate to use slave labour. Politically, it managed to align countries against Bolshevism (315-317).

In Russia, the period 1917-1930 saw a revolution carried out along Western lines, inspired by the French Revolution. After 1930, the experiment of socialism in one country and the collectivisation of farming took place and thereby introduced a new co-operative system to replace the market economy. In the USA Roosevelt introduced the New Deal welfare state.

Thus, right through the world the 19th century liberal laissez-faire market system was transformed into a system in which the State took charge of the social and economic destiny of nations. In his final chapter Polanyi discusses the question of freedom. Would the transformation to a much more complex society lead to a decline of freedom? In his view the issue of freedom is what divides socialists and fascists. Is it possible for socialists to realise freedom without falling into moral delusions (332)? His answer is not very detailed. He starts by recalling that the conscience of Western people has been shaped by three constitutive facts: the knowledge of death, the knowledge of freedom and the knowledge of society. The first of these was revealed by the Old Testament, the second by the teaching of the uniqueness of the individual by Jesus Christ in the New Testament and the third by the realisation that we are living in an industrial society. In support of the third one he refers to Robert Owen as somebody who believed that the freedom we have received through the teaching of Christ applies to individuals rather than to a complex industrial society. Although the Gospels remain the basis of a post-Christian era, a socialist republic is necessary to grasp freedom in an industrial society. We should be able to live as people in such a society. As long as we aim to create as much freedom as possible for all and to suppress whatever possible injustice, we should not fear that planning and power are opposed to and destructive of the freedom we try to establish through their intermediation (334).

Clearly, at the end of the book we get the impression that the transformation Polanyi has discerned should not emerge into fascism but rather into what he calls socialism, a system aimed at securing freedom in a complex industrial society. Thus, one of the key questions he raises is what is to be understood by society. He broaches this subject in particular by outlining the Great Transformation. In a nutshell, markets used to be embedded in social systems in Western societies until the end of the 18th century and still are in many so-called primitive societies. They used to be regulated on the basis of social requirements.

By contrast, in Great Britain in particular, the State subjected society to the requirements of a system of self-regulating free markets in the period 1834-1850, as follows:

1. The Poor Law was reformed in 1834 to the effect that people (individuals) should have an incentive to work. If one did not work one faced the prospect of having to enter sex-segregated workhouses, which should pay wages lower than the lowest market wage. At the same time, the Government was not prepared to intervene in any contract between master and servant.
2. Tariffs on imported agricultural commodities were abolished between 1846 and1850. Free trade should allow cheap imports as a means of fostering competition, low food prices and low wages, so that exports would be competitive in overseas markets. Imports of food should compensate for any shortage of land.
3. The Bank Charter Act of 1844 linked the creation of domestic money to the amount of gold reserves. This laid the foundation of the gold standard.
4. Between 1830 and1860 the freedom of contract was extended to land.

These steps, taken together, contributed to the Great Transformation of society into a system of self-regulating markets in which society was run as an appendix to the market system. Since voting rights in Britain were limited at that time, these legislative initiatives could be taken without the Government having to face the whole of the adult population at the polls.

Polanyi is careful to draw a distinction between a liberal economic market system and laissez-faire. The latter entails the freedom to refuse to work for a certain wage or to form monopolies and to charge high prices by limiting supply. However, since such actions impede the working of self-regulating market systems, they tend to be forbidden. The rights of trade unions are restricted and business faces anti-trust legislation. He puts it this way 'Strictly speaking, economic liberalism is the guiding principle of a society in which industry is founded upon the institution of a self-regulating market' (201).

How did this system come to grief? Polanyi lists four problems of the system (273):

1. Unemployment.
2. Exchange rates/balance of payments deficits.
3. Imperialist rivalries.
4. Class tensions.

A flood of cheap imports from the New World during the Long Depression of 1873-1886 (Polanyi's dating, see Ch 2.6) compelled many European countries to protect their agriculture and industry by import tariffs. Such protection led exporting countries to find other markets. The larger countries sought to extend the working of the market system by establishing more colonies. This had the added advantage of finding new sources of raw materials. Business followed the flag.

In the absence of a major disruption such as the Long Depression there was always the short-term business cycle to contend with. The gold standard

provided the discipline to bring smaller countries into line, which attempted to solve unemployment by monetary expansion either through bank credit or fiscal deficits. The larger countries preferred to engage in imperialist rivalry by trying to capture external markets from other powers. People who became thus incorporated into the market system, without any protection provided, suffered greatly.

However, once protectionism had been introduced, free markets could develop into monopolistic markets. The Long Depression became a time of social legislation to relieve the problems of poverty, deprivation of human dignity in factories and unemployment, when 'associations replaced individuals' (284). The system, in other words, ceased to operate as automatically as intended. Yet, the gold standard remained in place. Adjustments were difficult to make and took time. Equilibrium needed to be restored by political means. This ran counter to the idea that the political and the economic system were to be separate and created another source of tensions.

Looking back on the failure of the market utopia, Polanyi observes as two of its main features its rigid determinism and its economic character (284/85). The former flows from the mechanism of a market society. Tensions arising from the market sphere spread into the political sphere. The whole system kept functioning only for as long as the world economy kept functioning. Once the last of the institutions of the world economy gave way (free exchange of goods; free labour markets had already gone), tensions internal to national economies erupted. Thus, the blind force of inanimate institutions, the sole purpose of which was to increase material welfare, destroyed a civilisation (285).

In Chapter 19 the author deals with the collapse of the system more from a principial point of view. Why is it absurd to have a labour market? If workers should never sell their labour below the price employers are prepared to offer, then, they should be permanently on strike in order to discover how far the employer would be prepared to go. This would be a disaster of course (299). During the 1920s State intervention and the restoration of stable rates of exchange and sound money were major concerns, especially money. The world economy would not function properly unless a sound monetary system was in place. Moreover, everything was done to remove obstacles to the free movement of labour across countries. Yet, the problems created by the imposition of large amounts of war damages upon Germany made the restoration of stable international money almost impossible. At the same time The League of Nations in Geneva believed that priority should be given to deflation by countries plagued by inflation. Governments, which wanted to deflate, did so by political intervention. Sound money was considered more important than non-intervention. Democracy suffered. Great Britain and the USA abandoned the gold standard rather than to facilitate fascism.

Socialism was basically a means to '..ensure that society consists of truly human relationships between people. In Western Europe this had always been associated with the Christian tradition' (302).

From an economic point of view, however, socialism represented a break with the immediate past of the 19th century to appreciate financial gains as motivating productive activities and where private persons own the means of production. Socialist parties find it almost impossible to reform the system because as soon as they try they undermine confidence in the security of private property on which the liberal system rests. Polanyi outlines how workers and employers should have a joint interest in keeping society functioning within a democratic parliamentary system. However, during the 1920s class warfare erupted. It caused harm to both industry and workers. Fear made people resort to fascism.

To complete this summary it is necessary to get greater clarity on what Polanyi understands by society. He adduces four principles:

1. Reciprocity.
2. Redistribution.
3. Domestic usage of resources rather than the acquisition of monetary riches (76-83).
4. Habitation (61).

Features 1) and 2) are derived from anthropological studies of 'primitive' societies whilst 3) is based upon a distinction drawn by Aristotle. The economic system of pre-modern societies was embedded within these long-term relations marked by reciprocity and redistribution. Members of society should not be allowed to enrich themselves at the expense of others (reciprocity). If, nevertheless, a group became richer than another, then, redistribution should restore the balance, so that the community could continue to live peacefully (habitation). The author appears to believe that society has the ability to reassert itself when assailed by a self-regulating market system. He believes, quoting Dicey and others that the moves since the 1860s to redress injustices by state measures were made without any specific forethought or plan. By contrast, the self-regulating market order required the strong hand of the state to be imposed (181,182).

A large part of the study is devoted to showing how these principles were abandoned in England during the late 18th century under the impact not only of the industrial revolution but also on account of the interaction between economic thinking and social change. Robert Townsend, Malthus and Ricardo based their economic thinking on naturalism. Malthus perceived that the rate of increase of the population would always be in excess of the increase in food production, leading to misery. If people did not limit the growth of the population, vice, misery, famine and war would restore the balance. Ricardo emphasised the natural fertility of the soil as a cornerstone of the economic system. Wages would be determined by the price of food. As the number of people to be fed proliferated, more, less fertile, land would have to be taken into production (law of decreasing returns) and the price of food would become equal to its marginal cost of production. This would provide a rent income to landowners, who grew food on more fertile land. If such rents were

invested in industrial machinery, then the rate of profit would eventually fall to nil as the ability of the system to absorb the extra production would be very limited. The owners of machinery had to pay wages determined by the price of food. Thus, an increase in population would result in higher wage rates and, therefore, in higher prices charged. Profits would fall in sympathy with rising rents.

Townsend believed that people were essentially animals and that, therefore, only minimum government was required. Hunger would compel them to work and to maintain a degree of civility in their own interest. Owners would keep them in check as well by controlling the supply of food.

Bentham (Ch 4.5.1), on the other hand based his 'naturalism' not so much on biological but rather on associationist psychology. He believed that people were motivated by feelings of pain and pleasure. Should one feel hungry, then this should spark a desire to work. The incentive to work could be strengthened even more if workers became desirous of getting things of some value (to create a need). Such desire should overcome the pain of having to work. Work would create utility provided it was more than the dis-utility of work. For Bentham, laissez-faire was just another social technique (164/65).

Of all these thinkers Malthus was the most pessimistic about human nature. The others appeared to be unable to believe that people could descend to a level where they would become 'men-eaters'. Davis, however, gives many examples from the El-Nino droughts of 1870-1900 of people doing exactly this.[207]

The way Polanyi puts this is that *people discovered society or rather political economy (155-178)*. In this connection he writes that the industrial revolution was largely the result of artisans rather than the accomplishment of the sciences of nature. Yet, there was a mechanical revolution which enlarged human control over nature. It resulted from the economic theories devised by the theorists mentioned (165). These theorists had all one thing in common and that was their opposition to the Speenhamland System. In various places as well as in appendices to his book Polanyi has set out the essential facts of this system as well as its background in the preceding poor laws. From these sources the following sketch of the operation of the Speenhamland system can be constructed.

Although England was industrialising during the second half of the 18th century, it remained an agricultural country by and large. Farmers needed extra hands during two peak times every year, for sowing during the spring and for harvesting in the late summer. During the rest of the year their labour was surplus to requirements. Often people could work in cottage industries during those slack periods. The poor law required parishes to support people who were unemployed from rates levied on those who held land either through workhouses or direct financial support.

[207] See Davis, op.cit., pp.132-144, for instance.

In 1795 prices of food rose steeply, so that a crisis emerged in parishes with poor to support. The justices of the peace of Berkshire met in Speenhamland to consider the crisis. They decided that aid-in wages should be provided based on the price of bread to all whose income fell below the minimum level set whilst allocations should be made to families with children. This concept of a 'living wage' became popular and became law in practically all parishes.

In 1796 the Act of Settlement was eased to allow a greater mobility of labour. This was required by the needs of industry. Factories that expanded needed workers whilst hose that had to close down had to lay off staff that could be employed elsewhere. The Speenhamland system allowed people in transition to be supported by parishes.

The agricultural revolution of the 18th century and in particular the on-going enclosures had uprooted many people from the plots of land they had in their villages and which served them as a form of social security. Again the Speenhamland system appeared to be a logical solution for such problems.

Yet, the system could easily produce perverse effects. If workers had been able to form trade unions and had not been able to move, they could have pushed up their wage rates. Any resulting unemployment would be at the expense of the parish. Moreover, the higher cost of living would be reflected in higher aid-in-wages payments. Thus, the Combination laws of 1799-1800 came into effect, forbidding the formation of trade unions. In combination with mobility of labour, this allowed employers to reduce wages. They could even go as low as zero, as parishes would pay the workers their 'living wage'.

Mobility of course had an effect on farmers. If they did not want to lose workers to employers in town they would have to match the wages paid in town. The Speenhamland system was a considerable help to them, therefore. The counterpart of the system was that the parish had to raise rates to finance the subsistence wages. The more farmers and industrialists lowered wage rates, the higher the rates had to go. It could happen that a farmer was unable to pay the rates and had to join the subsistence system on the receiving end. A deal could be made whereby the rates payable were reduced if the farmer agreed to employ an unemployed worker. Roundsmen were one form of cheap labour available to farmers. These people worked wherever somebody wanted to employ them. Farmers could bid for their labour at auctions held in the morning or employ them against food provided.

Some poor were given a rent subsidy. Landlords made use of this by requiring absurdly high rents for grossly inadequate lodgings. The authorities did not mind too much, provided the landlords paid the rates due on such accommodation.

Workers quickly realised what was going on and reduced their productive efforts when employed. They had an income anyway. If they worked harder and asked for a higher wage, employers would simply take somebody else. The decline in productivity was such that the yield of the poor rates fell,

leading parishes to lower the aid-in-wages. Thus, it reinforced the pernicious effects of the system.

The system blurred the usual distinction between poor and unemployed. Poorhouses and workhouses were combined. The parish was in charge of administering the system, meaning that effectively the squire and the parish priest were in charge. One effect of this system was that wages and conditions differed from one parish to another. Employers could take advantage of such differences.

Amazingly, this system was maintained for about 40 years, from 1795 to 1834. Yet, opposition increased the longer it was in operation. Reports made around the 1830s indicate that farmers wanted to retain the system so as to keep their workers at the subsistence wage level. They also objected to providing people with plots of land sufficient to give them an independent source of income. Parcels should be no larger than needed to keep people 'off the rates'.

By contrast, employers increasingly objected to the system on three grounds:

1. It induced low productivity.
2. It offered scope for competition on the basis of low wages.
3. It kept people on the land. With the growth of industry employers preferred to have surplus labour close by in town.

Middle class ratepayers joined the opposition on the grounds that they could not see any reason why they should pay taxes for people to do nothing. When such people became voters through the parliamentary reform act of 1832, the Poor law was amended in 1834 to the effect of abolishing the Speenhamland system. Administration was transferred to a national level. Over the period 1834-1850 this led to incredible cruelty.

Parliament did not go as far as the classical economists (Malthus, Ricardo) who had preferred to abolish the poor laws completely. Speenhamland was usually perceived as indiscriminate support for the poor such that there would always be poor or unemployed. Debates about the poor law were intense and had a formative influence on men like Burke, Godwin, Marx, Owen, Stuart Mill, Darwin and Spencer. Polanyi goes so far as to see in these debates amongst these men one of the cradles of the 19th century civilisation along with the French Revolution of 1789 (121). Robert Owen, however, refused to consider naturalism as a cause. He simply worked on the assumption that an industrial society requires a different type of organisation and proceeded to implement co-operatively owned and operated factories in Lanark.

6.3 Evaluation of Polanyi's Thesis

A strong point is that the author shows how consistently major thinkers as well as politicians of the 18th and 19th century worked towards transforming society into a theoretical self-regulating economic system. They were prepared to run major risks such as making England dependent on imported foodstuffs. They

trusted that the Royal Navy would be strong enough to protect its overseas food supplies. He calls this system deterministic inasmuch as it had the tendency to make the whole of society subservient to its demands. Perhaps it would be better to use the word control. Once the price mechanism could operate without hindrance, the economic market system could be put on automatic pilot.

Coupled with this analysis is the view that the leading thinkers were revolutionary in the sense that they developed their thoughts in reaction to the problem of the poor. In the period 1790-1850 there were large numbers of poor people supported by their local parishes. They pleaded either for the scrapping of the poor law altogether or for providing the poor with a proper incentive to work. In turn, this required an extension of the price mechanism to labour. The traditional view on labour as represented by the Elisabethan Poor Law (1601) was that people who were without income, through no fault of their own, should be provided for either with income and shelter and/or with employment. The extension of this system to the Speenhamland system had created intractable problems. Hence this old tradition should be removed from a modern society.

It is striking that Polanyi uses technical metaphors such as a self-regulating system or the price/market mechanism. This must be deliberate. When he discusses the relationship between the market system and the Industrial Revolution, he makes the point that once a civilisation came to rely on machinery the idea of a self-regulating market was inevitable. Merchants and farmers sell what they buy. The same happens in an industrial system, but now one needs to buy raw materials and labour. These commodities should be available in large enough quantities to make production on a large scale by means of machines profitable (68/69).

When he reflects on his narrative he argues that the 19th century was marked by determinism. After the Second World War he summarised his main thesis in these words at a conference:

1. Economic determinism is primarily a phenomenon of the 19th century. It has now ceased to operate in the largest part of the world; it has been in effect only in a market system, which is rapidly disappearing in Europe.
2. This market system has violently deformed our views on man and society.
3. These deformed views will be one of the key stumbling blocks to a solution for the problems of our civilisation (13).

It appears that our author seeks the origin of this determinism in what he calls the naturalism of thinkers such as Townsend, Malthus and Ricardo. The natural laws of population and diminishing soil fertility when larger areas of land are planted constrain the economic system to a long-term equilibrium. One should not interfere with the working of this system. Thus, both labour and land should become commodities. Polanyi notes that Ricardo was not entirely consistent in that, like Adam Smith, he had a labour theory of value and suggests that this was a remnant from an earlier tradition. The new age of industrial capitalism could not work with such notions.

Yet, somehow society reacted spontaneously to the hardships imposed by the new system to protect itself. The new economy had to be imposed upon society and the old had to be cleared away. As John Gray has shown this happened also when countries such as New Zealand decided to introduce market reforms during the 1980s.[208]

A problem with Polanyi's analysis is that whilst it may have served to explain how fascism had its roots in Ricardian England, it is not sufficiently general to serve as an explanation of what might occur when self-regulating market systems are imposed upon other societies in other eras. Fascism does not necessarily follow. Indeed, Gray shows how the reactions in Mexico, Russia and Japan will differ according to the different types of culture in those societies.[209]

This is the reason why I would prefer to substitute the word 'control' for Polanyi's determinism. The British tried to set up control systems that were in sympathy with their industries and which would regulate the problems of the poor. Once we introduce the word control we can easily incorporate the measures of self-protection introduced in Great Britain to deal with the problems caused by the application of the free market principles. They helped to maintain control over society, in part by allowing industry to function without undue disruptions.

A similar problem of a lack of generality in the argument is apparent in the contrast Polanyi draws between traditional societies and the society made subject to the self-regulating market system. He relies on a few examples from anthropological studies of societies that were characterised by animist religion (Melanesia, for example). The notions of reciprocity, redistribution, domestic usage of resources and habitation are derived from these studies. It is not immediately clear, however, how such notions should be transposed into a modern industrial money-using society. They might have to be applied in new ways. The possibility exists that other types of traditional societies might yet have produced other important notions of society, if we were to use Polanyi's methodology.

The societies he studied had no idea of progress by means of scientific technology. Nor are the ideas of freedom and equality in a modern state with limited constitutional jurisdiction to be found in traditional societies. Importantly, though, Polanyi's vision saw the economic as part of a broader culture rather than as turning culture into an economic phenomenon, which is a key problem of modern globalisation.

This is not to say that Polanyi is wrong in suggesting that we need to recover what society is and that the economic system should not dictate what society should be. He could have made a stronger case if he had focussed on control

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[208] Gray, op. cit., pp. 39-44.

[209] ibid., pp. 133-208.

or order and freedom and responsibility. What balance should be struck between order/control and freedom in a business organisation, a family or a university? The love of Christ, which he believes is not applicable in a complex society, should indeed motivate office-bearers in industry, unions, universities and so on to create conditions enabling the people they are responsible for to carry out their vocations in a meaningful way. Admittedly, we are far from seeing this realised in present society.

The attention paid to the self-regulating system may have had the effect of reducing the importance of the power possessed by the main actors within the system. In our days, but also in the late 19th and early 20th century, large companies have been established which are able to wield immense market power. Although Polanyi refers to the emergence of monopolies in a market system as an inherent weakness of such a system, he could have strengthened this point by extending his analysis to the control such monopolists can bring to bear upon societies. Now we know that the theorists who refer to a self-regulating market system tend to think in terms of perfect competition in which individual producers are only able to adjust the quantities they are willing to produce at the given world price. How can monopolists arise in such a system? The answer given is usually that technical advances lead to the production of new products. Indeed, patent law provides a legal monopoly to innovators for a limited period of time.

This leads to the issue of naturalism in the economic thought of Ricardo and Malthus. There is no doubt that they built their economic thought on the basis of natural laws. The physiocrats (Ch 3.9) did the same by arguing that agriculture was the only industry able to produce something. They extended this principle to the whole structure of their thought, including perfect competition (natural law thinking). Ricardo's and Malthus's ideas of the long-term development of society were motivated by the laws of population (human biological fertility) and decreasing returns of soil fertility. It might be an advance to say that they perpetrated a reductionism of economics to biology. Similarly, Bentham reduced economics to psychology. Since in the spheres of biology and psychology there is no scope for human freedom in the sense that one can decide to conform or not to conform to the laws for these spheres, the reason for Polanyi's reference to determinism can be understood. Indeed, modern theoretical economics tends to model itself on physics and mathematics.

Once the possibility of monopolies based on technical innovations is introduced, it becomes difficult to maintain the reductions to biology or psychology, without risking inconsistencies.

As his own account of the spontaneous reform efforts consequent upon the introduction of the self-regulating market system indicates, responsible office-bearers in state and society did exercise the freedom they had to make amends to the working of the market system. Implicitly they recognised that there were norms set for social and economic life. Yet, Polanyi does not cite this phenomenon as an indication that the system was not fool-proof or not as deterministic as it appeared to be.

6.4 Conclusion

Polanyi showed that the industrial system brought about by the Industrial Revolution required that markets should be established for land, labour and capital, which in the past used to be subject to social controls. His account of the imposition of a self-regulating market system upon society in Great Britain and in the rest of the developed world of the 19th century is a good example of what is meant by economism and technicism. One area of life, the technical/economic sphere of production, trade and money working through supply and demand as regulated by the market is made sovereign over the rest of society. The life of society is thought to spring from the market order. The life of the state, family, school and all inter-individual relationships as well as the relationships between human society and the kingdoms of things, plants and animals are construed as technical/economic relationships.

Although economism and technicism occur together in the self-regulating market system, it is nevertheless important to distinguish them. Economism construes all inter-individual relationships, indeed the whole of society as economic in character. The meaning of economic, however, is then specifically financial in character. Polanyi connects human labour, land or nature and money and sees them, in my words, as part of an economistic structure. Human labour should be used productively or fruitfully in order to maximise financial profit. The same applies to raw materials and land. Once they are part of the market system, however, they might be wasted despite the mechanical operation of the price system. Financial profitability is not necessarily the same as a truly profitable system for people, animals and plants in the long run across the world.

The forming power of technology is part of this economistic system. Without technology it could not function. Indeed, the idea of a 'transformation' from traditional to modern market order carries a technical connotation.

As stated above economism has a totalitarian character as it affects all human relationships. Such domination is bound to call forth resistance and resentment. Indeed, Polanyi believes that the fascism of the 1920s and 1930s should be seen as such a reaction. Could it be that the present neo-liberal era might call forth another totalitarian reaction?

Clearly, the Great Transformation deeply affected agriculture, inasmuch as it became subject to market-based demand and supply. It had to compete for labour, land and capital with industry and commerce. Family-based farming had little future under this system, as viable units had to become large-scale, especially in an international setting. Thus, Polanyi highlights the development towards industrial farming sketched in Chapter 2.

The economic theory underpinning this will be the subject of the next chapter.

CHAPTER SEVEN: NEO-CLASSICAL ECONOMIC THEORY

7.1 Introduction

Karl Polanyi demonstrated that the introduction and widespread use of machinery since the Industrial Revolution has led to a free-market system in which labour, land and money (amortisation and interest payable), each previously embedded in social/political relationships, have become marketable commodities, with prices determined by demand and supply. These three resources play a key role in both the classic and neo-classical theory of international trade inasmuch as they are assumed to be unable to cross country borders. On the basis of this assumption one can establish a country's comparative advantage as its basis for participating competitively in the international economy. At present the People's Republic of China, for example, has an abundant supply of cheap labour such that it serves as a major low-wage input into manufacturing industries that are able to compete with similar industries in developed Western countries where labour is much less abundant and, therefore, much more highly paid.

The theory of comparative advantage is one of the key reasons why economists generally believe that free trade is a good thing. The specialisation to which it leads, so they believe, improves real GDP per head of the population. Neo-classical welfare theory works this out on the basis of Alfred Marshall's (Ch 4.7.2) theory of consumer surplus. Assuming a downward sloping demand and upward sloping supply curve, the removal of a tariff can be shown to result in a benefit for consumers outweighing losses incurred by both producers and the State. The social relationships underpinning demand and supply curves are ignored, however.

It is on the basis of these theoretical ideas that business leaders and countries such as those known as the Cairns Group (major agricultural exporters outside the European Union and the USA) believe that general economic welfare will increase when artificial impediments to international trade such as tariffs, quotas and domestic support for agriculture are removed.

This chapter seeks to examine the foundations of the neo-classical welfare theory of international trade as it arose from the marginal revolution around 1870. This revolution in economic theory *shifted the focus from the producer to the consumer, such that the utility of consumers expressed in market demand would drive the system of production.* I choose Meade's representation of this theory because of the rigour of his analysis.[210] In addition, he played a key role in the drafting of the GATT.

The inquiry extends to the nature of economic rationality as expressed in neo-classical thinking and includes an attempt to outlining an alternative.

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[210] J.E. Meade, *Trade and Welfare,* vol. 2 of *The Theory of International Economic Policy,* Oxford University Press, London, 1955. References to this source are put in brackets in the text.

7.2 Meade's Case for International Free Trade

The theory of international trade is based upon both consumers and producers having an incentive to maximise consumption and production. There is no state intervention or industrial relations legislation preventing wage rates from fluctuating according to supply and demand. Producers extend production to the point where marginal revenue equals marginal costs and consumers equalise marginal utility and prices paid under a budget constraint. Thus, self-interest acts as the pilot for achieving maximum world production. Meade has made the case for free trade in terms of the criteria of welfare economics in which economic welfare is defined as a state of Pareto optimum in which it is only possible to improve somebody's welfare by reducing that of others. Taking perfect competition as a starting point, individual consumers and producers are unable to influence prices by their own actions, so that the marginal cost of a factor of production equals its price and in which the marginal social net product of a factor equals the price of the product which, in turn, equals the marginal value of consumption.

On this basis Meade shows that each closed domestic economy enjoys a maximum level of economic welfare when the following seven conditions are satisfied (51-101):

1. *The condition of optimum trade.* Each consumer in a free market will buy each commodity until its marginal value to him is equal to the marginal payment, which he has to make to acquire one more unit.
2. *The maximisation of production.* Resources should be so used that it is impossible to produce more of one commodity without producing less of another.
3. *The optimisation of production.* It should be impossible to find any one factor, any two products, and any one consumer such that the ratio between the marginal net cost of the two products in terms of that factor should differ from the ratio between the marginal values of the two products to that consumer.
4. *The optimisation of effort.* It should be impossible to find any two citizens, A who is doing a particular type of work and B who is consuming the product of A's work, such that the marginal cost of a unit of effort to A differs from the marginal value to B of the marginal social net product of that effort.
5. *Optimum distribution.* If the distribution of income is such that it is impossible by shifting income from one citizen to another to increase the satisfaction of the latter more than the satisfaction of the former is reduced, then the condition of optimum distribution is achieved.
6. *Optimum population.* The condition of optimum population requires that the total utility enjoyed by a representative citizen is greater than the marginal utility of a unit of product to the representative citizen multiplied by the excess of the average consumption over the marginal product of a worker.

7. *Optimum savings.* This condition is met when the present rate of savings (e.g. amount saved per day) multiplied by the present marginal utility of income is less than the excess of the rate of total utility (e.g. total welfare per day) which will be enjoyed by the community in a state of glut over the rate of total utility which it enjoys in present conditions.

These seven conditions must be simultaneously fulfilled if it is to be impossible to increase economic welfare by any further marginal adjustment (119). Meade is careful to avoid defining the goal of policy as maximising economic welfare per head of the population. Considering the world as a whole, such a goal could be achieved by eliminating a population whose average economic welfare would be lower than that enjoyed by the rest. Instead, Meade defines the end of policy as maximising total economic welfare.

Although in this world there is no technical innovation, both population and capital stock are able to grow. The stock of capital equipment can keep accumulating until its physical marginal product is zero. This state might arrive when all consumers' needs are satisfied before the marginal product of capital is zero in a state called product glut. It could also arrive when the marginal product of capital has fallen to zero, because there is no land left on which it could be put to work with the existing labour force. This would be a state of capital glut, in which consumers still have wants to be satisfied but the production system cannot meet them anymore.

This reasoning shows that neo-classical theory recognises limits to the expansion of the system of economic markets such as availability of land where land should also be understood as including natural resources. However, market participants would not necessarily be concerned about such limits. All they do is weighing up utilities against dis-utilities, leisure against paid work, capital investment against additional profits, and so on.

Meade defines the net product of labour as the net maintainable increase in output where part of the labour is expended to maintain, in the case of growing wheat, the fertility of the land unimpaired (11). It is doubtful whether this requirement can be met in a state of capital glut as described.

In general, Meade uses a number of key concepts in a highly abstract manner, namely population, labour and capital. Without knowing the specific contents, they appear like labels for empty boxes. A population may be very coherent, sharing a unique history, language and culture or, alternatively, might be very diverse, with many dialects, races, histories and customs where some are very antagonistic to others or where some elites are very rich and dominating and others poor and subservient. Labour might range from a mass of poor low-skilled workers to a few highly paid, highly educated technical elites. Similarly, capital might consist of fertile land or land deprived of top soil and some farm equipment or of a range of specialised durable machinery, buildings and roads, some highly polluting, others hardly visible micro-chips. We have no idea how inter-personal relationships are shaped by the organisation of capital equipment or how fast natural resources such as oil, bio-diversity, copper etc. are being depleted, polluted or destroyed as the

economic system moves to its equilibrium positions. It seems quite likely that the huge expansion of capital equipment necessary to achieve zero marginal productivity might generate a level of pollution that would make it impossible for farmers to maintain the fertility of their land under given methods of farming and industrial production. The abstractions prevent us from considering the proper husbanding of given resources.

It follows that a system of money and markets with international trade may damage or destroy the factors of production on which it ultimately rests, whether or not they are able to cross borders. Only if consumers were fully aware of all the pernicious effects associated with their consumption patterns and only if they were able to make their voice heard in the market place could such effects be prevented in terms of neo-classical theory. Of course, there are more possibilities in this regard, but they might require detailed Government intervention or strong consumer organisations and these are not part of neo-classical theory.

Meade appears to acknowledge the abstract nature of his theory when he says that a situation in which all seven marginal conditions are met is utopian i.e. by altering one policy it is assumed that all other policies are of an optimum nature (8). In the context, this seems to mean that it is an unlikely situation, but that, nevertheless, it should serve as an ideal yardstick for policy-makers. If the actual situation is far removed from the ideal, they should be able to map out a road towards it.

However this may be, once trade across borders is possible, traders will take advantage of variations in the ratios of prices between countries. Trade will continue until the ratios are equalised and this is the marginal condition for the optimisation of trade and the maximisation of welfare in each country (142).

Thus, if all countries in the world follow utopian domestic policies in accordance with the framework of the seven marginal conditions, then, it follows that free trade (when factors of production cannot move across state borders) '.. sets internationally the proper marginal conditions for economic efficiency'(139ff).

In this world of given resources and technology, where only small adjustments are possible, labour and land are subject to decreasing marginal productivity. In the case of labour this implies that employers cease hiring workers when the marginal productivity of one extra employee becomes nil or when the wage rate payable for the extra unit she/he produces is higher than the price for which it can be sold. In countries with an abundant labour supply and high unemployment the wage rate might have to approach zero to achieve full employment. Although this may sound plausible the theory does not allow for the complementary nature of many factors of production. Laurent Cordonnier gives a delightful illustration of this in the parable of the grand piano. It takes two strong men to shift such an instrument from a hall to a lorry, one to hold it at the keyboard end (*the pianist*) and the other at the grand end (*the chin*). Since the operation can only be done by the two men jointly, marginal productivity and, therefore, remuneration is owed to the team. The members

of the team may decide to share the rewards 50/50. Alternatively, the chin may allow another man to share with the pianist and let them decide how to divide the 50%. Competition between the two will take some time till the chin pronounces that he will take 99%, leaving 1% for the two pianists.[211] It would be important to find out to what extent modern trading and production systems entail complementary 'factors of production'. In all likelihood, the proportion is high, considering that assembly line production, agriculture, fishing and most services require team approaches or have predominately fixed costs.

Having made the ideal case for free trade, Meade follows the road of diminishing abstraction by considering the issues raised by a less perfect world and asks under what circumstances welfare might be increased by protection against imports.

7.3 The Case for Protection

Meade summarises the arguments in favour of controls (tariffs etc.) as follows:

1. The marginal conditions for utopian efficiency are not otherwise satisfied throughout the various economies of the world.
2. The need to obtain an improvement in the world's economic structure.
3. The need to achieve a better distribution of income either within a country or between countries.

He then conducts a detailed examination of these three possible exceptions by gradually dropping the most restrictive assumptions. In the course of this analysis factors such as increasing returns to scale and external economies, for example through the advantages of conglomeration and the creation of atmosphere by the State (education, facilities) are thoroughly reviewed. It turns out that neither increasing returns to scale nor external economies are as such powerful arguments to establish Government controls over trade. In many cases temporary Government assistance might be justified. Often arguments for protection are plausible but even so other devices are usually available to achieve the ends desired.

It is often argued that those who suffer losses as a result of the removal of trade barriers should be compensated, usually by the State. This is rarely done, however.

Meade's approach to practical reality involves a discussion of specific cases or arrangements such as the need to diversify a country's economic structure in order to insure against uncertainty. The establishment of a new industry to reduce exposure to potential disaster would have to be very carefully assessed along with alternative policies to reduce the risks identified such as the formation of capital reserves from taxation. Such assessments are difficult

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[211] Laurent Cordonnier, *Pas de Pitié pour les Gueux; sur les theories économiques du chômage*, Raisons d'Agir Éditions, Paris, 2000.

to make (258). An exception seems to be the economies of conglomeration gained when a large number of firms are located close together. This would ease communications and costs of transport and would provide a pool of skilled labour. Know-how and new technical ideas would spread more easily through the industry (258).

If we link such external economies with the possibility of industries operating under increasing returns to scale, then the question is where such industries should be set up. Should they be set up in a few countries to maximise the advantages of conglomeration or should many countries be allowed to industrialise, even if this were to result in higher costs of production? Meade concludes:

> The answer is the unexciting one: sometimes the one side, and sometimes the other; it all depends upon what ...we have called the relationship between structural and marginal economies of large-scale production (260).

Meade concludes that there are four basic types of arguments in favour of controls over international trade. The first is that the actual world is 'second-best' in which there are many controls, which cause a divergence between marginal values and costs. If one removes one tariff, and not the others, chances are that one upsets the balance, which might have been optimal in some sense. Meade's reaction is:

> The interrelationships between the different relevant variables in the economic system are so complex that it is not really possible to apply this principle of "second-best" to each particular adjustment of trade policy. Yet there remains a general presumption that a removal of a trade barrier will have good rather than bad effects (565).

The second case involves the use of trade barriers to improve the terms of trade. The argument against such a policy is that it tends to invoke retaliation, so that after a round of moves and countermoves nobody will have gained much. Meade believes that for this reason, and also in the light of uneven bargaining power between rich and poor countries, there is a case for richer countries taking the lead to remove barriers to trade. A general system of free trade with rich countries providing grants-in-aid would be even better.

The third reason advanced in favour of protection is that it allows a redistribution of income within the protecting country in favour of those factors of production specially suited for employment in protected industries. Meade finds this the least compelling argument of all because such a domestic redistribution of income can be achieved almost always by other means than a reduction in world economic efficiency resulting from protection.

The fourth argument is a structural one. The establishment of new industries with large economies of scale or which create important external economies (atmosphere-creating) might justify the use of protection. It is very difficult to predict in advance the outcome of such protection or to evaluate the desirability of such structural change. As a result every country could deploy

this argument to escape from the obligations imposed by international agreements.

In terms of the freedom of factors of production (labour and capital) to move from country to country, Meade supports the view that unrestricted emigration from countries which have a rapid and uncontrolled population growth would justify a policy of restricted immigration by richer countries to prevent them from becoming over-populated. At present Europe, Australia, the USA and New Zealand are indeed applying this policy advice. In general, movements of labour and capital might have to be restricted if countries pursued widely different policies in terms of efficiency and equity. A country practising a policy of redistributing incomes might attract low-skilled labour from a country that promotes efficiency rather than equity, but could lose highly qualified labour to the latter.

Thus, Meade ends up in favour of '...rebuilding ... a liberal international economic order' (570).

Such an order should be secured by means of international agreements even if they cut deeply into domestic economic arrangements. Such agreements would work best if the countries concerned were to adopt reasonably similar objectives for their economic policies. A form of international supervision would be needed to ensure proper implementation.

7.4 Evidence Lacking

Using the same economic criterion as Meade namely that economic policy, including trade policy, should be judged in terms of its ability to lift welfare, economic historian Paul Bairoch has concluded that, more often than not, countries that practice protectionism have had a better record than others.[212] The USA, for example, has been protectionist right through its history. As a very large economy it has been able to preach free trade, to the benefit of its producers, whilst practising the opposite.

Nonetheless, a recent survey found that 97 percent of academic economists in the USA support free trade.[213] After the Second World War, the economists' policy recommendation of free trade has underpinned the establishment of international agreements to secure free trade such as the GATT/WTO (Ch 13). Thus, over the past 60 years or so, various trade rounds have been conducted to reduce tariffs and other trading restrictions. Such bargaining has been difficult because major commercial interests are at stake. Those who enjoy an established market position with stable profit margins are unlikely to be keen on being exposed to foreign competition. Third world

[212] Paul Bairoch, *Mythes et paradoxes de l'histoire économique*, La Découverte, Paris, 1993/1999.

[213] Willemien Kets and Paul Tang, Free Trade and its Enemies, *De Economist*, vol. 152/3, September 2004, pp. 427-437, with reference to a survey reported in 1996. They could also have referred to Alfred Marshall, who recommended free trade to the UK Government in 1906.

countries, on the other hand, have been arguing that their welfare is impeded by the protectionism of the rich countries.

Jacques Berthelot has surveyed the practical application of comparative advantage in cost-benefit studies of agricultural projects in Third World countries.[214] He notes that the reference prices used for labour are often below market values or even nil, whilst the price of land is often taken as nil, despite fertile land being less and less abundantly available, so that peasants must pay rents for any extra land used. Also since 1960 the gap between wages paid in developing countries in the South and those in the developed North has been widening, whereas the theory would have predicted a diminishing gap under the impact of international trade.

7.5 Meade's Assumptions

Meade has based his analysis on a number of very basic assumptions, which he shares with most neo-classical analyses. I shall list these and then make detailed comments on each of them.

1. Marginality and Optimum.
2. Markets and Division of Labour.
3. Money.
4. Competition.
5. Profit Motive.
6. Comparative Advantage.
7. Static Technology.
8. Individual Welfare.
9. Floating Exchange Rates.
10. Balances of Payments in Equilibrium.
11. Abstract Entities.

7.6 Money-Using Economies

Assumptions 2, 3, 4, 5, 6, 9 and 10 indicate that the author's discourse relates to a money-using set of countries and markets in which companies, employees and consumers compete. The economic criterion of maximising standards of living, therefore, must be appreciated in that context. Consequences of the process of production and consumption which are not valued in money such as pollution or the extinguishing of biological species are treated as externalities. Meade treats these as causing a divergence between marginal social values and costs and notes that the Government should provide monetary compensation to those affected under policies of modified laissez-faire free trade. In recent times there has been a trend to

[214] Jacques Berthelot, *L'Agriculture; Talon d'Achille de la Mondialisation*; *clés pour un accord agricole solidaire à l'OMC,* l'Harmattan, Paris, 2001, pp.59-67.

establish markets also for trading in pollution such as carbon-dioxide emissions. If we combine the concept of markets with the profit motive (assumption 5), we should ask whether there are areas of life that are not or should not be subject to markets? Increasingly, markets are set up in areas that used to be beyond commercial considerations such as sports, education, arts or even politics. Combined with the assumption that comparative advantage (meaning that price ratios of similar goods differ between countries) extends, in principle, to all market prices, this would imply that business may provide such 'services' on an international basis as well.

In general, neo-classical theory reasons as if money does not have any effect on demand and supply, except in the sense of having its own market in a general equilibrium sense. Binswanger has referred to this aspect as a 'black hole'.[215] His argument hinges on business investing in new capital equipment by means of interest-bearing loans. The principal of the loan is spent on wages and materials and these are recovered by sales of products, according to the theory. If the workers were to spend all of their income on the firm's product, the firm would still make a loss equal to the interest payable. In practice, this can be done only if other firms are also investing and raising demand, including demand for the first firm's product. Thus, as a result of interest the system must keep expanding. The consequences of such expansion are basically unknown.

7.7 Marginal Analysis and Optimum (Assumption 1)

Consumers are assumed to be subject to decreasing marginal utility and producers to increasing marginal costs and falling marginal revenue (when faced with a falling demand curve should competition be less than perfect).
As the seven marginal conditions indicate, when marginal revenues (price in perfect competition) equal marginal costs and marginal utility equals price, throughout the economy, the standard of living is maximised. Nobody can be made better off without making somebody else worse off (also known as Pareto optimality).

The postulate of falling marginal utility is often seen as a psychological given, because normally the intensity of satisfaction diminishes with every extra unit of a good consumed. Such a given for humankind acts like a natural constraint on consumers. Since, in neo-classical theory it is consumers who drive the whole system, it would take only one step to assume that the market system as such is a natural phenomenon.

The seven marginal conditions all involve an optimum. Both consumers and producers move along their marginal utility and marginal revenue and marginal cost curves until they reach a point from where no extra utility or extra net revenue can be had. Indeed, such points could be calculated by means of computers. The usual assumption is that the curves are continuous and, therefore, differentiable, which makes it easy to find unique points of

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[215] According to Robert von Heusinger, in *Die Zeit*, 48/2004, 18 November, p. 35 (Verdammt zum Wachsen).

equilibrium. In the labour market, assuming that the wage rate is 'flexible' that is to say free to fluctuate up and down and that both employers and workers are able to compete, the optimum wage rate is the one at which full employment of all those who want to work is secured. At a higher rate employers would be unable to maximise profits. At a lower wage rate, employees would not be able to maximise their consumption. At the optimum rate both employment, profits and consumption are maximised.

This mechanistic approach goes back to Adam Smith's fascination with astronomy as a fundamental and exemplary science. Newton had shown how the force of gravity as attraction could explain the movements of the planets and much besides. Cournot and Walras likewise shared this admiration for a fully determined mechanical system, which when left to its own devices would always move back into equilibrium after a shock. The price system, driven by demand and supply and their associated marginal equilibrium conditions would see to that.[216]

The crucial place held by the concept of equilibrium or optimum in economic theory follows logically, therefore, from a reduction of what is economic to an application of mechanics and simplistic psychology. In physics equilibrium is a key concept involving the way powers and energy interact. If, for example two objects each having a different temperature come into contact with each other, then an exchange of heat will take place until each object has the same temperature and equilibrium is achieved. Or, if two equal but differently directed powers act simultaneously on an object it will not move. There is equilibrium. In a similar way economic theory postulates partial equilibrium if a business expands its production to the point where marginal costs equal marginal revenues.

The object of neo-classical economic theory (both macro and micro) has been called '.. a description of an equilibrium in terms of pre-suppositions. ...The object of knowledge does not entail a way of discovering laws but rather to construct something, i.e. an imaginary equilibrium'.[217]

I hasten to add that neo-classical economic theory, despite its limitations, has fashioned a number of tools that are indeed helpful to understand practical realities. In many business situations, for instance, one may use marginal analysis profitably. The same is true for price and income elasticities and many other concepts. This core of truth reflects a true relationship between what is mechanical and what is economic. In Dooyeweerd's philosophy this is known as an anticipation.

7.8 Division of Labour (Assumption 2)

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[216] Jean-Paul Maréchal, op.cit., pp. 43-63.

[217] W. Boerboom, Genesis en Rol van de Belangrijkste Postulaten in de Gangbare Ekonomie, in: *Krisis in de Ekonomiese Theorie*, VESVU Kongres, VU, Amsterdam, 1973, p. 35.

Adam Smith believed that the division of labour is constrained by the extent of the market. We should add that such division becomes more extensive and intricate the more complex technology becomes. More and more round-about ways of producing final goods are put in place as technology develops. Import protection limits the market and hence reduces the benefits to be had from the market. The further the division of labour can be pushed the greater the scope for large-scale production and specialisation. When production takes place in a variety of factories, transport is required along with suitable infrastructure. Thus, production systems emerge that are closely inter-linked through specialisation and transport and communication networks. In recent times this specialisation has assumed global characteristics. The theory of comparative advantage, in its various forms, presupposes the existence of such networks between and within countries based as it is upon the view that capital and labour are only free to move within but not between countries. The problem is that such networks play no role whatsoever in the theory as such.

International trade negotiations tend to disregard the incongruity between the ability of capital to be sent around the globe and the much more constrained freedom for labour. Even though migration is allowed and refugees move in large numbers to certain countries, as a percentage of the total number of workers such flows are small and subject to major restrictions. Recently, electrified fences have been erected along the Mexico/US border to stop the flow of illegal immigrants into the USA.

A more significant point is that labour has always been free to move across borders, provided we take a wider view of labour and understand it to include all products of human labour such as knowledge. Once goods can be shipped from one country to another, knowledge moves as well. Books, as well as the knowledge underlying the trading and credit networks necessary for the conduct of international trade, would move along with manufactured products of various kinds. Japan has shown that the analysis of imported manufactures might be an important source of new knowledge that could be utilised in the development of new industries and products.

Historically, when Britain opened its borders in 1846-1849 it had already been exporting parts of its population to its overseas colonies in North America, South Africa and Australia since the 17th century.

7.9 Static Technology (assumption 7)

Mrs. Joan Robinson has outlined the strange conclusions to which neo-classical theory can come. An increase in the quantity of capital in the production process relative to labour should lead to a decline in the marginal productivity of capital, so that the marginal product would decrease, given the state of technology. In this case the rate of profit should decline. According to Robinson, this is nonsense. With a given state of knowledge and technology one cannot add new units of capital to a given quantity of labour for very long. Moreover, one does not find that in a country richly endowed with capital such as the USA the rate of profit is lower than in a country poorly endowed with capital such as India.

> The whole idea of accumulation of capital at a given state of technology is totally void of contents. The accumulation process must always involve technical changes-a more productive technology is embodied in new machines.[218]

Robinson used this opportunity to attack the common confusion between profit and interest. Business invests in the hope of making profits and pays owners who have financed the investment a rate of interest for making their wealth available.

7.10 Comparative Advantage (Assumption 6)

We should add to Mrs Robinson's observations that comparative advantage is continually changing not only as a result of the introduction of new technologies but also in consequence of migrations and, in former times, colonisation. A key issue at present is the effect of subsidised exports of agricultural products on the agriculture of Third World countries.

7.11 Individual Welfare

Meade refers to the 'old-fashioned utilitarian criterion of considering the total economic welfare of the community as made up of the sum of economic welfares of all its individual citizens' (5).

In this respect he thinks of welfare as represented by real GDP. This begs many questions. Accidents, for example, and heart attacks resulting from people working hard to raise GDP have the effects of increasing GDP. On the other hand, external effects, which are not measured in money through the system of production, such as pollution are excluded from GDP. The definition appears to exclude also public goods, although Meade might consider them as 'atmosphere' creating.

In his analysis, however, he acknowledges that statesmen should consider also social and political criteria such as freedom and equality. This calls for a careful balancing of both economic and other criteria in devising policies. A progressive tax system may be used to achieve greater equality and this would have the effect of raising economic welfare, as many poorer people are enabled to consume more, whilst the rich might only reduce their savings, but if the rate of progression is very steep, it might have the effect of reducing incentives to work and invest.

The theory's focus on individuals is such that the social and cultural relationships between individuals are ignored. Yet, they are of great importance to the development of relations, including commercial relationships, between countries. A country may be protectionist because it wants to preserve its long traditions and peculiar customs and culture from

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[218] Joan Robinson, De Troonsafstand van de Neoklassieke Ekonomie, in *Krisis in de Ekonomiese Theorie*, 1973, p. 22.

being eroded and attacked by the free import of goods and services which are symbolic of a different culture. Gray documents how free trade policies always require the actions of a dictator or a removal or suspension of democratic controls, because markets are always embedded in social relationships.[219] In other words, if consumers are willing to accept slavery or a depletion of natural resources, then, the economic criterion used can only register that the sum of individual welfares is increased.

7.12 Abstract Entities

The analysis is conducted in terms of assumed (abstract) entities such as factors of production (land, labour and capital), consumers, utility and prices. This provides always an element of particularity or contingency. Meade's discussions of structural issues are a case in point. The marginal analysis is unable to provide clear-cut answers as to the wisdom or otherwise of setting up new industries behind protective barriers.

In this connection, it is not surprising that welfare theory has not been widened or adapted to take cognisance of the role TNCs play in the modern world. Doing so would require the use of a dynamic rather than a static theory, because TNCs compete on the basis of (new) technology and continually fight for market share. The innovations to the theory of international trade by Krugman focus on monopolistic competition and external economies (atmosphere in Meade's theory). They have led to a theory of competitive advantage or strategic (managed) trade. The basic premise that 'free trade' should be the norm has not been abandoned, however.

7.13 Lack of Unique Equilibria

If consumers were to decide to defer their purchases, because they expect that prices will keep falling, they might plunge the economic system into a deep recession. This possibility raises the question whether a determinate stable and unique equilibrium is possible? The answer is yes, if one makes a large number of additional hypotheses. Perfect competition is a key one, although it hardly ever occurs in practice, certainly not over the whole spectrum of markets. Sonnenschein has developed a theorem that shows that it is impossible to derive the curves of demand and supply from maximising behaviours. A general equilibrium may exist, depending on very specific configurations of demand and supply curves, but it would never be reached in practice. Mathematicians Israel and Guerrien have demonstrated that in a general equilibrium model the level of unemployment pre-supposes that wage rates are too high. However, once these are allowed to fall, all prices and quantities in the model change, so that the original general equilibrium has ceased to exist. In what way could six billion individuals form a general equilibrium? In these models money is supposed to have its own market, with

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[219] John Gray, op.cit.

supply and demand determining its price (the rate of interest).[220] Since money is an instrument that allows all markets to function and prices to be calculated, it cannot have a market like all other goods.

Economists who start from the premises of individuals as optimising economic actors using money prices can only think of unemployment as caused by workers refusing to accept lower wage rates and of environmental degradation as externalities for which markets have not yet been invented. Thus, the idea that the whole of reality is basically economic in nature is already part of the theory.

7.14 The Rationality of Neo-Classical Theory

Neo-classical theory has its roots in three philosophical approaches, each of which sees individual human subjects as facing the world:

1. Jevons saw the human subject as receiving utility (pleasure, satisfaction) from objects.
2. Menger adopted a Kantian approach in which a transcendental I orders the chaotic impressions from the objects outside in terms of forms such as natural resources and human needs. People try to obtain goods that are able to satisfy their needs. This ability constitutes economic value. Menger would not recognise any intrinsic economic value of any object.
3. Walras applied a Cartesian-mathematical method to economics in the sense that he postulated two realms of facts. First, facts of nature (blind and fatal) which in economic terms would be subject to the laws of supply and demand. The price mechanism would bring about a new equilibrium at a new set of prices after every shock to the system. The system would work like a physical-mathematical system of n equations for n unknowns. Second, facts which have their origin in human will (clairvoyant and free) and which concern a) relationships of objects to people and b) relationships between people. Walras called the relationships meant by b) moral. In the general equilibrium system human subjects play no role whatsoever. Business managers make neither profit nor loss.[221]

In each case we meet rationally operating individuals who set out to satisfy their needs by moving towards an optimum position, in the context of perfect competition. Unimpeded by imperfections such as Government regulations, monopolies or other deviations from the ideal state, the law of diminishing marginal utility and marginal costs being equal to price, the individuals achieve their objective. Amartya Sen has called such a rational being a *rational idiot or homo oeconomicus.*[222]

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[220] Samir Amin, Économie "pure": une nouvelle sorcellerie, *Manière de Voir* No 72, Décembre 2003-January 2004, Le Monde Diplomatique, Paris, pp. 42-44.

[221] This summary is based on A. Kouwenhoven, *Vrijheid en Gelijkheid*, Kok/Kampen and Stenfert Kroese/Leiden, 1965 pp. 72-92.

[222] Maréchal, op.cit., p. 122.

This rational idiot is not so much a full-blooded human being, but rather a mechanical computing machine that operates in the world, at least the world of markets where money prices are set through an interaction of demand and supply. Many economists argue that the theory is not necessarily confined to markets. In cost-benefit analysis one may consider the value of nature lost as a result of road construction, for example. Even so, such value will be expressed in money terms. The marginal principle of the theory supposes that rational consumers will establish a list of items to be bought according to intensity of need, given prices and income. Thus, they maximise their utility. As pointed out above, this procedure is based upon a psychological or natural given. We do not keep eating beyond a level of satisfaction. If this is what consumers do, then, how autonomous are they? As employees many have little freedom to decide whether to work or not. Perhaps the only way in which consumers exercise autonomy is by anticipating price changes, but if they do so, then, any equilibrium that might arise would be the result of chance.

7.14.1 Means-Ends Rationality

One has called this maximising rationality a formalistic approach to the discipline of economics. It is a means-end rationality, with the end given (maximising utility or profits) or a procedural rationality about efficiently approaching certain ends.[223] Whilst recognising its lack of realism, one uses it as a yardstick to measure actual economic situations against. This implies that the theory is easily used as a means of advising policy makers. The further an economy is removed from optimum conditions the greater is the likelihood of inefficiencies and sub-optimal welfare. Meade is in fact following this approach as he outlines how politicians might modify laissez-faire free trade.

Hennipman focused on formal means-ends rationality. Assuming that economic subjects have limited means which can be deployed in alternative ways, economic science develops an abstract theory regarding choices made regardless of the contents of ends or the rationality of acting. The theory seeks to map the structure and the regularities of the dispositions of economic goods by the participating members of society.[224]

In his view rationality can never be a matter of ends. At best we can work out that subjects proceed more or less efficiently (rationally) in seeking to achieve their ends.[225]

I note here that Hennipman's starting point is close to Lionel Robbins famous definition of economics as 'the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses'. However, he is careful to argue that economic theory limits itself to a specific aspect of acts covered by such a wide definition, namely the allocative aspect

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[223] Bas Kee, *Meer dan het Rationele*, VU Uitgeverij, Amsterdam, 1987.

[224] P. Hennipman, *Economisch Motief en Economisch Principe*, Noord-Hollandsche Uitgevers Maatschappij, Amsterdam, 1945, p. 435.

[225] ibid., p. 277.

of choice and behaviour (quoting Knight).[226] Thus, if a room is heated by a coal-burning stove the allocation of a certain quantity of coal to the room is an economic act. Whether one fills the stove with all of this coal or only half is a technical matter.

To explain his definition Hennipman provides the example of a firm that maximises profits by expanding production to the point where marginal revenue equals marginal cost.[227] Should we find that it does not equate marginal revenue with marginal costs, then, we should wish to find out why. The ends, knowledge and expectations of subjects form the data for economic theory. Since individual subjective preferences and expectations are not objectively available to economists, they must use research and reasoning. Hennipman then argues that it is highly important that the premises of the theory adequately represent reality. He distinguishes three types:

1. Positive facts about economic acts: the law of decreasing marginal utility, the law of demand, Keynes' fundamental psychological law (marginal propensity to consume is less than one).
2. Alternative assumptions about various possibilities of reaction such as elasticities of supply and demand, the behaviour of business during the business cycle, etc.
3. Unreal hypotheses such as the view that business is exclusively concerned to maximise profits or acts always rationally in an objective sense.[228]

In the light of Hennipman's views one could argue that the typical neo-classic theoretical features are already introduced by way of theoretical premises. Thus, Meade's seven marginal conditions are premises, which he uses to establish the case for free trade as part of an international liberal order, even though they are highly unrealistic. How, for instance, does one find out, in practice, that a population has reached optimum size?

7.14.2 Substantive Rationality

In contrast to this formalistic approach, substantive rationality considers the economic as the ways and means available to people to constitute their subsistence.[229] In this much more pragmatic approach one establishes how a particular culture or world-view influences economic life. E. Todd, for example, asks how countries/regions differ in a demographic/anthropological sense. Whereas Anglo-Saxon countries tend to be highly individualistic, countries Like Sweden, Russia, Japan and Germany see individuals as part of a family or collective and ensure that their children receive the best education

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[226] ibid., pp. 393/4.

[227] ibid., p. 437.

[228] ibid., pp. 441-443.

[229] Maréchal, op.cit., pp. 121/22 quoting L. Dumont for these two approaches.

possible.[230] The latter tend to be much more protectionist in terms of international trade than the former.

Hennipman's means-end rationality is a form of procedural rationality, which emphasises how one should act to achieve ends about which one has little certainty. Not knowing whether they will be able to achieve the ends they have in mind for the future, people act as rationally as possible with their means in the present. In their decision-making they may weigh up whether to save money for their retirement or to get a better education that will enable them to earn a higher income, with on-going potential for savings. Meade deploys such procedural rationality when he suggests that nations should build a liberal economic order so that free trade may help them to maximise economic welfare.

As indicated above, the abstractions of neo-classical theory are not particularly helpful when it comes to issues raised by economic practice. One reason for this is that the relationship between the scientists (theoretical economists) and the object about which they try to form knowledge is obscured by the theoretical apparatus. The optimum that is so important to the theory says nothing about the effects achieving it will have on consumers, their mutual relationships, the production process and the environment. It should, therefore, not be seen as a proper economic criterion or norm. It can also be applied as a criterion for technical things. A bridge will be designed so that there is an optimal or best possible relationship between the weight the bridge should carry and the strength of the supports on which it rests. But why is 'best possible' an economic criterion? A consumer who carries out her purchases and reaches the optimum according to the theory may not have the right quantity of food given the needs of her children. She will rather apply a different calculation that is based upon her idea of what her family requires. She will act economically, bearing in mind her understanding of an ethical norm to which her family is subject. As such she will be accountable for her economic actions.

7.14.3 Making Economic Decisions within a Cosmonomic Framework

As we try to gain knowledge of economics, we should have a basic understanding of the way in which in real life economic decisions are made or should be made. The importance of ethical considerations in such decisions indicates that we are dealing with an area of life subject to norms. In addition to ethical norms we take into account a variety of other norms such as the aesthetic. If we have a choice between two cars that are technically equivalent, we choose one that has a style and colour scheme that appeals the most to us.

As it is neo-classical economic theory reduces the economic norm to a mathematical mechanical norm. Although this corresponds to the quantitative approaches of modern business, it does not account for the psychological theories and methods it uses to condition consumers to buy, whether it is

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[230] E. Todd, *L'Illusion économique; essai sur la stagnation des sociétés développées*, Gallimard, Paris, 1998, pp. 69-96.

good for them or not. Similarly, the theory abstracts from the economic power large business enterprises bring to bear upon human relationships or even upon States and relationships between States.

As noted above one of the most basic premises of neo-classical economic theory is that subjects must make do with means that are scarce in relation to the many ends to which they may be put. Let us assume that in reality the opposite is the case and that humanity is provided with abundant means that should be husbanded for the enrichment of human life, without squandering or destroying the subjects and objects of the three other kingdoms. This would require a procedural as well as a substantive rationality, because one would have to find a way of using these abundant means for the benefit of people in many relationships. One should search for a production process that does not pollute the air, destroy the structure of the soil or squander a precious mineral such as phosphate. Such a search needs patience and should be guided by love for neighbour. Normative principles must be identified and performance audited. Corrections will have to be made. Before a new technology is applied its potential economic effects (which means will have to be used; what objects would be replaced or displaced; what new type of accidents might occur, etc.) should be evaluated. I would call this a search for (economic) wisdom. Of course, the results of such searching should be reflected in the formation of economic theory.

In this context wisdom involves an acknowledgement that economic activity as well as the systematic reflection upon it should be shaped not only by the economic normative principle, but by all given normative principles, since none should take priority over others and all are interwoven with the economic through a set of analogies. The ethical, juridical, social, linguistic, technical, analytical and aesthetic aspects cannot be separated from the economic, although, of course, they can be distinguished. In reformatioinal philosophy these normative principles refer to the law to which the structure of the cosmos has been made subject by the Creator (structural law). In the human kingdom people have choice as to how they shape their life in response to given norms (Ch 9.10 elaborates this in more detail).

The application of these principles engages always the object functions of the kingdoms of things, plants and animals. Let us return to Hennipman's case of a person wanting to heat a room. He or she should consider whether children or old folk using the room needs a higher temperature than the average person. The stove should be in good working order to prevent the emission of carbon monoxide. The stove should not waste fuel. It should not be unnecessarily big or ugly looking. The room should not be draughty. The householder would consider using warm clothing to let the fuel last longer. Thus, physics, technology, ethics, aesthetics etc. are all taken into account in the economic process of producing heat. Coal, wood and gas would be used so as to prevent wastage. The householder is motivated by love for the people using the room. He or she would make rulings for those people in terms of using the stove, clothing to wear or drawing the curtains.

Of course, the householder needs to think about how to do all this. A proper way of structuring the process and usage should be sought. In sum, the structural law sets signposts, whilst the law of love sets the direction to take to enable the householder to work out wise directives. It is a heuristic process in the context of a comprehensive cosmonomic framework. The word *cosmos* refers to a totality of norms and laws and nomic to *nomos*, law.

7.15 The Liberal Economic Order

Despite its highly abstract, utopian character, to use Meade's term, neo-classical theory has survived since its inception during the 1870s, Keynes's attempts to dislodge it during the 1930s notwithstanding. It is still being taught at universities and used widely as a basis for policy advice.

There are two answers to this puzzle. One is given, implicitly, by Benjamin Ward to the effect that most (academic) economists in the USA are liberals holding values such as hedonism (Bentham's pain/pleasure principle), rationalism and atomism (individualism).[231] They also believe in a harmony of interests to be exercised through free markets (the invisible hand) and the state's protection of accumulated private property. Since Ward wrote this, small state liberalism has gained a strong foothold in Western countries. One pleads for a reduction in taxes, flat taxes, safety-net targeted social welfare and free international trade.

In this ideology the economic risks of life should be borne by citizens rather than the State. Hence, private financial investment and private insurance for health and education are promoted. Thus, the boundaries of the market system are extended to areas that used to be part of the public domain.

Since neo-classical economics stresses the importance of free markets and the need for prices and wages to be flexible (this word is part of the mechanical metaphor *the price mechanism*), meaning that individual workers should be able to bargain with employers on an individual basis, there is a clear link with neo-liberal ideology.

This is reinforced through the value of competition. Although 18th century philosophers such as Adam Smith and Immanuel Kant accepted competition as a rough and ready way of making progress towards a universally rational and enlightened state, they did not accept it as an ideal. With the advent of Darwin's theory of evolution and the development of social neo-Darwinism subsequently, particularly during the age of the US robber-barons, competition has become almost a universal value held throughout Western society as important in all sorts of field of endeavour, but especially in sports, education and business.

The interconnections between elements of neo-classical economic theory and the modern liberal world view explain the survival of the former. The

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[231] Benjamin Ward, *What's Wrong with Economics?*, Basic Books/MacMillan, New York, 1972, pp.3-14.

prescriptions of the theory such as the need to remove all barriers to the operation of perfect competition have been put into practice at various times. The first such occasion was the removal of the grain duty by England in 1846-1849 (Chapter 2). However, policy-makers in England were not led solely by a desire to implement a theory. Joan Robinson noticed that Alfred Marshall wrote in an Appendix to his Principles that List had shown convincingly that a small tariff would be beneficial in those countries where the indirect effects of free trade would be bad.[232] In the same context she noted that pre-1914 Great Britain had everything to gain from other countries adopting free-trade policies and very little to lose from maintaining it herself, basically because Britain was the most advanced industrial nation at the time and at the centre of a world-wide empire.[233] Thus, she remarked that, contrary to the claim of being universalist, current economic theory is rooted in nationalism:

> A genuinely universalist point of view is very rare. The nearest we get to it, usually, is to argue that in a generally prosperous world we are likely to do better than in a miserable one.....Behind the facade of laisser-faire theory the governments of all capitalist nations have boosted trade and production, conquered territories and adopted institutions to help their own citizens to gain advantage. Free-Trade doctrine itself, as Marshall shrewdly observed, was really a projection of British national interests.[234]

In our time the United States jealously guards its control over the world's electronic and communication networks, whilst preaching the virtues of free trade in international fora such as APEC, WTO, OECD and IMF.[235]

7.16 Conclusion

In order to maintain the integrity of a theory of international trade, one should incorporate all crucial relationships. Meade's theory is constructed as a set of mechanical relationships between customers and producers in terms of goods and services demanded and produced. What consumers want is what consumers get. The social relationships necessary to form markets are left out of consideration. Similarly, Meade abstracts from the relationship featuring payments in money by consumers to producers. In practice, however, buying and selling and paying (borrowing) and receiving (investing) money go together and, in combination, introduce a strong element of contingency or uncertainty in the allocation of resources. Rhizoid theory (Ch 11) seeks to account for both the social and the monetary relationships and the way in which they impact on the kingdoms of things, plants and animals.

Increasing economic welfare to the highest possible level is assumed to be the goal of economic policy. Free trade is seen as essential to achieving it.

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232 Joan Robinson, *Economic Philosophy*, Penguin Books, Harmondsworth, 1962, p. 64.

233 ibid., p. 64.

234 ibid., pp. 118/119.

235 Herbert I. Schiller, Vers Un Nouveau Siècle d'Impérialisme American; dominer l'ère électronique, *Le Monde Diplomatique*, Paris, August, 1998.

Meade's only justification of this goal is that in such a state all consumers' needs would be satisfied. He skips over the possibly serious environmental consequences of such a state. The danger is that powerful corporations with vested interests in maintaining or establishing access to scarce resources will use international trading agreements to their private ends by pressurising governments.

The static welfare theory of international trade assumes that producers such as farmers and consumers move mechanically along their supply and demand curves on the basis of a given technology. Once technology is allowed to change the theory ceases to apply, strictly speaking, although it still supplies useful concepts such as price elasticities of demand and supply. The rationality of the theory is a means-ends rationality, which assumes that there are limited means (scarce means) to meet infinite wants.

Neo-classical theory has remained popular because it views Government involvement as disturbing the price mechanism. This is compatible with the views of most business people and economists on the importance of free enterprise.

A mechanically operating economic system obscures the real economic problem, which is a way of husbanding precious resources, so as to keep them productive, able to supply goods and services in abundance, but without squandering them or inputs needed to produce them. It involves searching for a way that does justice to a multiplicity of given normative principles, as part of a cosmonomic framework.

Confusing an abstract theoretical system with actual economic practice is an expression of scientism. When scientism shapes economic and technical practice, it leads to technicism and economism, the subjects of the two following chapters.

CHAPTER EIGHT: TECHNICISM

8.1 Introduction

The word technicism indicates the dominating power of technology in modern society, such that it turns other human functions and relations into technical functions and relationships. Schuurman (1937-) refers in this respect to a basic attitude in our culture and to its picture of the world as a technical, mechanical world that may be technically controlled.

Since the early 1970s, when he published his doctoral thesis *Technology and the Future; a philosophical challenge*, Schuurman has expanded upon his thesis that our modern society is dominated by scientific technology in a large number of books and articles. The purpose of the present chapter is to review his thinking and to find out how technicism relates to economism.

8.2 Schuurman's View in a Nutshell

Schuurman's most basic starting point is that the creation was called into being by the Word of God. In this good creation nothing is absolute, because all of its aspects are meaningful within their own limits, dependent on the Creator and pointing to Him. Humankind is charged with caring for this creation in response to the Creator's Word. For this reason, the whole of life is religion. Since humankind fell into sin, his religion became directed towards something in the creation itself rather than to the Creator. Idolatry became an all too real possibility. By God's grace in Christ the whole creation has been redeemed in principle and will fully become the kingdom of God at the end of the ages. Thus, despite sin, the original movement from the beginning of creation to its end, from the garden (Genesis) to the city-garden (Revelation 22) will come about. Although this involves a linear concept of history, it is a linear movement subject to the vertical one of God's involvement and law to which everything is subject. As humans we are called to work, horizontally, in history to God's glory and in obedience to His will (the vertical dimension).

The original creation is inexhaustibly rich and diverse. We can never know it in all its fullness. The fall, however, means that as humans we seek a refuge in what we build and construct. We are always inclined to make an alternative world in which we are lords and masters on our terms. Such constructions are likely to ignore or distort aspects of the creation, but without being able to eliminate them. As a result a dialectic is initiated between the worlds imposed upon the good creation and the suppressed parts or aspects. The latter may gain the upper hand, leading to the imposition of another world upon the creation and on the remnants of the displaced construction.

Since the time of Descartes and Francis Bacon in particular, the development of Western culture has come increasingly under the control of scientific thinking expressed in technology and science as a means of fostering the further development of technology. The industrial revolution of the 18th and 19th century has been instrumental in expanding the reach of technicism, so

that our culture has become a technicised culture. The prevalence of a materialistic view of life empowers the drive towards technicisation.

This entails a clash of two worlds. On the one hand is the practical world of daily life, in all of its fullness and with all of its problems, with many aspects and entities. On the other we have the abstract, uniform world of modern technology which increasingly overwhelms the former, also in the sense of curtailing cultural freedom, as one is compelled to comply with the requirements of technology, especially if political and economic powers develop and operate such scientific technology. Protest movements in various forms may succeed in making small changes from time to time, but without altering decisively the course toward ever greater technicisation.

Nevertheless, there is hope inasmuch as the Creator will not abandon his work in the beginning, but rather will bring it to fulfilment in and through Christ.

8.3 Schuurman's View on Technology[236],[237]

Historically, technology has developed from a time when it was primarily arts and craft (1200-1800) and the craftsman both designed and made a technical object in one and the same process to a time when technical objects were designed scientifically and design and execution separated (1800 to the present). As a result of this intimate link between science and technology in the modern period, there has been an explosive technical development.

This division into two distinct periods parallels approximately the division drawn in Part I between the history of agriculture from 1000-1850, when agriculture was basically a craft and the period from 1850 to the present when it became industrialised.

Already in his doctoral dissertation Schuurman noted that since the 19th century the development of modern technology has taken place primarily

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[236] I use three recent publications: *Filosofie van de Technische Wetenschappen*, Martinus Nijhoff, Leiden, 1990; trans. John H. Kok, as *Perspectives on technology and Culture*, Dordt College Press, Sioux Centre, Iowa, 1995 (with an additional chapter); to be referred to as Perspectives; *Geloven in Wetenschap en Techniek; Hoop voor de Toekomst*, Buijten en Schipperheijn, Amsterdam, 1998, trans. John Vriend as *Faith and Hope in Technology*, Clements Publishing, Toronto, 2003, to be referred to as Faith and Hope, and, *Bevrijding van het Technische Wereldbeeld; uitdaging tot een andere ethiek*, final lecture, Technische Universiteit Delft, 2002, trans. John H. Kok as *The Technical World Picture and an Ethics of Responsibility; Struggles in the Ethics of Technology*, Dordt College Press, Sioux Center, 2005, to be referred to as Final Lecture. References to the Doctoral Disseration: *Techniek en Toekomst; confrontatie met wijsgerige beschouwingen*, Van Gorcum, Assen, 1972, trans. H.D. Morton as *Technology and the Future; a philosophical challenge*, Wedge Publishing Foundation, Toronto, 1980) are denoted as Dissertation.

[237] Schuurman draws a distinction between "techniek" and "technologie" in his Dutch publications. The English translations, however, translate both words as *technology*. Where specifically technology refers to *scientifically designed technology* I will refer to *scientific technology*.

within corporate business organisations.[238] The contrast between the older craft-based technology and modern technology is that the former was characterised primarily by an inter-human relationship, whilst negative effects were minor and foreseeable. It was embedded in the natural order as it were. In contrast, modern technology has expanded so massively and so dynamically that it has become the outstanding characteristic of our culture and has become a world-encompassing system. "Take away this technology, and our culture collapses'.[239]

It should be noted here that the historic development of technicism receives but scant attention in Schuurman's writings. His main point is that today's problems are rooted in the intertwinement of science and technology as an expression of the attitude of the Renaissance and the Enlightenment to master the world by means of science and technology. Frequently, he refers to Descartes and Francis Bacon in this respect, especially to the former's idea that 'nature is a machine, as easy to understand as clocks and automata, when one but investigates it carefully enough'. Since nature can be deciphered in this way it can also be mastered, rendering humans the masters and owners of nature.

The scientific method is especially important in the design phase. The scientific knowledge of what is technical is called technical science or scientific technology. Technology is a practical science inasmuch as it is used to solve practical problems or to make practical objects.

Science and technology are distinct fields of activity. The sciences seek to discover how the world is structured and how it functions. They seek knowledge. Technologists on the other hand seek to transform the world by inventing new things, using their productive fantasy, and by embodying these inventions in new technical objects. Technology is defined as the human shaping of nature by means of tools for human purposes. One can design and shape new technical objects for purposes that are not themselves technical in character such as a car, which serves social purposes, or a rocket, which serves military purposes. Many technical objects are formed to further technical development itself.

At present, we should distinguish tool-based technology and bio-technology, with biotechnology as the science of designing bio-technical processes.

Important features of scientific technology are:

1. A growing distance from nature, as we live in an environment shaped by modern tools.
2. Increasing use of materials that as such are not found in nature and have universal characteristics (e.g. plastics).
3. Energy is derived indirectly from nature.

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[238] Dissertation, op.cit., p. 352.

[239] Final lecture, op.cit., p. 5.

4. Machines rather than humans shape technical objects.
5. Modern tools work independently according to a programme (automation).
6. There is no direct contact between producers and consumers, as engineers, manufacturers and employees design and make technical products.
7. The technical plan and the manufacturing process are separated.
8. Mass production rather than individual production of objects.

In general, modern technology is highly differentiated and dynamic. If the whole technical development since the beginning of human culture were compressed into one day, the steam engine would be invented during the first half of the last minute followed by a truly astounding development, which would change the world beyond recognition during the last half minute (quoted from Stork).

The development of computers and robots has initiated the period of information technology, allowing the possibility of complete automation. In the sciences, computers are used as a tool for thinking, but in technology as a tool for designing and steering manufacturing processes. It is a general tool for analysing, searching, identifying, calculating, sorting and communicating. Robots are tools with a computer as heart and sensors and perceptors to observe the world outside and to perform functions accordingly.

Modern technology has brought great benefits, but has increasingly also been seen as the cause of many problems, including the destruction of nature and growing unemployment. Many believe that modern culture is in crisis as a result of the phenomenal technical development. It is a crisis, because there is no consensus about solutions of the perceived problems.

Schuurman identifies five such problem areas:

1. The position of human beings in technology. Labour has become a quantity and its application is increasingly intensified. Labour has become part of an impersonal process. Many jobs are automated away. Computers are used in service industries, in commerce and politics. Personal data in databanks can be manipulated for all types of purposes, often unbeknown to the persons concerned.
2. Since Descartes nature is seen as a machine. The natural is reduced to what is quantifiable and measurable. If nature is a machine it can be technically mastered and used. Nature has no intrinsic value (utilitarianism). We use more of nature than it is able to reproduce. Nature, subject to our technical control, becomes a threat to humankind. The greenhouse effect, rising sea levels, ozone-holes and desertification are cases in point.
3. Technology is intertwined with economic and political powers. Technical development is seen as autonomous. Nobody seems to be in control. Industrial concerns prepare inventions and

innovations in secret. It creates new needs. There is increasing specialisation and massification. People become parts of the technical system.

4. Employees are not supposed to bear responsibility for what they are doing. They have to carry out pre-determined operations. Engineers have been given much greater responsibility. However, they have to work in teams and have little appreciation of how their products will impinge on society. Genetic engineering offers promises, but may also have unknown dangerous consequences. Who will come to a responsible judgement?
5. Problems of modern technical developments do not occur in isolation, but tend to be interdependent. Solutions require an integrated approach. This can only be achieved if there is consensus about the meaning of life, the significance of human beings, history, culture and the future. Our culture lacks such a common vision, because it is spiritually disintegrated.

8.4 The Scientific Design Method

In order to elucidate these problems Schuurman has analysed the scientific design methods of technology in detail and in comparison with the methods of obtaining scientific knowledge. The latter involve a process of abstraction, analysis, isolation and synthesis. The resulting knowledge is universal, coherent and enduring. The engineer will pose a technical problem or it will be handed over to him or her for a solution. Thus, it is abstracted from its immediate context (abstraction). In general, a ready-made solution will not be available. Hence, the engineer will analyse the problem and partition it into a series of smaller problems, which can be solved separately (isolation). Since the solutions so found can, generally, be used for a variety of purposes, they appear to be neutral as to the technical purpose for which they are employed. Once the smaller problems have been solved the various solutions can be integrated (synthesis) into a complete solution for the problem in hand. This integration may well require adjustments to the partial solutions. Eventually, a design for solving the problem emerges. This final solution, the new whole, might well affect reality in many unintended ways, however, because it is much richer than the problem area addressed by the newly designed technology.

This process is seen concretely in the design and development of 'building blocks' of 'standardised neutrality' with universal applicability in technology such as propellers, rivets and dovetail joints.[240] We could add computers, telephones and radios to this list. The use of these technical objects in modern society has changed old patterns of living beyond recognition and has helped to speed up the depletion of limited stocks of raw materials, whilst causing pollution on a massive scale.

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[240] Perspectives, op.cit., pp. 41ff.

Since the methods of obtaining scientific knowledge and of scientific technical design are so similar, they have similar effects on the concrete practical world. It is like the development of a secondary world which is imposed upon the primary world. The more technology advances the more the primary world begins to assume the features of the abstract secondary world.

Remote control of a technological design is believed to be achieved by the integration of all neutral partial solutions. This integration can allow for individuality, especially through the use of computers. However, in general the design will aim to shape a production process that is not influenced by variable factors such as dampness and temperature. Negative feedback loops might correct deviations from norms set. The production process resulting from the design should be coherent and reliable. The result of the process could be a mass product (similarity with universal scientific knowledge).

Nevertheless, the properties of scientific knowledge are not congruent with those of actual practical reality where everything is unique, interdependent and changeable. Scientific technical design can never completely overcome these features.

Schuurman has pointed out that the rapid growth of technological knowledge makes it imperative for engineers to specialise. In turn, this necessitates team-work to design projects. However, this implies that individual specialist members of the team may not know or understand exactly how the various parts work that fall outside their area of expertise or how the finished product as a whole relates to its context. Related to this is a tension between the 'neutralising individuality' of the partial solutions, which have a universal character and the functional integration into a whole that must function in an individual context.[241] A similar problem occurs when users of computer programmes lack insight into the precise construction of those programmes and, therefore, may unwittingly make mistakes. Such tensions and problems are caused by the imposition of an abstract technical world on the everyday world of concrete experience. Since the latter is not the mechanical world Descartes assumed it to be, it offers resistance to the imposition. This becomes clearer when we extend this inquiry into the relationship between technology and economics.

8.5 Inventions

The development of technology depends very much on inventions, resulting from productive fantasy or chance ideas. Basic inventions can open up complete new fields for technical innovations. Other inventions concern improvements to already existing technical objects or operators. Innovations are new developments, based on already available technology. They often result from work done by innovation teams. The use of mathematics, physics, information science and technical sciences in the development of inventions might have the undesirable effect of making the productive fantasy sterile. On

[241] ibid., p. 57.

the other hand, new tools such as the computer might be used to open up unexpected new possibilities.

The state of technology at a certain time may be such that the birth of a new invention is almost predictable. The distinct phases in the invention process: preparation, incubation, illumination and verification are such that this may come about, so that the same invention is made simultaneously in a number of places. The process of inventing requires a close interaction between those who design and devise new things and those who must build the new designs in the form of prototypes, pilot factories and tests. The problems of materials, environment and unforeseen human reactions are often such that one seeks to minimise or eliminate the human factor altogether (automation).

Inventions may lead to the discovery of new scientific knowledge and this, in turn, may provide the basis for new inventions. Indeed, there is an interaction between technology and science. They need each other. It is this interaction which might condition people to believe that the process of technical and scientific development is autonomous.

Nevertheless, technical science is a normative science, because engineers and inventors should seek normative principles as to how technology should relate to human beings and to nature. If, for example a process is designed that is not entirely automated, then, care should be taken that the people who have to work it are not considered as technical objects or expected to work as components of a machine.[242] I might mention here the quality system designed by Toyota in which people working along an assembly line are able to stop the line if they believe the machinery under construction shows a fault.

Technical problems may arise in a particular environment and yet require a universally applicable solution. By way of example, energy transformation processes tend to be designed for universal application. When available, the environment in which they take place must be adapted. On the other hand, there are technical objects that are universally applicable and can be used for the construction of a wide range of individual products.

Biotechnology is part of the technical sciences. Its characteristic feature is not the development of tools but the manipulation of plants and animals for human purposes on the basis of the bio-sciences such as molecular biology and genetics. The discovery of DNA and the development of DNA-recombinant technology have opened untold new perspectives for agriculture, medicines and the repair of the environment. Humankind now seems able to command and programme 'nature'. Yet, there are also major threats and many unknown consequences when manipulated plants and animals interact with 'normal' plants and animals. Manipulated animals might suffer in ways that are considered 'inhuman'. Farmers could become dependent on industrial suppliers as they must buy new seeds for every new harvest or could be

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[242] ibid., p. 55.

confronted with new surplus production. When applied to human beings the problems become even more daunting.[243]

8.6 Nature and Culture

Schuurman's analysis proceeds generally in terms of the modalities of reality as developed especially by Herman Dooyeweerd. Reality as given to us may be resolved into entities (what is this?) and into modalities (how is this?). The latter are of two kinds, the natural ones that qualify things, plants and animals and the normative ones, which are to be shaped by responsible human beings in the way they function. As humans we analyse, form technical objects, speak, socialise, economise, appreciate art, are just or unjust, have ethical relations and have faith (Ch 7.14.3). When Schuurman refers to nature he means the modalities in which things, plants and animals are subjects i.e. number, space, mechanical, energy, organic life and the psychic (a set of the sub-rational). The normative human ones then cover the area of culture. However, following Dooyeweerd, Schuurman often refers to the technical modality as the cultural-historical norm. This leads him to suggest that:

> Technical science as cultural science is the first science in the transition from the natural to the cultural sciences. For that reason we encounter many things in technical science that resemble the natural sciences. [244]

Thus, technical science shapes the nature-side of reality by means of tools.
The downside of the modal way of considering the mastery of the world by the power of science and technology is that, firstly, it tends to minimise the influence of those entities that are actually, in a pronounced fashion, the seats of those powers such as the universities, the military and the business enterprise. Secondly, it minimises the relationship between culture and nature in all human functions (which correspond to modalities). Older concepts of nature see it as, for example, a reflection of cosmic law in human reason.[245] Now, in the theory of modalities, the earlier 'natural' modalities anticipate in their structure the normative ones and these retrocipate on the natural ones, so that all the modalities, albeit distinct, are closely interwoven. Dooyeweerd's colleague Vollenhoven emphasised in his later period much more strongly the four kingdoms of things, plants, animals and people.[246] Each kingdom develops its potential in time by actualising the modalities it contains. Each kingdom recurs in the others via object functions. For example, plants use minerals, animals eat plants and humans use all three kingdoms in many ways. They simply cannot function without eating and breathing. However, we must also trust that our fellow human-beings will behave normally, that the kingdoms of things etc. keep functioning as usual and that people have a minimum sense of care and fair play. Similarly, we cannot invent and

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[243] ibid., p. 68.

[244] Faith and Hope, op. cit., p.181.

[245] See J.J. Venter, Early Modern Conceptions of "Natural Law", op. cit., pp 1-39.

[246] A. Tol, K.A. Bril, *Vollenhoven als Wijsgeer; inleidingen en teksten*, Buijten en Schipperheijn, Amsterdam, 1992.

construct anew the basics of human life such as technical implements, safety on the streets, etc. We rely on a persistent stability of life and this is a retrocipation on the modality of movement (mechanical, persistence).

The subjects in the non-human kingdoms use or are confronted with the technical objects produced by humans. They may be killed as a result, but they may also take advantage of them. In Australia, parrots, for example, have migrated to cities where they are free from natural predators. In human life, it is impossible to do anything without involving the other kingdoms. Whatever we do as human beings springs from the heart, the centre of our being. Technicism means that people exploit, destroy, deplete and pollute the other kingdoms because their heart is set upon such mastery via the scientific-technical functions.

On the one hand, Schuurman's modal focus has led him to clearly identify the devastation resulting from human hubris to control everything by means of scientific technical thinking and practice, whilst on the other he argues that such dominance is expressed in a utilitarian, instrumentalist ethics (*what can be made, should be made*). So, instrumentalism and utilitarianism are associated with technicism. This whole complex he also denotes as materialism.[247] So, when he addresses the question how we might escape from this hubris he seeks a renewed (ethical) liberating perspective. Perhaps, we might think of an iterative pathway. Once we recognise what technicism is, we begin to seek a more modest use of technology. At the same time we renounce the ethical direction implicit in technicism and set out to find a more appropriate one. However, at first sight there is a tendency for –isms to multiply.

It should be possible to approach the issues of a wrongly directed culture by examining how entities are functioning. How do universities function when technicism holds sway? What does it mean for business enterprises and their employees and customers? How are inter-human relationships and relationships within entities affected; and the rest of society and the kingdoms of animals, plants and things? Although much of this can be found in Schuurman's writings, his overall view might have become even more striking if he had moved from entities to modal analysis instead of the other way round.

Historically (Ch 1.3.2.4) the current complex of state, military, business companies, scientific technology, profit-making and globalisation has its origins in mercantilism as well as in the development of mathematical and physical sciences since the Renaissance. Thus, technicism can be said to have two historic roots: entities and the functions of science and technology.

8.7 Technicism and Technicisation

Materially, Western culture has become very rich. At the same time there has been an accumulation of problems. Bio-diversity is rapidly diminishing. The

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[247] Perspectives, op. cit., pp. 76-79.

climate appears to be changing as the result of the emission of greenhouse-gases on a large scale and the felling of large stretches of tropical forests. There is widespread pollution of water, oceans, air and soil. Agriculture has become highly industrialised and has been divorced from its ecological and biotic context.

The power of technology appears to have grown to such an extent that nobody knows how to master it anymore. Our culture is in crisis, because it has fallen under the sway of an overblown technical-scientific domination. Problems are accumulating in number and intensity. There is no consensus on the way to solve them.

Since technology in the sense of the technical sciences has a key position in the development of modern culture, it seems logical to seek the root of the problems in this sector. The influence of the sciences on technology is such that there are always tensions between the nature of science, with characteristics such as the striving for universality, durability, abstractness and logical coherence on the one hand, and practical reality which is always unique, changeable, with a diversity of aspects, entities and relationships which are not reducible to the rational.

Schuurman believes that there is likely to be a pre- or non-scientific motivation underlying this fascination with scientific technology. This motivation could have structural consequences for the ongoing scientific-technical control and its impact on sectors such as agriculture, health, economics and politics and education. Silence reigns, however, when it comes to these basic issues. Schuurman wants to break this silence, working from the perspective of reformational philosophy, which has not only contributed structural philosophical analyses but also discussions of the deeper motivations in humankind's cultural activities.

Starting point in the discussion is the dynamic development of humankind's power in recent centuries. The power of science and technology has evoked very serious problems that appear to be out of control. What should be done about the degeneration of the world's cities, the devastation of nuclear war or nuclear accidents, poverty in the Third World, the destruction of the natural environment, persistent unemployment and the many irrational reactions to these problems such as drug-abuse, lasciviousness, growing loneliness and alienation?

He then formulates technicism as:

> Technicism is the pretension of humans, as self-declared lords and masters using the scientific-technical method of control, to bend all of reality to their will to solve all problems, old and new, and to guarantee increasing material prosperity and progress. By means of their technology humans want to control and safeguard the future.[248]

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[248] Faith and Hope, op. cit., p.69.

Schuurman emphasises that this religious ground-motive, while pre-eminent, has not been the only one in the development of Western culture. This in itself is a sign of hope. He then says that technicism involves an ethical direction which he describes as a utilitarian ethos: what can be made should be made, as long it is useful for as many people as possible. Referring to Oswald Spengler he speaks about an expectation of salvation from technology. He argues that René Descartes is the father of technicism as he believed that nature was a mechanical system to be grasped as simply as clocks and automata. Hobbes and Comte extended this view to the state and society:

Limitless industrialisation and modern technical-scientific agriculture, including modern traffic, result in destruction and in unparalleled pollution of soil, water and air. Nature becomes unstable. In turn, this causes an intensification of scientific-technical control. We might trigger a dangerous vicious circle.

The instrumental use of science, under the influence of technicism, has modelled reality according to the properties of science, as follows:

1. Science (meant are the physical and biological sciences) investigates everything from one particular angle. It reduces everything to physics or biotic life. If one forgets the reduction and applies the knowledge so gained through technology to reality, in a large-scale manner, then reality itself is reduced and eventually destroyed.
2. Within the framework of the first, the functional abstraction, one pays attention only to what is universal and abstracts from what is unique or concrete.
3. One ignores actual reality and concentrates on the laws that are valid for reality. Science develops a map of the world.
4. Self-interest or the pecuniary interests of others should not influence the direction of research.

Scientific knowledge so obtained is organised into a system of knowledge. When put into mathematical symbols, information technology may help to manipulate knowledge and the reality examined. By applying the models in practice we attempt to mould actual reality in accordance with the models. This leads to a technicised, distorted, reality. We start living in the abstract technical models.

To illustrate the distinction between the world of abstractions and the concrete practical world, Schuurman has often used the example of distributing four apples over four children. It is done easily in theory, as an arithmetical sum, but in practice it is fraught with problems because children prefer particular apples in terms of colour and size.

Particularly since the Enlightenment science as a theoretical map has come to be identified with reality itself. It is the expression of the Greek meaning perspective (Ch 3.2).

8.8 Technology and Economics

Whilst Schuurman acknowledges the close relationship between modern technology and modern economics, with references to the industrial corporation and the military-industrial complex, he has not addressed in any detail the precise relationship between the two. Nevertheless, his emphasis on the design and production of technical objects suggests an important connection. Production and consumption are carried out via the intermediary of a technical object called money, which is technically easy to produce (strokes of ink on paper, computer software) but which requires a system of computers, telecommunication equipment, bank buildings and accounting systems to function. Money in Western economies is inseparable from interest. Indeed, the phenomenon of interest rates payable on borrowed capital acts as a key factor in the proliferation of technical objects (Ch 7.6).

Such expansion takes place in either of two ways: first, by an increasing round-aboutness of the production system or capital-deepening and, second, by capital widening. In the former case, the system becomes more complex with more investment in systems of production that take a longer time to mature into final consumption goods. In the latter case, existing systems are multiplied. As a result of capital-deepening people are able to buy an ever wider and more sophisticated menu of consumption goods. The products of the technical system consist of technical objects used in the production process (machines or technical operators) and technical objects useful for a variety of non-technical purposes. Given the necessity to earn money and make a profit, the system is guided by a technical object which is blind as to what the production and consumption processes are actually doing to nature and to human relationships. Interest and money are human inventions, with a logic that takes no account of nature or human relationships.

The interrelationship between the technological process and the economic process, as outlined, is such that the true meaning of economics appears to be obscured. It used to be said, for example, that clean air and water were so abundantly available that they could not be considered economic goods, which were assumed to be scarce. In reality there is such an abundance of technical objects and emissions of dangerous gases and poisonous wastes that clean air and clean water have become scarce articles in many places.

Seen in the context of the wider modern technical-economic system, elements of technical design that are neutral from the design perspective are anything but neutral when part of a rapidly expanding production system. In the light of the present problems caused by the interaction of science, technology and economics such as ecological disasters and, depletion of natural resources Schuurman's following comments made in 1972 are very apt:

> The limits to the disruptions of meaning are unknown to us...Although it may sometimes seem as though the dislocation of meaning is in the ascendant, God does not permit the boundless dislocation of meaning.[249]

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[249][249] Dissertation, op. cit., p. 335.

Science, technology, economics and politics are intimately interwoven in our society and are driven along by technicism, which promises material prosperity and happiness. Thus economics becomes the economics of material progress, in which the power of capital and material gain dominate. Politics seeks to advance such economics, so that it reinforces technicism. As the method of technical-scientific control is applied in political life, we experience a growing power of technocracy. People in other cultural sectors are keen to partake of the gains promised. Sectors such as agriculture and health are dominated by the concentrated powers of science, technology, economics and politics. The outcome may differ from the promise, however. Over a period of time agriculture could contribute to a destruction of the natural environment. When applied on a small scale over relatively short periods of time, the method appears to be very successful. This makes it attractive in that it tempts us to construct a type of counter-creation, in which humans are lords and masters, assured of unparalleled material prosperity, albeit blind to the consequences of what they are doing.

The systematic manipulation of plants by selective breeding methods so as to find varieties that produce a maximum of fruits is a case in point, inasmuch as it raises the danger of depleting the genetic pool (genetic erosion). The plants obtained and sown over wide areas might lose resistance to new diseases. Yet, the world food situation requires a broad genetic pool, if major disasters are to be avoided.

Genetic modification of plants exacerbates the problems of selective breeding. Usually, such modification proceeds on the basis of a technical model of the plant's genetic structure. One imagines that the genetic building blocks are similar to pieces of lego that can be re-arranged in new configurations, resulting in trans-genetic manipulation. For example, a gene from a fish used to swim in cold waters might be inserted into the genetic structure of a tomato to prevent rotting. Such trans-genic manipulation pre-supposes a mechanical model of plants and animals and ignores that they are living plants and animals. The complexity of their genetic structure and the environment in which that structure works tends to be ignored.

Trans-genetic manipulation is different from selective breeding inasmuch as it breaks through natural species barriers, as in the example of the tomato equipped with a fish gene. The consequences of such manipulation are unknown. There is certainly no consensus about them. The social effects should also be considered. Would farmers not become dependent on the power of companies that possess a limited number of transgenic plants and also provide the associated weed-killers? World-wide there has been an increasing concentration of biotechnical companies. As a rule they make new varieties infertile, so that farmers cannot use a proportion of their harvest as seed. The dependence of farmers becomes about 100 percent. Technicism and economism go together in this way.[250]

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[250] Faith and Hope, op.cit., p. 105.

The more technicisation intensifies, the more the negative consequences become apparent. The abstract frameworks become so powerful that the original full reality falls apart in small bits and functions. Put in a nutshell, technicism is an ethos, a ground-motive of many people in knowing and acting, in science, technology and economics.[251] This is expressed especially in the view that most problems may be solved and material prosperity guaranteed by means of technology. Some think that we can make a machine that can think or that the human spirit has migrated to the computer.[252] Pretending that humankind is autonomous, and, therefore, makes its own laws, we get an autonomous technology, which moves forward by its own logic and makes people subservient to itself.

The idea of an autonomous technology should be appreciated as an illusion, although it is a very operative illusion. The computer is a tool and should be appreciated as such. If we fail to do this, we become victims of our illusions, as has been pointed out by both Christians and Neo-Marxists (Habermas).

8.9 Escape from Technicism and Technicisation

To prevent disasters from unknown consequences of new products or technologies, the author signals his agreement with the precautionary principle i.e. do not proceed unless there is no other way to deal with a very serious problem. The application of such an ethical decision-rule might put a brake on potentially uncontrollable dangerous developments.[253]

In general, various groups and thinkers have spotted the dangers of technical control in modern societies and have protested against it in various ways. Existentialists reject technicism because it threatens human freedom, especially when human beings are treated as technical objects. Neo-Marxists draw attention to the affirming influence of political and economic powers on the development of science and technology in our culture. Counter-culture theorists strive for less nature-destroying technology. New-Age movements take issue with materialism and emphasise the need for greater spirituality. Finally, naturalists want to conserve and preserve nature as it is. Yet, none of these counter-forces offers a truly liberating perspective for an alternative development. They put other absolutisations against the absolutisation of science and technology (freedom, spirituality, nature). Our culture is torn apart as a result of this tension, according to Schuurman.[254]

As pointed above (Ch 4.1) our author sees a polar tension between the scientific-technical ideal of control and the whole of reality. The connection between science and technology threatens not only human freedom but also the kingdoms of things, plants and animals.[255] Efforts to fight for human

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[251] Faith and Hope, op.cit., pp. 70, 73/74.

[252] ibid., p. 124.

[253] ibid., p. 55.

[254] ibid., p.150.

[255] Ibid., p.149.

freedom and the preservation of nature had, therefore, better be called the ideal of nature. Thus, we arrive at a polar dialectic between the ideal of scientific technical control and the ideal of nature (naturalism). The pole of technicism appears to win most of the time, because it uses the latest technical discoveries and innovations such as information science, which appear to bring great benefits to consumers. How do we find a way out of this polar dialectic?

Schuurman does not reject science and technology. On the contrary, he wants them to have a serving role in society. Science should be integrated with the fullness of reality, so that our normal day-to-day experience is deepened and enhanced. Thus, he pleads for a growing in wisdom. Technology should stop constructing for the sake of constructing and be used also to protect the environment. In agriculture the emphasis should fall on harvesting, tending, caring and keeping.[256]

We should learn to bear responsibility, so that the normative principles given in creation are developed to norms that can provide wise direction to culture. Wisdom, building and keeping are key motivations in such an approach.

8.10 The Garden Metaphor

In *Faith and Hope* as well as in the *Ethics of Responsibility* Schuurman uses the metaphor of a garden as a guide to a culture marked by wisdom and responsible stewardship, in contrast to a culture that is directed by the metaphor of a technical structure. Sustainability is impossible in the latter because it relies on going to larger scales, acceleration, pollution and waste. Effectiveness and efficiency are the only norms guiding this construction.

The metaphor of a garden, which should be tended and managed respectfully and carefully is evoked by the story of creation in the first chapters of Genesis. The first thing to be noted about the garden is that everything in it is given and has its own intrinsic value. Everything is from, by and unto God. Creation and creature should be approached and treated according to their own nature, otherwise life will disappear. Thus, humans respond to the care bestowed by the Creator upon his work. They are stewards. A responsible development of culture amounts to living from the interest yielded by the given capital. Sustainability is a real possibility because capital is preserved. Science, technology and economics are important activities in this garden model, for as long as they serve the maintenance and growth of life in all of its diversity. Ecological organic agriculture is a key example of what Schuurman has in mind. Scale and tempo will be such as to foster the symbiosis of people and creation. In this respect one can also think of building underground, construction of zeppelins and re-cycling. All norms should be heeded in a balanced manner (care, law, economic, politic, social, communication, making, knowing, aesthetic etc.).

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[256] Inaugural Wageningen, op.cit., p.28.

It is in keeping with the creation story of Genesis that people learn from the worlds of plants and animals. An architect in Zimbabwe has designed a house for example, with a perfect and cheap system of air-conditioning based upon the nests of termites. It is an example of how nature may be integrated into human life.

8.11 Stellingwerff's Critique

Johan Stellingwerff responded to Schuurman's *Faith and Hope* with a critical study.[257] The key point of his criticism is that he does not accept that society is in the grip of awaiting its salvation from the powers of science and technology. Nevertheless, he does believe that in our time Western culture is busy plundering and destroying the earth, partly because of technical developments. Business corporations, employees and consumers are jointly guilty in this respect. Military powers play their part as well, whilst states are failing to set clear boundaries. They even encourage this exploitative way of economising. Technology is obviously a stimulant, but it may also be used to combat the rape of the environment. He sees, therefore, the root of the problem much more in consumption, stimulated by liberal policies and a capitalism that is out of control. He believes also that the extreme idealism of freedom in our time of great prosperity plays a role. It is a freedom that refuses to serve others, so that there is a great shortage of people wanting to work in the caring and teaching professions. As power corrupts, so does prosperity.

In terms of the discussion above of nature and culture Stellingwerff adds another –ism, namely capitalism. His emphasis on freedom evokes the natural state of Hobbes in which individuals are free to compete for honour, power and wealth. Influential professionals, institutions and business corporations, however, tend to see modern capitalism, when freed from State control, as obeying the eternal natural laws of economics, such as supply and demand. There is no true freedom here, except the freedom to compete. Nevertheless, people today believe they are free or should be free to enjoy themselves on the basis of the menu provided by business.

Stellingwerff's critique, however, fails to do justice to the far-reaching effects of the inter-linkages of modern mathematical, physical, chemical, biotic and information sciences and technology, as analysed by Schuurman. Yet, he makes a useful comment on the distinct roles of technical and economic functions. Considering technology as 'making', then, a mass product is technical in terms of its design and model, but in terms of its production in so many copies it is economic. The number of copies made is a matter of demand and supply. In his view technology and economics are intertwined only in the research and development departments of an industrial company. However, universities have developed strong commercial-oriented research divisions, bent on securing patents and taking on projects for private sector firms.

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[257] Johan Stellingwerff, Wat is Technicisme Precies? Kritische Notities bij E. Schuurman, Geloven in Wetenschap en Techniek, *Philosophia Reformata*, vol. 64 (1999), no. 2, pp 132-147.

8.12 Secularisation of Culture

From our review of thinking since the Renaissance (Ch 4) and of Adam Smith's Enlightenment's views (Ch 5), it appears that the desire to control nature, by nature, has motivated the unfolding of scientific technological power in the service of states, TNCs and universities. Smith stated that people first satisfied basic needs (necessities), before they are able to tackle conveniences, from which they then progress to luxuries. Business insists on profits and these must be made at a rate sufficient to satisfy money lenders and shareholders. They quantify results quickly using established double-entry accounting methods and quantitative mathematical analysis. They must innovate, it matters little how, to keep ahead of the competition. This puts pressure on technical staff, university contractors, government departments and others.

Stellingwerff's notes in this respect complement Schuurman's. Both diagnose a materialistic culture driven by scientific technology and the need to achieve economic growth, which distorts other societal structures, preventing them from fulfilling their own tasks in life, by subordinating them to the power complex of capitalism. Of course, from time to time the focus of this power complex may shift, from the State to the business corporation or to the military or the other way round.

Both thinkers accept that many of the problems identified relate to the secularisation of Western culture. In Vollenhoven's scheme (Ch 4) we are confronted with the vanishing synthesis between Greek philosophy and the Christian religion since about the time of the Renaissance. As a result many pagan motivations have become stronger, including the desire to come to grips with the contingencies of life through rational thought as expressed in science and technology. In 1938 Vollenhoven pointed out that in a Christian approach a distinction is drawn between God and creation.[258] God rules the world by his law (boundary between God and creation). The world is subject to His law. The relationship between God and humans goes via our heart (vertical) and we then function in the world from our heart (horizontal). The heart is pre-functional. If we do not believe in God, then, we forget also the starting point for our life in its centre or heart. Vollenhoven then mentions a number of possibilities. One is that a particular function or set of functions is held for a great deal more than they actually are, namely as the centre of life rather than functions. Another is that the functions may be split between some that are higher and others that are lower. In the first group falls, for example, Thales' view that everything diverges from water.

If the significance of the pre-functional heart is not recognised, then one might consider one or more functions as indeed the equivalent of the heart, namely as the centre of life, so that it or they motivate all other functions. Functions considered as central to life are not considered to be functions. They are believed to be the centre. According to Vollenhoven, when in the history of

[258] D.H.Th. Vollenhoven, Realisme en Nominalisme, 1938, op.cit.

philosophy this occurs, the centre is then always sought in the higher (cultural) functions, those in which humans have the ability to choose, as distinct from those where they have no choice. The latter include functions such as space, movement, energy, organic life, psychic feeling. The former include aesthetic appreciation, logical distinctions, making things etc. Stoics, for example, seek the centre of life in analytical thinking, hedonists in the life of feeling.

I would suggest that Schuurman believes that modern secularised society seeks the centre of life in science and technology, so that the functions of abstract analytical thinking and of procedural production (scientific technology) are so central that they motivate all else, including economic life. Wants are suggested, technically, by the media, often sub-consciously, and are thereby turned into needs. Everybody is made to believe that by following the market and all it entails life will flourish. The scope and depth of environmental problems is disguised or used as new business opportunities. The same applies to the threats of pandemics and terrorism.

8.13 The Business Corporation

For these reasons, the analysis offered by Schuurman should be extended to include much more specifically the role and functions of the modern business corporation. This would have the additional advantage of bringing in the concerns raised by many about the direction of economic life. Business corporations have become as powerful, if not more so, than many states in the modern age.[259]

The few who call the shots in this system get very high rewards, whereas the rest receive less and less. Automation increases unemployment and makes existing jobs precarious. The Third World has become a source of cheap labour and cheap raw commodities as well as a sink for waste materials.

In this context, what is referred to as globalisation should be seen as the growing power of business networks that span the globe, using sophisticated transport and communications technology. As investors are able to withdraw capital, if profit returns are unsatisfactory, TNCs seek to make clients dependent on their technical innovations. Farmers in Argentina and Brazil as well as in South Africa, India and China have been pushed into growing genetically modified soy-beans, with forests being cleared to expand the area so used, as the TNCs concerned hope in this way to put pressure on the EU to accept GMOs.[260] Thus, globalisation strengthens the impact of technicism and economism across the world, including agriculture. People, plants and animals are reduced to functioning as machines.

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[259] See, for example, David C. Korten, *When Corporations Rule the World*, Kumarian Press, Oakwood, 1995.

[260] Pierre-Ludovic Viollat, Argentine, un cas d'école; les transnationales mettent le vivant en coupe réglée, *Le Monde Diplomatique*, Paris, Avril 2006, p.22.

In many ways business and business corporations are seen as the heart of a modern society. They are the 'engines' that should bring about innovation and economic growth. The state should ensure that they are able to operate profitably. Do we, as a society expect our salvation from the way these companies operate? The relationship between science, technology and economics is certainly particularly strong in the business sector. This creates the danger that scientists employed by business stop searching for truth out of sheer curiosity and dis-interestedness and, instead, focus on finding results that are quickly able to be harnessed for technological innovations that help the company compete. Such pressure on scientists is the result of economism (Ch 9).

Since scientific technology and economics are not considered as functions, but rather as heart, the two are intimately and inseparably bound together in an industrial/financial business company. Schuurman's definition of technicism can be applied, almost without alteration to the business corporation, as follows:

> *By means of the business corporation and its scientific-technological/economic ways humankind pretends to be lord and master over the whole world in order to solve all problems (except religious and philosophical ones), old and new, in order to guarantee a growing material prosperity or progress.*

If we put it this way, we can do more justice to the metaphor of a garden as a guide to cultural development. Once we recognise the business corporation (or rather the whole complex of business corporations across the world) as a monster striding the earth blindly, leaving chaos in its wake, whilst being invoked to clear up the mess, we may find political means to tame it. The monster has an insatiable appetite for the world's resources as well as for people, either as consumers or wage-workers. It spews out large quantities of wastes and pollution. Eventually it might die in its own debris. The problem is that this monster is not recognised as such. One perceives the welfare, the glory, the comforts and the control it brings as great blessings. Such modern materialistic or naturalistic values guide the development of technicism. The values of a garden metaphor can only be regained by very piecemeal and patient endeavours.

However, ideologically leading politicians believe that all this is inevitable if we want economic growth. Major political crises are triggered when economies cease to grow, let alone shrink. The process of consumption and production must be fed through the three powers of science, technology and money, acting like fertilisers. It is sobering to note that those who have been pleading for different types of growth, based, for instance, on appropriate technologies suitable for developing countries, have not been heard, despite the fact that the predictions of the Club of Rome have been realised during the past 30 years.

In contrast, a garden is the opposite of uncontrolled growth of monstrous proportions. A wise gardener will always be concerned to identify and eliminate weeds that can stifle the growth of beautiful and wholesome plants.

If one plant were allowed to grow uncontrollably, the garden's delightful variety would disappear. The demands of that one plant would be such that no food and no sun were left for the others. The garden would turn into a green desert.

It requires the development of technology and economics as separate, but inter-related functions of humankind, needed as ways of looking after the garden in the ways of wise stewardship. The wise gardener will use many ways of developing his garden. The design should be beautiful and well thought out. He will ensure that plants are pruned on time (a technical activity), otherwise fruits will be lacking. New varieties will be developed through grafting techniques. No function can be neglected if the garden is to continue providing wholesome fruits for all.

This may sound all very idealistic. So, is it possible to implement a garden metaphor in the modern complicated world? Some believe that there is a pedagogy of crisis and disaster. Let us assume that the oil crisis is truly upon us, with oil and gas production peaking and then declining, triggering major price increases in the face of growing demand, especially in countries such as China and India, whilst at the same time global warming is having an increasingly adverse impact on climate and agriculture in many parts of the world.

Even in these circumstances many changes can be made that would over a period of time help mitigate the problems. Governments should take a leading role in providing incentives to save energy and reduce the emission of greenhouse gases. They could implement agricultural policies that would emphasise the need for nations to feed themselves. This would involve the use of variable levies on import prices, production quotas and a general prohibition of export subsidies. At the same time, Governments in consultation with farmer organizations would provide incentives to expand biological (organic) production of food. As prices of chemical fertilizers and sprays are rising rapidly under the assumptions made, this should not be too onerous in financial terms. The quota system could be used to achieve a significant reduction in livestock across the world (cows and sheep are major emitters of methane). Since present diets feature generally too large a volume of meat, more balanced diets would help improve human health. Such a policy would reduce the felling of tropical forests to grow soya for livestock and make it possible to expand the area of land used for horticulture and biofuels. Transport across the world would decrease as well. In general, the direction of change would be towards smaller scale systems and an elimination of waste.

8.14 Conclusion

Schuurman's view is that since the time of Bacon and Descartes the human functions of scientific analysis and technology have become so prevalent that our culture has become a technicised culture.

Under Neo-Liberalism the business corporation has become a key agent in the process of technicisation inasmuch as it relies on science to devise new technological innovations to help it stay ahead of the competition. More and

more areas are becoming subject to the rule of markets and business corporations. Thus, the three functions of science, technology and economics are united and are seen as the highest functions or the heart of life and culture.

By starting the analysis from entities, such as business corporations, rather than modalities, the concept of technicism may be deepened. Business must try to survive in a world dominated by large-scale companies, operating world-wide. Such competition forges a link between science, technical innovation, marketing and monetary profits, often at the expense of human workers and the environment. Markets should be extended to areas that used to be non-economic such as education, healthcare, sport and infrastructure. In modern life the search for monetary profit by means of science, technology and economics is a way of seeking the good life. In reality, however, technicism and economism have very destructive effects on both culture and nature.

By contrast, the metaphor of the garden-city involves a development of culture in which all human functions contribute without any hypertrophy. No single function should dominate the rest.

Chapter 9 will consider economism more closely, whilst Chapter 10 will focus on the impact of technicism and economism on agriculture and will try to trace a different way that reflects the garden-city metaphor.

CHAPTER NINE: ECONOMISM

9.1 Introduction

The enclosure movement in England (Ch 1.3.2) sought to make land productive in a money-using production and trading system. In all of its phases it led to depopulation. During the first phase (1459-middle 17th century) of enclosures, when arable fields were converted to pasture, authorities such as the church offered major opposition on account of their detrimental social effects. After 1660, however, it became a much more acceptable practice because of the requirements of agricultural improvement, even though depopulation continued. Tate has found that well before the 18th century proponents of enclosure used an argument that became common during the 18th century namely that enclosure was good for the poor as it would give them an incentive to work and earn a wage.[261] When the Industrial Revolution began around 1780 people who had lost their land moved into the major cities to be employed in 'dark Satanic mills'. Enclosure meant that land became a marketable commodity in the same way as labour became a commodity subject to the laws of supply and demand (Ch 6.2).

When economic arguments become so important that people disregard social concerns and social effects, then, there is a prima facie case of economism in the sense that the economic takes over the running of the whole of life.

In its second phase, the enclosure movement was linked with the use of science and technology in practical economic affairs such as modern agriculture and industry. This combination would gain in strength during subsequent centuries as modern business corporations began to compete on the basis of technical innovations.

Markets, private property, business corporations and financial capital have become major powers especially in Western societies since the first Industrial Revolution. Although over time Governments have sought to restrain the power of business and finance, they have not been able or willing to prevent it from influencing if not dominating the rest of life. This raises two questions. First, what effect, if any, does economism have on the economic sector itself? Second, if it is allowed to have such a dominating role, then, how is it possible that we notice it? Perhaps, we notice it because we know better from experience or knowledge of different times or because we observe its destructive effects on our life. Those who resist it should be carefully listened to.

In recent times, resistance has tended to take the form of opposition in particular to the ways of neo-liberalism, often seen in relation to neo-classical economics as advocated by F.A. von Hayek and Milton Friedman. Indeed, since the 1980s the world has seen the implementation, albeit in part, of the liberal economic order seen as desirable by economist J.E. Meade in the late 1940s (Ch 7.15).

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[261] W.E. Tate, *The English Village Community and the Enclosure Movements*, Victor Gollancz Ltd., London, 1967, p.76.

Neo-liberal policies have led to a deregulation of financial markets, so that speculative capital flows are chasing the highest returns around the world. The warnings of the Bible, Aristotle and the scholastic theologians of the Middle Ages against usury have been forgotten. We should ask whether they, nonetheless, did not contain a superior wisdom?

The task of this chapter is to trace the meaning of economism as currently understood by a range of people who are troubled by its perceived effects, especially in relation to neo-liberalism, and, then, to examine the views of Aristotle and their influence on the thinking of the Middle Ages. This is followed by a discussion of the Renaissance and the Reformation in relation to the rise of modern capitalism. The chapter closes with a discussion of economism from the point of view of reformational philosophy.

9.2 Neo-Liberalism

The doctrine that has guided the world's financial centres and most countries since 1975 is known as the Washington Consensus, consisting of the following 'commandments':

1. Governments must reduce fiscal deficits to a minimum and seek to have fiscal surpluses.
2. Government subsidies should be eliminated and core expenditures focussed on health, education and infrastructure.
3. Taxes should be levied on a large tax base and marginal income tax rates should be low.
4. International financial markets should determine interest rates. High real interest rates encourage savings and prevent capital flight.
5. Foreign exchange rates should be floating unimpeded by Government intervention.
6. There should be no import tariffs.
7. Foreign investment is to be encouraged.
8. Since the private sector is more efficient than the public sector, the latter should be reduced in size.
9. The economy should be deregulated and labour markets made flexible.
10. Private property rights are essential and should be strictly enforced.[262]

The article from which these ten commandments are quoted sets out in detail how the eight richest countries of the world, acting like the world's shareholders, have been developing policies according to this Consensus, using the IMF, the World Bank and the WTO. The World Bank has become a major lender to poor countries to finance major infrastructures such as roads,

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[262] Adapted from Jean Ziegler, Portrait de Groupe à la Banque, *Manière de Voir 75, Altermondialistes de Tous les Pays…*, Le Monde Diplomatique, Paris, Juin-Juillet 2004, p. 20.

hydro-dams, canals, ports etc. to enable them to develop an export/import economy. Whenever new ideas emerge around the world such as 'sustainable development' the Bank hears, appoints new staff and becomes an ardent advocate of such development, although the projects continue to be financed as usual, despite the environmental problems they tend to cause.[263] Many Third World countries pay out more in debt servicing than they receive in aid. Yet, the rich countries have been unwilling to forgive their debts in a meaningful way. The IMF provides financial assistance (loans) to countries in need and imposes structural adjustment policies (eliminate subsidies, reduce social welfare payments, privatise state enterprises etc.) which force such countries to export crops wanted by the rich countries, often at the expense of traditional agriculture and with major environmental degradation. At the same time the USA and the EU have been unwilling to stop subsidising their own farm production and exports of surpluses to the detriment of Third World farmers.

The problems of the Third World (poverty, sickness, lack of potable water and food, loss of forests, depletion of natural resources and environmental degradation) have become so aggravating that meetings of the G8 (USA, Canada, Japan, Germany, UK, France, Italy and Russia) and the World Bank, IMF and WTO have become subject to massive protest movements.

Nonetheless, around the world neo-liberalism has caused politicians to reduce the size of the State in favour of private enterprise, with the exception, however, of the military establishments. Spending on arms remains by far the largest item of international trade ($780 billion world-wide in 2003), followed by drugs ($400 billion) and compared with a mere $6 billion on education.[264] The development, production and trade in arms contribute to environmental problems, depletion of resources, growing debt burdens and mortality (land mines).

Nation states remain important not only because of their powers to regulate markets and impose taxes, but also because they may use their armies to protect and expand their markets and/or safeguard supplies of natural resources. The beneficiaries of the policies put in place have been the owners and top management of the business corporations of the First World and, often, ruling elites in the Third World.

The connection between business, finance and national policies is so intimate that the demands of the financial system appear to take priority over just about everything else. This may be due to the instrumental means-end rationality of the neo-liberal set of policy prescriptions. Given that the objective is to raise GDP per head of the population, the most efficient way of going about is believed to be to give rein to the profit motive and all round

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[263] Ziegler, ibid.

[264] Gustave Massiah, Le G8, club de riches très contesté, *La Manière de Voir 75*, Le Monde Diplomatique, Paris, Juin-Juilllet 2004, p. 24.

competition in a set of free markets. If the objective is not met, then, the approach should be intensified. Are we dealing with economism?

9.3 What Is Economism?

In 2003 a group of French and Belgian thinkers, led by economist René Passet, published a set of essays entitled *Sortir de l'Économisme (Leaving Economism behind)* in which they sought to work out an alternative to neo-liberal capitalism.[265] I have identified the following propositions as examples of economism according to these authors:

1. Primary riches such as natural resources, life in all its forms and intrinsic values (sense of truth and aesthetics, human relationships of marriage, friendship, religion) are measured by money prices or used as commercial brands. Since they cannot be produced at will, this is entirely inappropriate. Intrinsic values are used as marketing tools.
2. The destruction of natural resources provides scope for the production of artificial substitutes. Similarly, pollution provides new business opportunities.
3. Modern technologies such as ICT and genetic engineering are to be controlled only by the cold logic of commercial regulation.
4. As a result of short-term financial requirements, the present system leads to over-exploitation of natural resources, environmental destruction and the distress of millions of people.
5. Whilst an abundance of food is produced, 825 million people are under-nourished and 1.3 billion live on less than $1 a day.
6. Indigenous cultures are destroyed and replaced by commercial cultures or converted to tourist attractions.
7. A society totally dominated by the imperatives of the productive apparatus and in particular by those of the international financial system. Speculative capital seeks short-term profitability and security. An investment should return at least 15%-20% p.a.
8. Everything becomes merchandise. What is economic is reduced to a commercial logic.
9. After the collapse of communism we are now in a natural state where there is only one economy possible, the neo-liberal one (TINA, there is no alternative), the prophets of which are F.A von Hayek and Milton Friedman.
10. Capital operates world-wide and imposes its laws on society via corporations and the power of international financial agencies such as IMF, World Bank, WTO and OECD.
11. Countries should repay their foreign debts even if their people are suffering.

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[265] Philippe Merlant, René Passet, Jacques Robin, *Sortir de l'économisme; une alternative au capitalisme néoliberal*, Les Éditions de l'Atelier/Les Éditions Ouvrières, Paris, 2003.

12. Economic development is much more important than ethical and spiritual development. 'To have' is more important than 'to be'.
13. There is no limit to consumption and the generation of waste.
14. Competition destroys inter-human relationships.
15. Scientific research is ruled by the imperatives of production,
16. We are obsessed (part of a religion of economic growth) by one statistical standard (GDP).

The authors assume that, somehow, there is a proper way of understanding and practicing economics and believe that the current practice, of which the above are instances, has stepped over the boundaries of proper practice, so that the system has become oppressive and destructive in character. Their reflection on current practice should not blind us to the possibility that in other cultures and historic periods 'economism' has had expressions different from the above. We should aim for a general characterisation.

The Dutch economist Bob Goudzwaard, who has been critiquing economistic practices in a series of publications spanning a forty year period from the 1960s to the present from a reformational philosophical standpoint would agree with most of the concerns highlighted above.[266] He seeks the source of the problems in a strong faith in progress (Enlightenment) understood as a continuous increase in living standards measured as real GDP per capita, achieved at the expense of other areas of life, the natural environment and the Third World. This faith has been linked up with a neo-classical theoretical approach to study the operation of markets by assuming that non-economic (exogenous) factors would not affect their working. Thus, needs and tastes are assumed to be non-economic and, therefore, constant. Detrimental effects on health, employment and the environment are considered to be external and, therefore, are not charged to those who cause them. In fact, this theoretical approach is mirrored by actual practice, which tends to consider what is economic as that which can be traded in markets by being denominated in money prices.

To conclude I give the following definition of economism:

Economism stands for a way of considering and acting in life and the world as though everything is solely economic including people, their inter-human relationships, all social structures and institutions, with business, the market and competition being present means of salvation and the economic object functions of things, plants and animals being absolutised.

This definition can be adapted to cover forms of economism such as totalitarian states running economies or slavery.

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[266] B. Goudzwaard and H.M. de Lange, *Genoeg van te Veel/Genoeg van te Weinig; wissels omzetten in de economie*, 3rd ed. Ten Have, Baarn, 1986/1991 gives a good overview of his approach.

9.4 The Modern Business Corporation Again

The logic of capital, in a global setting, by which major investors (pension funds etc.) require returns of at least 15% on their investment has forced business to cut costs and to exploit natural resources at rates far beyond the usual rates of natural reproduction. Labour-intensive operations are located in countries where there is an abundance of workers who are prepared to work long hours in sweatshop conditions. Many finite resources such as oil and gas are being depleted, partly because of the extensive transporting of goods and services around the world. The extension of intellectual property to life forms turns nature into marketable financial assets. To force revenues up, consumers are enticed to buy, often on the basis of debt-financing and under the pressure of relentless advertising via public and private media (their product is the target audience). Sponsoring popular events helps business to raise their image and sell their expensive merchandise.[267] It is a logical step from here to become a provider or financier of tertiary education, as it enables them to purify textbooks by the elimination of views contrary to business interests. This may also explain why tertiary institutions, which rely on income from fees tend to focus on those subjects that enable students to earn high salaries on graduation. Their goals should be attained as efficiently and quickly as possible.

Businesses must not only compete to maintain and expand their markets in the face of severe competition, but they should also be alert to the risk of being taken over by more powerful competitors. In recent decades mergers and acquisitions have been the order of the day, the aim being to achieve larger economies of scale and to reduce competition, so that prices may be raised or input prices reduced. The rhetoric of competition is not always as pure as suggested by neo-classical theory.

Modern information and communication equipment enables the outsourcing of operations, also to low-wage countries, and the standardisation of operations. At the same time treasury divisions seek to make money on financial markets (derivatives). To provide the Chief Executive Officers with appropriate incentives, they are rewarded not only with high salaries but also with shares and options to buy their company's shares. The danger is that they start running the business for their own financial gain (by engaging in speculation, mis-appropriating staff pension funds, etc.).

Governments are called upon to eliminate impediments to competition (exchange controls, minimum wage legislation, etc.), to lower taxes on higher incomes and to curtail social welfare provisions or made subject to means-tests and work-tests. Thus, the gap between rich and poor widens. The emphasis on the need to work for a living and on earning money through either working for a business or owning one, is reminiscent of John Locke's labour theory of property (*Second Treatise on Civil Government).* Indeed,

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[267] For a detailed analysis see Matthew P.McAllister, *The Commercialization of American Culture; new advertising control and democracy,* Sage Publications, Thousand Oaks, 1996.

some modern political leaders (like the Prime Minister of New Zealand) have become fond of what they call 'the ownership society'.[268]

From this perspective, agriculture is no more than another market to be supplied with inputs and for farmers to work as suppliers to major corporate processors. Thus, farmers have been forced to adapt their operations to the requirements of agribusiness. To maintain or conquer meat export markets, the EU, for instance, has prohibited the vaccination of cows and pigs against foot-and-mouth disease and swine fever (Ch 14). Providing offal-based feed to cows has led to the outbreak of BSE in various countries.

9.5 Aristotle (384BC-322BC)

Stepping back into the past, we wonder whether Aristotle might shed some light on the problem of economism, given his stature as a philosopher who had some definite views on money which had a formative influence on the church for many centuries. Aristotle made some pertinent observations about matters economic in his essays on political theory, published together in *Politics*.[269] As the subject is a theory of the state, he does not focus primarily on functions but rather on concrete entities such as the household, the family, the state and the relationships between them. In view of our subject we can focus only on what appear to be the economic aspects of the analysis.

Aristotle defines a household as 'An association established by nature for the supply of men's everyday needs' (6).The state is formed in order to attain self-sufficiency for the sake of a good life. Self-sufficiency is its end or final cause (7).

Aristotle's basic world-view is a biological view, derived from a close observation of plants and animals. These develop from very small to a final shape or form allowing them to live as intended. Hence, the state is a natural phenomenon that reaches its destiny when it has self-sufficiency. Its purpose is to provide a good life in which all members enjoy the satisfaction of their basic needs. Later on, when he describes the ideal state he argues that 'external goods, like all other instruments, have a limit.' An excess of such goods will prove harmful to the possessor (192).

The idea of self-sufficiency is rarely mentioned today, certainly not as the purpose of the modern state. If it means anything at all, it would have to apply to humankind as a whole on a global scale. Modern states engage frantically in importing and exporting in order to raise their welfare or standard of living. They do not subscribe, therefore, to the ideal of self-sufficiency. WTO rules (Ch 13) effectively prohibit self-sufficiency on the basis of economic theories suggesting that the welfare of all countries is enhanced by systems of free trade. However, nobody has ever suggested that there should be a limit such

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[268] For a detailed discussion of Locke's theory see Ulrich Duchrow & Franz J. Hinkelammert, op. cit. pp. 43-76.

[269] Aristotle, *Politics and Athenian Constitution*, ed. and trans. John Warrington, J.M. Dent and Sons, London, 1959. Page numbers of references are given in brackets in the text.

as self-sufficiency or the good life for everybody, no matter how these terms might be understood today by peoples of different cultures.

Aristotle concludes his notes on the definition of the state by emphasising that it provides order on the basis of justice. If there were only individuals, then, these might use their power of speech (reason) to engage in brutal warfare ('armed injustice', (8)). In our time we can think of war lords as well as of the practices of TNCs that seek out those countries that permit exploitation of workers and natural resources or which put pressure on states or on international bodies to allow them scope for practices that would normally be prohibited.[270]

Aristotle believes that some people are naturally slaves or servants (instruments), articles of property, and, others born rulers (12). In this respect, he draws a distinction between instruments of production and instruments of action. A shuttle is an example of the former and a slave one of the latter. We would say that the instruments of production are capital goods. The slave is like a household article that serves life. He/she is an auxiliary of action and as such belongs completely to his/her master as an article of property (10). Masters should learn how to employ slaves (14). Aristotle regards the relationship of masters and slaves as a) natural, b) social, c) juridical and d) as allowing masters to do the things they like such as philosophising (14).

In terms of history, these ideas are not as outlandish as they may appear. In feudalism, lords would probably have agreed with Aristotle. The New World of the Americas was developed by means of slavery. Similarly, in early stages of modern industrialism many would argue that workers were like 'living parts of the master's body' (14). Allowing for the fact that Aristotle would have denounced matters such as very low wages and de-humanising working conditions, because the master should, naturally, look after his instruments, he could not have disagreed with the principles of scientific management whereby employees became parts of the 'machine' (the enterprise). The latter should be regarded as an expression of technicism (Ch 8). In recent history one can find many instances where people believe that owners and key management of business enterprises have the right to rule over staff, without being required to consult the latter. We should also note that in the modern global economy, many people are employed in conditions close to slavery (factory work in Asian countries, au pair girls from Eastern Europe in Germany, girls sold for prostitution).

Aristotle distinguishes two forms of acquisition. The first is natural and involves the use of what nature provides to the household. Various households may decide to barter to ensure that they have sufficient of the various necessities of life. In this respect, he argues that nature has made all the animals for the sake of humans, and plants for the sake of animals (16). Food, clothing and tools made from the materials provided by the kingdoms of

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[270] Naomi Klein, *No Logo*, Flamingo, London, 2000; David C. Korten, *When Corporations Rule the World*, Kumarian Press, West Hartford, Connecticut, 1995/96 and Lori Wallach and Michelle Sforza, *Whose Trade Organization?*, Public Citizen, Washington, 1999.

things, plants and animals constitute the 'storeable necessities of life', which are:

> the elements of true wealth; and a good life requires no unlimited amount of property, despite Solon's remark in one of his poems that 'no bound to riches has been fixed for man (16,17).

Aristotle disagrees with Solon since, as he put it, no art has unlimited instruments and riches are a collection of instruments for use in the household or in the state (17). These are natural riches (18).

The second mode of acquisition is based upon exchange, especially by means of money. It is a method that has arisen as states had to rely more and more on foreign sources for their needs (18). Rather than engaging in the shipment of goods to accomplish barter trade, one used metallic coins as a means of payment. Once money was available it became possible to abandon barter trade and acquire things via the retail trade. Retailers work by acquiring coins and paying suppliers by coins. If they set a margin between the two they might get more coins than needed for their own 'store of necessities', if we understand Aristotle correctly (he does refer to profit-making). There is no bound to the accumulation of coins, which he calls 'spurious riches' (19). Yet, he points out, there are those who engage in the acquisition of money and they increase their hoard of currency indefinitely (19) in order to become increasingly rich or to sit tight on what money they have. Aristotle opposes usury, indeed he detests it, especially in the form of charging interest on money loans because 'It makes profit out of money itself, not from money's natural object, and therefore it is the most unnatural means of acquiring wealth.'(21).

Nonetheless, there are those who direct 'all their faculties to the acquisition of wealth, as if money-making were the end to which all else must be subservient' (20).

The term 'money's natural object' refers to the means of exchange. Generating interest is not money's natural object in Aristotle's view. The birth of money by money is usury. The church fathers read this as buttressing Scripture's prohibition of lending at interest..

The author concludes with denouncing monopolistic practices to make money such as Thales of Miletus who anticipated a record olive harvest and cornered the market for pressing the olives by buying up all the olive presses.

More than 2600 years later one cannot but admire Aristotle's analysis. He grasped the abstract nature of money as an object introduced to facilitate exchange but used to build up financial fortunes, without any reference to the natural world. A. Heertje once noted that money is the greatest abstraction introduced by humankind. In his view money has the effect of short-circuiting any discussion about the true meaning of things. On the market we interact

with each other by means of money.[271] In modern life usury, as defined by Aristotle, occurs on a wide scale. One can think of practices such as the use of financial derivatives, including stock options as part of executive pay-packages, attempts by executives to drive up the price of the shares of their corporations, creative accounting, credit card interest charges etc. In the Middle Ages the term usury connoted this wider set of conditions, as pointed out by Tawney.[272]

In Aristotle's view, we engage in exchange (by barter or money) in order to obtain a sufficient set of goods to allow us to live as families and states. As culture develops, exchange becomes more important. In other words, he assumes that there will be specialisation between states and villages (18). Through exchange a new distribution of goods comes about that presumably brings the states closer to the norm of the good life. The products of nature and human technology (the example of the shuttle) must be distributed on the basis of needs in order to ensure that it is truly fruitful for human culture (the good life). The surpluses that arise in production should not go to waste.

Aristotle's objection to usury indicates a profound awareness of the seduction of accumulating money. St Paul would warn of the love of money, as being the root of all evil (I Timothy 6:10).

Summarising, Aristotle views households and states as natural entities with specific ends. As such they are subject to natural limits and should not engage in a hot pursuit of material goods. If they obtain what helps them to attain their end they have sufficiency. The good life is, therefore, a limited life. This is the reason why he opposes interest. It is unnatural and leads to an unnatural striving for more. The economic function is seen as the way of acquiring that amount of material goods necessary to achieve the good, self-sufficient, life of the state. Since neither individuals nor households are able to be self-sufficient, the economic function is actually a political function.

9.6 Renaissance and Reformation

The Canonical prohibition of usury, inspired by both Aristotle and Holy writ, remained in force for a long time, as mentioned above. During the Renaissance, the world of merchants, bankers and industrialists resented it and tried to circumvent it. They needed money to expand their business. Similarly, finance was needed to equip armies and navies. Increasing prosperity and display of wealth ran counter to the preaching of asceticism.

9.7 Martin Luther and John Calvin

In 1529 Luther wrote a Large Catechism for the benefit of those who had to teach the Small Catechism to the children of the church. When dealing with

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[271] A. Heertje, Geld....wat is het en wat doen we ermee?, in *Geld..wat is dat eigenlijk?*, SMO Informatief 19, Stichting Maatschappij en Onderneming, Scheveningen, 1977, p. 5.

[272] R.H. Tawney, *Religie en de Opkomst van het Kapitalisme* (Dutch translation of *Religion and the Rise of Capitalism*, 1922), C. de Boer/Brand, Hilversum, 1964, pp. 146ff.

the First Commandment: 'You shall have no other gods', Luther asks what it is to have a god? What is God? His answer:

> A god is that to which we look for all good and in which we find refuge in every time of need. To have a god is nothing else than to trust and believe him with our whole heart. As I have often said, the trust and faith of the heart alone make both God and an idol.[273]

When he gives an example of a common failure to observe this commandment, he mentions mammon as the most common idol on earth.[274] Although Luther puts his remarks about god mammon in a personal way, in the style of a catechism, the question that concerns us about economism is whether it is possible for a whole culture or society to be (mis) guided by faith in a false god called mammon. During Luther's time Western culture was still dominated by the Roman Catholic Church and its canon law. It was a corporate culture in which the individual was always seen as part of a community, overarched by the church and its sacraments. However, since the 14th century the Renaissance movement had started to emphasise the freedom of individuals (Ch 4.3) to shape their own destiny, perhaps under the impetus of the plague.

The prohibition of usury notwithstanding, the papacy had become a major economic power. The church owned large tracts of land and owned many precious buildings in the form of monasteries and churches laden with treasures of art. The prosperity brought by the trade with the East and increasingly with the Americas enabled this accumulation of wealth. Yet, Pope Leo's desire to build an even greater church in Rome stimulated the search for money through the sale of indulgences. Luther protested and thus shook the economic base of the papacy. In this way he attacked what was a form of economism practised by the church.

The on-going struggle of the church over the centuries to maintain its prohibition of lending at interest, on account of both Scripture and Aristotle, indicates that it was not accepted wholeheartedly by the merchants and bankers of those days. Growing prosperity caused concern not only in the top of the church hierarchies, but also amongst the common people. Protest movements against materialism and the accumulation of wealth took shape in new monastic movements devoted to poverty and serving the sick and the poor.

The debate on usury covered the period of the 12th to the 16th centuries. The prohibition of usury compelled the church to take a position on the emerging money-using economy, especially as embodied in the trading, manufacturing and mining enterprises and in the quest for gold in overseas lands. The church insisted that one should not get in return more than one had lent i.e. no interest.

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[273] M. Luther, Large Catechism, Theodore G. Tappert, *The Book of Concord*, Fortress Press, Philadelphia, 1959, p. 365.

[274] ibid., p. .365.

Le Goff, as quoted by Grandia, describes the church's fear that usury would derail society because:

1. Peasants would migrate from the land to the city to lend money.
2. Peasants could lose their livestock and farm implements to the lords who would expropriate these chattels if the peasants could not pay interest charged. Famines would result. [275]

These fears were certainly not a figment of the imagination of the church fathers. Down through the ages farmers have been exposed to the danger of losing their farm and chattels if in times of bad harvests or poor prices they were unable to meet their mortgage commitments. By contrast, industrialists and traders tend to have more means of adjusting their business to meet their obligations should they have borrowed and fallen on difficult times. This is not to say that they cannot be faced with rates of interest far in excess of their ability to raise productivity. There is always a risk in borrowing money.

As the money using economy expanded, the church had to face the problems caused by its prohibition. It did so by redefining usury as excessive profits and by making a variety of concessions, so that gradually the prohibition of usury as a barrier to a money-using economy was removed or deprived of its sting.

The greed of usurers (banks and entrepreneurs such as the Fuggers) caused Luther to preach on a number of occasions against usury. Throughout his career his view remained that of his first sermon on the subject, preached in 1519. One should not steal, nor treat others with special favours. Rather one should take pleasure in giving and lending to the needy without expecting to become better off as a result. Charging what the traffic could bear when the poor could not pay for their primary needs was wrong. One should consider the interest of the purchasers. A merchant cannot withdraw from the injunction: love your neighbour. In his sermon of 1519 Luther pays special attention to a transaction where, for example, a farmer could borrow a sum of money against a promise to pay the lender the whole or part of a series of harvests. If both the seller and the purchaser needed a reward, he could agree to this type of transaction provided the rate of interest was as low as possible and certainly not in excess of the productivity of the land and provided also that the property concerned was not small. He doubted whether a rate of interest higher than 6% could ever be justified. Charging 7%, 8%, 9% or 10% for small deals amounted to exploiting the common people and should be prohibited by the authorities. Usury is essentially theft.[276]

In 1520 and 1524 Luther castigated not only the common practice of usury but also the practices of the large trading enterprises of his days. They did not shrink from cornering markets and charging monopoly prices. Sometimes they

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[275] Bram Grandia, *Zeven Maal Zeven; over Sabbatjaar en Jubeljaar als God's bevrijdende economie*, Ten Have, Baarn, 1998, pp.186-211. Le Goff's study is specifically on the usurer and hell.

[276] Martin Luther, *Ein Sermon von dem Wucher*, Martin Luther Ausgewählte Schriften, Band 4, Insel Verlag, Frankfurt am Main, 1983 (original 1519).

would undercut the prices charged by competitors in order to capture their market share and so create a monopoly. In 1539 Luther admonished his fellow pastors to preach against the evil of usury during a major famine. Lords and merchants had bought up what grain there was in order to profit from its scarcity. Those who remained unrepentant should not be given absolution, Holy Communion or a Christian burial. He was so severe on these people because they broke the solidarity of the Christian community, between rich and poor.

The emerging capitalist system and the claims of the Gospel could hardly be reconciled in Luther's view. Thus, he appears to have had an intuitive understanding of economism as a systematic attempt to enrich oneself at the expense of neighbours, especially at the expense of the poor.

Similar to Martin Luther, John Calvin (1509-1564), the reformer who lived and preached for many years in Geneva, emphasised the solidarity between all people in his views on the problem of usury. He likewise opposed the charging of interest to the poor. One could lend to the poor, provided the rate of interest was nil or sufficiently low to enable them to make a living and repay the loan. Calvin realised that modern industrial enterprises required capital to enable them to be productive. The resulting productivity warranted the payment of interest to the lender. In his view the biblical texts, particularly those in the Mosaic laws were meant for an agrarian society and not for a modern industrial society. He considered that the Mosaic laws were part of the political law and, therefore, not binding on us. However, the underlying principle of these laws was very much relevant to any society and that is that the neighbour's interests should be protected and that the poor should not be taken advantage of. Calvin did not oppose so much the differences between rich and poor but rather any indifference of the rich towards the poor. The latter were God's advocates to the rich. Solidarity between people would lead to an exchange of material goods between people. Money should be seen as a bridge between people. To this end the Government should see to it that the poor would not be exploited. For their sake special rates of interest should be set and observed.

The greater openness of Calvin to the potential of modern industrial trading and manufacturing enterprises, albeit within a legal system that should maintain social justice, was quickly seized upon by less scrupulous followers to make profit. The social restrictions of Calvin were quickly forgotten. Since in many areas Calvinists were excluded from public offices they often sought a career in the commercial world and so adopted the customs of that world. Calvinist preachers became more concerned about sexual morals than about usurious practices or the evils of capitalism. Calvin's subtle way of exegesis ran the danger of being misunderstood in the sense that those old words held no message for a modern capitalist society.

Nevertheless, Biéler in particular has emphasised that Calvin transferred the importance of social justice, which underpinned the Mosaic prohibition, to his

modern world.[277] Social justice can only be found by minds that are informed and motivated by the same concerns that drove the prophets of old. In Geneva usurers could be taken to court for their practices.

Grandia makes the point that neither Luther nor Calvin realised that the Mosaic institutions, especially those of the Sabbath year and the year of Jubilee, were a prophetic reaction to the social practices of the countries surrounding Israel such as Egypt, Assyria and Babylon. The differences between rich and poor in these countries were staggering.[278] The year of Jubilee was meant to prevent a relentless accumulation of wealth and a corresponding enslavement and impoverishment of many. Luther appreciated this aspect of the year of Jubilee in his sermons. He noted that without such a correction the burden of debt could be so heavy that rich trading enterprises were able to hold princes to ransom.

9.8 From Thinking from Above to Thinking from Below

Both Luther and Calvin approached economic life from the perspective that it is subject to God's will or norm. As human beings we are called upon to shape economic life in accordance with this given norm. In their view this is not an automatic mechanical procedure. We have to search out the truth from the Bible and from the world seen in its light.

Key thinkers that followed them developed a different perspective, although they remained confessing Christians. Francis Bacon (Ch 4.3.1) saw nature as an object and humans as subjects free to explore and use it to develop science and technology in a methodical fashion to conquer the universe. Theology should not be mixed with natural philosophy. Humans should engage in discovery through an interaction of mind (reason) and matter. Nature would yield its secrets if approached methodically by human reason. Such interaction should also apply to ethics and politics.[279] René Descartes (Ch 4.4.2) set out along a similar track by opposing the thinking mind and the material world outside, in which laws are seen as part of nature. Importantly, by acquiring knowledge of nature and its laws humankind is able to become master of the world.[280] Like Bacon he put a strong emphasis on the correct method of approaching nature so that it would open its treasures for human purposes. Both Bacon and Descartes saw nature as a kind of storehouse, without which we cannot live.

In subsequent centuries, Western thought has continued along these lines with on-going discussions about the relationship of nature and culture and the position of humankind in relation to each. The relationship of God/humankind and nature has ceased to be a determinant of economic or social life. From

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[277] André Biéler, *Calvin,Prophète de l'Ère Industrielle*, Éditions Labor et Fides, Geneva, 1964.

[278] op. cit., p. 207.

[279] Crowther, op.cit., p. 115.

[280] See for example, J.J. Venter, Early Modern Conceptions of "Natural Law", op. cit., pp.12-16.

thinking from above, as the church, including the reformers did, Western society shifted to thinking from below, from nature as the fount of all good.

The idea of mastery of nature through human reason and effort became the basis of John Locke's theory of property or as he put it in his draft of the Constitution of Carolina: life, liberty and property. In Locke's view, if a person works on a piece of nature, then, it becomes his/her property. Neil Wood has shown that this theory reflects Locke's interests in agriculture inasmuch as he was in favour of enclosing the commons.[281] By improving an enclosed plot of land it became more valuable to the farmer and, therefore, should be seen as his private property. Without private property, the result of human labour, there could be no life and no liberty. This labour theory of property was accepted by the classical school of economics as well as by Karl Marx (labour theory of value). It has become a key plank in modern neo-liberalism as well as being a key ingredient of American values. Once private property is elevated to a principal value, it becomes important to protect it. This is one reason for current concerns about internal and external security.

9.9 Karl Marx (1818-1883)

Marx had a sharp eye for the destruction and misery brought about by the Industrial Revolution, especially on those who had to labour long hours in factories for wages that were hardly sufficient to live on. In many ways his writings were a sharp protest against those conditions. He attempted to overcome the evils of the industrial capitalistic society by changing it into a communist society. For this reason, his views can be characterised as positivistic. Positivism sought to renew society by means of a study of its laws and by a control over nature.

He framed his protest on the basis of an analysis of the writings of political economists of the late 18th and early 19th century, especially Adam Smith, Say, Ricardo and Mills. His *Economic and Philosophic Manuscripts of 1844* bear eloquent witness to this. This analysis was conducted within the framework of Hegel's dialectical philosophy. However, whereas Hegel saw reason or thinking as the prime mover of the dialectic, Marx located it in human labour or in productive forces. Thus, he emphasised the importance of the economic process through time. Whereas Hegel's dialectic was designed to show the reasonableness of everything, Marx aimed at using it to change reality.

9.9.1 The Division of Labour

Like Smith, Marx was fascinated by the division of labour, but contrary to Smith he did not perceive this division as the wellspring of a prosperous society. Marx outlines the dependence of workers on the division of labour in two ways. First, the workers only have their ability to work as an asset. They lack the capital (means of production) and income from interest and land that the capitalist owners of the production system enjoy. Without the division of labour entailed by the productive system they cannot work and hence will die.

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[281] Neil Wood, *John Locke & Agrarian Capitalism*, University of California Press, Berkeley, 1984.

Second, they cannot develop their abilities and potential they may have outside the production system. The first dependency is expressed in the statement that labour is a commodity, subject to the law of demand and supply.[282]

Starting from the premise that capital, understood as all the means of production, is accumulated labour, Marx argues that there is only one state of society favourable to the worker, namely when wealth is increasing. In this event wages increase and this leads to over-time work. Such extra work shortens the workers' lives to the benefit of the working class as a whole, because it necessitates the production of an ever-fresh supply of labour. Moreover, the wealth of society can only increase as the result of the accumulation of labour.

> ..;as the result, therefore, of the fact that his products are being taken in ever-increasing degree from the hands of the workers, that to an increasing extent his own labour confronts him as another's property and that the means of his existence and his activity are increasingly concentrated in the hands of the capitalist.[283]

The more extensive the division of labour is the greater the labourer's dependence on 'very one-sided, machine –like labour' becomes.

> Just as he is thus depressed spiritually and physically to the condition of a machine and from being a man becomes an abstract activity and a stomach, so he also becomes ever more dependent on every fluctuation in the market price, on the application of capitals, and on the mood of the rich.[284]

Conversely, when wealth is advancing competition between capitalists becomes more severe, leading to a greater concentration of enterprise, with smaller capitalists sinking back into the working class, where as a result wages fall again and the dependence on a few big capitalists increases. Parts of the working class lose their jobs and are reduced to beggary and starvation. The division of labour makes him evermore one-sided and dependent, so that he competes with machines. Finally, overproduction brings about unemployment or very low minimum wages.[285]

Turning to his own explanation of this sad state of affairs, Marx introduces the concept of estranged labour. Employees manufacture commodities or material objects. These, however, are not expressions of the workers' self-realisation. They become alien to them, as they belong to the owner and later to the customers. The effort, indeed the life, spent by the workers is a loss to

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[282] Marx developed this dependency very strongly in a series of articles in the *Neue Rheinische Zeitung* in 1849, later published and edited by F. Engels under the title *Common Ownership: Wage labour and Capital*, 1st NZ edition 1997 by the Common Ownership Journal.

[283] Karl Marx, *Economic and Philosophic Manuscripts of 1844*, Foreign Languages Publishing House, Moscow, n.d., p. 25.

[284] ibid., p. 25.

[285] ibid., p. 26.

them. The labourers produce capital for others. Often it turns them into machines.[286]

Alienation goes further than this, inasmuch as it also applies to the activity of working. It is an activity external to the worker 'He is at home when he is not working, and when he is working he is not at home.'[287]

His work is coerced labour or forced labour. In fact, he becomes like an animal. Marx follows this up by discussing a third way in which labour is estranged. He argues that humankind is a species (*Gattungswesen*) and as such different from animals. Animals cannot consider themselves, as they are identical with their life-activity. Humankind as a Conscious Being (capitals in original) has its own life as object, as something they freely design. This design is a matter of working up inorganic nature, which is our inorganic body, or as he puts it 'That man's physical and spiritual life is linked to nature means simply that nature is linked to itself, for man is part of nature.'[288]

The freedom available to us means that we produce universally. We contemplate ourselves in a world that we have created.

> In tearing away from man the object of his production, therefore, estranged labour tears from him his *species life*, his real species objectivity, and transforms his advantage over animals into the disadvantage that his inorganic body, nature, is taken from him.[289]

Estrangement in the modern production process means that the species life becomes a means of individual existence and in consequence the worker becomes estranged also from other people. The alien power of objectivised labour belongs to other people, who are hostile to the workers. Hence, we have wages and private property. They are identical. Private property is the antithesis of truly human or social property.

Addressing this issue in detail by analysing the various forms of communism Marx states again that humans are part of nature. At the same time, however, they are different from nature (standing over against it). It is through history that we become what we are:

> But since for the socialist man the *entire so-called history of the world* is nothing but the begetting of man through human labour, nothing but the coming-to-be of nature for man, he has the visible, irrefutable proof of his *birth* through himself, of his *process* of *coming-to-be*. Since the *real existence* of man and nature has become practical, sensuous and perceptible - since man has become for man as the being of nature, and nature for man as the being of man - the question about an *alien* being, about a being above nature and

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[286] ibid., p. 71.

[287] ibid., p. 72.

[288] ibid., p. 74.

[289] ibid., p. 76.

> man - a question which implies the admission of the inessentiality of nature and of man - has become impossible in practice.[290]

The context of this quote is a discussion about creation, which Marx rejects. If we ask whether humans and nature were created, we abstract from them as they are and postulate that they do not exist. But, how can we prove them as existing? If we apply this to ourselves we think of ourselves as non-existent. If man and nature were created, they would lack any essence. Atheism denies such inessentiality. Through this negation, the existence of man is postulated: 'Socialism proceeds from the *practically and theoretically sensuous consciousness* of man and nature as the *essence*' (emphasis K. Marx).[291]

These words have a modern ring to it as scientists are busy trying to find the source of consciousness in the physical/organic brain. Marx is right in saying that from the point of view of creation humans are not seen as essences, but rather as beings created in the image of God (Gen. 1:26, 27). This entails a very different view of the relationship between humankind and 'nature'.

In Marx's view people are essences that are shaped in history by their labour and in doing so shape nature and are also shaped by nature in a long process of interaction. This implies that those who are living on rent and interest and, therefore, are not working fall out of history and should be removed from it, a consequence drawn by some communist leaders (Stalin, Mao). It could also mean that those who disagree with the progress of history as given shape by political leaders (why would they know where the dialectic between humans and nature has progressed to at any stage?) may run into conflicts, causing the leaders to implement a police state.

In another work: *German Ideology*, Marx developed this idea further in the sense of historic materialism. People are distinguished from animals when they start to produce their own means of subsistence. How people do this is their way of life. They reflect what they produce and how they produce. Thus, their material production processes determine what they are. These same ways of production determine the political and social relationships between people. To be human is a matter of production or labour and as such it is dependent on material conditions.

> The social organisation and the state constantly arise from the life-process of definite individuals, of those individuals not as they or other people imagine them to be, but as they are *really*, i.e., as they act, as they materially produce, consequently as they are active under definite material limitations, provisions and conditions which do not depend on their free will.[292]

Since the institutions of private property and division of labour have made the production system completely dysfunctional, the historic process will cause a

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[290] ibid., pp. 113/114.

[291] ibid., p. 114.

[292] Karl Marx and Frederich Engels, German Ideology, in *On Religion*, Foreign Languages Publishing House, Moscow 1957, p. 73.

revolution. A revolution would come about when poverty would be widespread around the world and if there were a class of oppressed suffering people. It is not surprising that Marx followed the events in Britain's colonies in India as well as the Opium War with China with great interest.

This basic thought must have been in Marx's mind when he said that the final purpose of writing *Capital* was to reveal the economic law of motion of modern society.[293]

To get to the bottom of this process, which is dialectical, it is necessary to be sure of the relation between human beings and nature. Other than Hegel, Marx believes that they are interdependent. A human being is on the one hand a living active natural being furnished with natural powers of life, abilities or impulses inside of him. On the other hand he has needs for natural objects outside of him.[294]

We might interpret this as suggesting that humans are basically organic/psychic beings. Nature is so much as the human body. Yet, Marx also says, as quoted above, that humans achieve a re-birth through history, i.e. through what they accomplish in a scientific and technical sense. To be human is a goal in other words.[295] This distinguishes people from animals.

These two notions recur in *Capital*, first: 'Primarily, labour is a process going on between man and nature. He confronts nature as one of its own forces,..', and then, second:

> We have to consider labour in a form peculiar to the human species. But what from the very first distinguishes the most incompetent architect from the best of bees, is that the architect has built a cell in his head before he constructs it in wax.[296]

This indicates that human beings work with a purpose in mind, a purpose that becomes so much as a law for their activity. To realise the purposes to be achieved, tools must be designed and used. In this connection Marx points out that agriculture cannot produce much at all, unless there are tools the farmer can use. Marx does not answer the question how humans as natural beings can also at the same time have a consciousness, full of reason and the ability to see nature as separate from themselves, so that they can make designs to form and transform nature. He confines himself to the history of the world as a history of human labour.

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[293] Karl Marx, *Capital*, op. cit., 1972, p.1.

[294] *Economic and Philosophic Manuscripts 1844*, op.cit., p. 157.

[295] I am indebted to H.G. Geertsema for pointing out these two aspects (H.G. Geertsema, *Van Boven naar Voren; wijsgerige achtergronden en problemen van het theologische denken over geschiedenis bij Jurgen Moltmann*, J.H. Kok, Kampen, 1980, p. 143).

[296] *Capital*, op. cit., pp. 169 and 170.

This history of how humankind realises itself, that is comes to a new birth through its labour, is dialectically shaped. It is a dialectic of labour and the division of labour, of the forces of production and the relations in which production is organised. The organisation of production, the division of labour, determines how society thinks inasmuch as it generates a certain type of political and legal system, ethical relations and so on. Labour itself is largely a matter of producing output by means of production, some of which may be based upon materials found in nature, plants or animals. If the organisation of labour becomes inappropriate to the technical process of labour, then, the division of labour frustrates the production process and eventually a social revolution occurs which yields a new organisation, a new form of the division of labour. The present capitalistic system with a division of labour between capitalist owners and proletariat will not endure as it forms an attack on the humanity of the proletarians. Indeed, the misery of the latter will increase. As the productivity of the technical production process increases, less labour will be required and wages will fall. Marx illustrated this in numerous ways. A typical example is his speech of 1848 on free trade, shortly after the UK had abolished the Corn Law.[297]

Freedom of trade means freedom of competition. In turn, this implies that labour is paid the minimum cost of production, or just as much as is necessary to allow labourers to live and to propagate themselves:

> To sum up, what is free trade under the present condition of society? It is freedom of capital. When you have overthrown the few national barriers which still restrict the progress of capital, you will merely have given it complete freedom of action. So long as you let the relation of wage labour to capital exist, it does not matter how favourable the conditions under which the exchange of commodities takes place, there will always be a class which will exploit and a class which will be exploited.[298]

He concluded with these words:

> But, in general, the protective system of our day is conservative, while the free trade system is destructive. It breaks up old nationalities and pushes the antagonism of the proletariat and the bourgeoisie to the extreme point. In a word, the free trade system hastens the social revolution. It is in this revolutionary sense alone, gentlemen, that I vote in favour of free trade.[299]

Had Marx lived today, he would have felt strongly vindicated, despite the fact that the universal social revolution had not yet taken place. The strongest point about Marx's views is that he analysed the destructive nature of a capitalist, liberal society, with great accuracy.

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[297] Karl Marx, On the Question of Free Trade, Speech to the Democratic Association of Brussels, 9 January 1848, in Karl Marx, *The Poverty of Philosophy*, Foreign Languages Publishing House, Moscow, n.d.

[298] ibid., p. 250.

[299] ibid., p. 253.

The idealistic nature of a dialectical process that, almost by itself, would eventually initiate paradise, even at the cost of large numbers of people, blinded him to the realities of a much more complex society than a system of production, organised between workers and owner capitalists with an appropriate superstructure.

Could one say that exactly the acceptance of the severe tension between base and superstructure (at least within pre-communist periods of history) which he imagined, and some remnants of a wider understanding of the human mind than a purely naturalist one, helped Marx to understand the problems of capitalism a bit better?

What is also strange is that on the one hand Marx has a very high view of humankind, virtually to the point of assigning them god-like status (i.e. we are the highest being for ourselves) and believing that humankind achieves its own rebirth through its own labour. Yet, the analysis of the dialectic between forces of production and the organisation of production shows that this process of rebirth is highly traumatic for a large part of humanity.

The picture of humankind as a subject over against nature (taken in a broad sense as covering the realms of things, plants and animals) subduing it for its own benefit is typical for Western society since the time of the Renaissance.

Marx puts the centre of humankind's life in technical production. Yet the modern system of production as it emerged in the first industrial revolution required a control over production that was very harmful to the people who had to work with the machines. Such systems are developed through scientific technology and are scientifically organised. This means that the systems are designed and planned in a systematic analytical fashion.

Sachsse has shown that modern thinkers, starting with Descartes, and including Marx, have been technicistic. Marx, however, had also a sharp eye for the combination of technology and economics since the Industrial Revolution and the effects this was having on human relationships.

9.9.2 Marx and Economism

Marx protested against the economism of his days by charging the liberal elites and the political economists they relied on with a relentless exploitation of the working class for the sake of extracting surplus value from them. The political economists used an abstract model of society in which humans are reduced to a cost factor, to be bought and sold. In the speech quoted above on free trade, Marx cited a certain manufacturer by the name of Dr. Bowring who had represented the workers as means of production, which must be superseded by less expensive means of production.

The development of farming since the 19th century shows that it is subject to the same type of processes as analysed by Marx. Industrial farming is becoming large scale and ever more productive, so that smaller farmers are forced to leave farming to be employed at very low wages in urban

conglomerates in the Third World. The surplus value so extracted from them is appropriated by consumers in rich countries.

Kraan has argued that Marx's own views are also economistic.[300] He bases this in particular upon Marx's preface to his *Critique of Political Economy* of 1859. Here Marx argues that the forces of production or the technical production system, which changes frequently on the basis of technical innovations, come into conflict with the much more static organisation of labour or, what amounts to the same thing, the property relationships. The productive forces then become shackles to development and a social revolution becomes inevitable. As the economic foundation changes the whole superstructure turns around. In Marx's view the bourgeois society of the 19th century and the relationship of capitalists and workers it entails is the last antagonistic form of the societal production process.

The point here is that in the past, notwithstanding one class of proprietors succeeding another, like guild-masters taking the place of feudal lords and industrialists fighting guild-masters, the system of production remained under the control of an individual 'patriarchal' leader. The Industrial Revolution had changed this. The very complex division of labour to which it had given rise had introduced a highly co-operative organic system of production. Nevertheless, the ownership of the factories remained individualistic. The workers became employees who sold their labour for money to the employer. Eventually, this contradiction would bring about a world-wide revolution that would bring the means of production under control of the community.

In particular, Kraan understands by economistic that the so-called superstructure is determined by economic forces (the dialectic between technical production and the organisation of production).

Kraan has gathered up the various features of this new state:

1. All needs would be satisfied.
2. There would be complete freedom as a result of careful planning.
3. There would be no division of labour as people would be able to do whatever suited them.
4. There would be no such thing as exchange value as buyers and sellers would have no role to play.
5. There would be a reconciliation of community and individual (no class struggle).
6. The whole world would share in this state of bliss.
7. Family relationships would be transformed to communal values.
8. Humanity would have complete control over society and nature.
9. The State would be abolished.

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[300] K.J. Kraan, *Een Christelijke Confrontatie met Marx, Lenin en Stalin*, J.H. Kok, Kampen, 1953, pp. 44-101.

Since this paradisaical state would come about through a historic process, without deliberate human intervention, purely as a result of human labour, Kraan calls this view an economistic-deterministic idea of history, rather than materialistic. In his view, Marx was not a materialist in the sense that he explained the origin and evolution of everything in terms of matter. The labouring person (*homo laborans*) is the key to history, more precisely to the dialectical development between forces of production and the organisation of labour. Under the influence of Feuerbach Marx called it a materialistic process that would culminate in the self-realisation of humankind as *Gattung*. The whole historic process begins when the size of the human population increases and creates needs that must be met by labour and by an ever greater division of labour, until the point that people would be so specialised that they would be in danger of losing their humanity. At that point the final revolution would take place and people would become all-rounded in the state of bliss of a new society. The producers themselves would order such a communal society rather than a special agency such as the state.

Why would the focus on labour, humans as tool-making animals, be *economistic?* Could one not argue that it is *technicistic*, because the purpose of human labour is to make things or that it is a *socialist* conception? The latter makes sense when Marxism takes the role of conflict between classes as the key factor that leads eventually to the ideal state of freedom, where there is no oppression of one group by another.

Marx looks at social relationships in terms of dialectics that work themselves out in a historic process. Both in his earlier and in his later works he starts from the labouring human being who through his work experiences estrangement as the work of his hands becomes something objective outside of him, alien to him. In fact, the owner of the workplace rejoices in having the objectified labour of the workers. Thus, the workers and the owners become alienated. Hence, his view that private property is the root of this alienation between people. In contrast, the classical economists considered private property and the economic process in terms of natural law. Marx's emphasis on history would make it possible to 'do something about alienation', whereas those insisting on natural processes would be concerned to ensure that Governments would allow nature to do its work. In each case, however, one would have a vision of a glorious future.

Marx grasped the problems of a technical civilisation, driven by division of labour, and its effects on human labour, as Sachsse puts it.[301] Social relationships, therefore, are seen as the product of a social system with private property as its core and as a basis for a highly technical culture. This results in a transfer of surplus labour value to the capitalists owners, an economic estrangement resulting from the social/technical organisation.

It would seem to me that Marx considered the centre of human life as a group of three human functions, namely technical, social and economic. These three

[301] Hans Sachsse, op.cit., pp.201-203.

bring about the ordering of human life through a traumatic historic process. All other human functions then flow out of this complex of three functions.[302] In this way, Marxism is a functionalistic theory. The labouring humans subject and subdue nature and society according to their human designs.

9.10 Reformational Philosophy: The Economic Norm

In contrast to Marx and Marxism Goudzwaard has been working in the line of the Reformation by thinking from above rather than from below. He has done so from the point of view of reformational philosophy, which can be seen as an elaboration of the basic views of Luther and Calvin. This approach believes that the Creator God has subjected the whole of the world and the whole of life to His law. What is can only exist because of this law. As humans we must seek to understand the normative principles for life, in the light of the Bible. One of the findings of this philosophy is that everything is subject to proper limits. There is a place for the State as well as for business enterprises and universities. None, however, should try to dominate all of life and the world. Secondly, the life of these entities should be shaped in response to all normative principles simultaneously and not to an economic principle at the expense of everything else. A business corporation should seek to have proper relationships between management and staff and to produce things that do not damage the health of customers (ethical). Work done should be rewarded appropriately (social). Prices charged should be set correctly in terms of costs incurred (juridical). Technical processes should be well thought out (analytical) and should be run optimally (technical/economic). The corporation should be credible and trustworthy in all its dealings and publicity (certitudinal).

In terms of the theory of modalities, the economic is an aspect or modality of the kingdom of people. This modality retrocipates on modalities that are lower and anticipates those that are higher. Modalities that are lower than the economic anticipate the economic one. Water, plants, animals, amongst other things, may be used for economic production. The economic modlality involves an economic norm, meaning that as humans we must try to find out how to act economically according to the norm. We may get it wrong. We should keep searching for economic wisdom. The economic norm may be formulated as:

Seek abundant fruits for the enrichment of human life without squandering what is given.

The truth of a standard profit and loss account or balance sheet is that it shows the two sides of economising. Fruits can only be achieved by careful husbandry of resources. A car engine may perform technically optimally at a speed of 100 km per hour, but economically it might waste oil and petrol. A farmer works with cows to produce milk, but without turning them into

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[302] For a general discussion of such a possibility see D.H.Th. Vollenhoven, Realisme en Nominalisme, *Philosophia Reformata*, J.H. Kok, Kampen, Volume 3, 1938, pp. 150-165.

technical objects that are milked continuously and killed at the end of their most productive year.

The use of means is always limited and directed by other normative principles such as the ethical, the aesthetical, technical etc. With respect to the kingdoms of things, plants and animals, the economic object functions of their subjects should be used so as to preserve their long-term fruitfulness. A cow, for instance, has an economic object function (to produce milk or meat). By caring for her we allow the cow to produce milk in as natural a way as possible, rather than by selective breeding changing her into a giant udder.

In modern society, marked by economism and technicism little time is spent on identifying a proper application of the economic norm in conjunction with other normative principles.

Economism involves not only an over-emphasis of what is economic, but has also consequences for the relationships between things. By going for maximum pig-meat production in a small geographic space, Dutch pig-farmers produced a flow of manure that had a destructive effect on the eco-system. Moreover, the production of soya and tapioca to sustain such production has led to the destruction (waste) of large parts of the eco-systems of tropical forests (Ch 14).

It is on the basis of this meaning perspective that Goudzwaard has critiqued the modern obsession with economic growth. A society that seeks an unlimited expansion of material production will create a dynamic of downward moving spirals such as growing poverty of those excluded from employment and income, lack of services because they cannot keep pace with the dynamics of production, environmental degradation and the problems of the Third World, including a growing migration of people to the First World where unemployment grows because of the shift of production to the Third World. However, the fact that there are downward spirals implies that upward spirals are also possible. By cleaning up the environment, we may create employment. One could also start by anchoring the financial system to non-financial values such as the needs of Third World countries (health, education, food and clothing).[303]

9.11 Conclusion

The valuable part of Aristotle's analysis is that he sensed the problems that would arise if money became a dominating force through the instrument of interest. Interest plays a key role in the drive to higher and higher production in the current economic system and, therefore, has become a key driver of economism (Ch 7.6). Aristotle's sense of limits is lacking in today's world where the tendency is to value everything in terms of money or profit, including all human relationships or to give priority to the interests of business

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[303] B. Goudzwaard, *Tussen de Klippen Door; om het openhouden van perspectieven voor beleid en samenleving,* final lecture at the Free University of Amsterdam, in *Bewogen Realisme; Economie, Cultuur en Oecumene,* H. Noordegraaf and S. Griffioen, Kok, Kampen, 1999.

corporations. In this context, economism will always work in tandem with science and technology in modern society. Modern business corporations employ science to develop patents on new technologies that will help them to beat competitors and to accumulate profits for shareholders. Universities should produce graduates who can produce research results that may lead to new marketable products. Governments support the corporations as the vehicles that will bring prosperity, employment, tax revenues and re-election to office. Thus, it becomes exceedingly difficult to deal with all the problems caused by this ideology of economic growth.

Karl Marx analysed how the industrial/technical system that had resulted from the Industrial Revolution had become a very exploitative economic system. Labourers had become part of the machines and often had to live in misery. What he analysed was in fact a scientific-technical-economic system run for the sake of making monetary profits. However, Marx thought of humankind as natural /material subjects functioning to wrestle a living from nature (understood as objects). At present such thinking is often reflected in statements such as that one should first put the economy in order before one tackles environmental problems and poverty.

In contrast, the reformers Martin Luther and John Calvin placed the centre of human life in the heart, which is pre-functional. They called the people of their day to a new obedience, to a new hearing of God's Word. By God's grace all human functions would then contribute to a new life, a new justice without oppression on the basis of money.

Goudzwaard, as a representative of reformational philosophy has denounced the ideology of the pursuit of economic growth regardless of costs and environmental devastation by seeking to apply the normative economic principle simultaneously with other normative principles as thinking from above rather than from below. Economism is in fact a pursuit of the good life, in a material sense, without acknowledging any limits.

Thus, over the centuries, the economic sector of life has been reduced to a money-making machine, run by business enterprises with the support of the State, which disregards any effects that cannot be expressed in monetary terms. It has, therefore, become blind as to its waste of people, land, animals, plants, water and clean air. Rhizoid theory seeks to remedy this by including all flows of production and consumption, monetary and physical in its analysis.

As the destructive effects of the technical-economic system become apparent, movements have sprung up that seek to turn the tide. There is little co-ordination between these groups and academic thinkers. However, the powers of money and corporate business interests are such that Governments make only marginal changes. Industrial farming is encouraged much more than biological farming. Indeed, efforts to remove trade barriers to international agricultural trade may have the effect of strengthening the position of industrial farming (Ch 12, 13).

CHAPTER TEN: AGRICULTURE and NATURE

10.1 Introduction

Part I outlined the history of European agriculture; in Ch 1 up to 1850, when it was mainly small-scale, biological (organic) and family based and in Ch 2 after 1850 when it became globally based, large-scale, industrialised and in need of international markets (Ch 14 presents the case of the Dutch pig industry as dependent on international markets for feed, whilst Ch 15 examines the NZ Dairy industry as an industry dependent on export markets in particular). Chapters 3 and 4 showed the imprint of abstract scientific thinking on Western culture and in particular on technology and economic relationships as a means of taming nature. Remnants or revivals of older mythological/magical approaches have remained, however. Economic theory has not escaped from a mechanistic way of thinking. Since Adam Smith (Ch 5) there has been a strong belief in the importance of free markets and competition as ways of raising material welfare. If need be states should impose such economic order. Socialism has made corrections to this order, but in recent times neo-liberalism has gained the upper hand in a global economy, which should be based upon free trade (Ch 6). The underlying neo-classical economic theory of international trade was examined in Ch 7.

Ch 1 showed that already in the early times of Western European agriculture the profit motive was at work to bring about a greater specialisation and a growing dependence on markets and money. Ch 8 related this development to the growth of scientism and technicism since the Renaissance, especially in its effects on business corporations. Ch 9 indicated that the fascination with markets and money has developed into economism. Since the 19th century economism and technicism have become inseparable.

The task of this chapter is to draw Part II to a close by returning to modern agriculture, asking specifically:

1. Is modern agriculture managing nature responsibly or is it trying to control it so as to make it a source of money profits?
2. Is agriculture (including horticulture) in the grip of the absolutisations of technicism and economism?
3. If the answer is affirmative, then, is the recent quest for sustainable agriculture an attempt to escape from these absolutisations?
4. If it is not, then, is the development of biological farming a long-term answer to the problems of industrial farming?
5. Is a truly sustainable agriculture possible in the light of the precarious position of small family farmers, especially in the Third World and the problem of feeding a world population which is expected to grow to nine or ten billion?

10.2 Farming as Enkapsis

It is generally believed that farming developed about 10,000 years ago at the end of the Neolithic period, possibly over a fairly long period of time. We can imagine that women played a key role in the transition from hunting-gathering to settled farming. They had time to observe the germination of plants and might have tried to grow some they liked. Perhaps, they took care of some baby animals that had wandered off and lost contact with their mother. By patient and careful observation, by trial and error, they gradually managed to establish gardens and, with help from their husbands, between hunting trips, to build some fences for their pet animals. Some caves would have functioned as simple sheds or stables, as indicated in the story of Odysseus and the Cyclops. Thus, the hunters and gatherers moved on to become settled farmers or nomad/farmers. We do well to remember, however, that hunting and gathering often involved a pleasant lifestyle, including the 'farming' of game and bush, as shown by studies of Australian Aborigenes and Kalahari bushmen. In contrast, agriculture involved hard work.

However it precisely happened, the attention paid to the functioning of plants and animals in relation to the seasons would have paid off eventually in terms of a greater availability of food than during the time of nomadic existence as hunters and gatherers. The skills and tools developed in these pursuits could easily be adapted to the requirements of farming. We may take it for granted that the domestication of plants and animals did not come without major failures and heart-aches. Animals might have escaped from their enclosures. Plants could have failed to bear fruit or grow at all due to the soil being unsuitable. The toxicity of most fruits might have been a problem. Eventually, a surprisingly small number of plants and animals were selected and developed for farming purposes.

As humans we have had to learn that both plants and animals are differently structured from us. No matter how successfully we manage to bind them into a farm structure, they will remain different and subject to diseases and problems alien to us. Over time we learn and as we breed plants and animals such that they suit our farming objectives, they will become different from their wild counterparts. It is this relationship between differently structured living beings in a farm setting that Dooyeweerd has captured with the term *enkapsis.* It is a concept that plays a key role in his reformational philosophy.

He sees the whole of the cosmos as pointing beyond itself to the Origin (God, the Creator). Everything in the cosmos is inter-dependent. No entity or aspect rests in itself or is truly absolute. Everything points to everything else. Reality, therefore, has the character of meaning. If something in the creation would be considered absolute, then everything else would have to receive its meaning from it. If money is the pivot around which my life turns, then everything I do bears the stamp of my pursuit and worship of money. Dooyeweerd has developed the idea of enkapsis to show some of the interdependencies between structurally different entities. He defines enkapsis as 'an

interwovenness of individuality-structures that cannot at all be qualified as the relation of a whole and its parts.'[304]

He gives examples such as political parties and the state, where the former depend on the existence of the latter (foundational enkapsis). A party is qualified by a faith or ideology, but a state is a juridically qualified entity. Pigs living in a forest are involved in an enkaptic symbiosis. The shells carried by mussels and oysters form a subject-object enkapsis, with the former being the object and the latter the subjects. Companies competing in a free market setting form a correlative enkapsis with the market. International trade on the other hand, depends on the existence of traffic (means of transport) and is, therefore, a foundational enkapsis (NC 661). In each of these cases there is a dependency, but such that differently qualified structures are involved.

Dooyeweerd also discusses a farm as an enkapsis. He gives the following examples:

a) The fields, pastures, cattle, buildings (with their stock-in-trade) function in this human societal structure, as well as all the usable objects belonging to the farming. The land and the cattle are qualified only as economic objects of the latter as far as their enkaptic function in it is concerned.

b) But the animals functioning as the live-stock of the farm are, as such, i.e. in their own internal structure, certainly not of a typically economic qualification. They are natural beings, according to their inner animal nature bound to the pasture (as a vegetative collectivity) in a symbiotic interlacement, and interwoven in a correlative enkapsis with their "Umwelt". They live in an animal bi-unity when they copulate, and for some time after the birth of the young at least the mother-animal lives in a natural community with the latter.

c) In this enkapsis industrialized natural things display cultural-economic variability types....The business-organization, binding animals, pastures and fields in their natural structure, is interwoven with a great number of other human societal structures; also the industrial objects are included in these new, extremely complicated enkaptic relations (NC 652).

Quote a) suggests that a farm is an economically qualified entity. If the purpose of a farm were to conserve a piece of nature, it would not be a farm. A farm is set up to produce food products, eventually for distribution to people at prices or rewards that allow the farm to continue functioning. Farms may also produce animal or plant products that serve as materials for industrial purposes. Again, eventually this will serve human ends. In order to carry out this economic function, farmers will use plants and animals only to the extent they are able to serve the farm's economic function. On a dairy farm, for instance, cows will be milked. It is for this purpose that they are on the farm. Otherwise, they are simply cows.

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[304] H. Dooyeweerd, *A New Critique of Theoretical Thought*, vol. 3, op. cit., p. 636. Following quotes are indicated in brackets by the letters NC followed by the page number.

Quote b) strengthens the point of the previous quote and states that cows, if we use again a dairy farm as example, have a symbiotic relationship with pastures. Clearly, cows should have grass to graze upon. Without grazing pastures would deteriorate and would lack the fertilisation of cow pats. Farmers must attend to these natural needs of their herds. There is also a difference with wild herds inasmuch as farmers will make and feed hay and silage to their herds during winter. Such interventions will have to take into account the specific nature of cows. The recent BSE crisis shows what can happen if such natural needs are ignored and cows, being herbivores, are fed animal offal in the form of industrially manufactured feed in order to raise their production of milk. The quote also indicates that in reality one will find a variety of enkapses.

Quote c) extends the point of quote b) by stating that the farm itself will be embedded in a rich variety of relationships in which it will remain a distinct entity, albeit interdependent with, for instance, a dairy co-operative or a farm-extension service.

Applying this analysis to hunting/gathering, we should call it a symbiotic enkapsis between the hunters and the plants/animals they use for food. In a broader sense, Dooyweerd's general theory of enkapsis enables us to view farming in relation to the wider environment of eco-systems in which it functions in terms of a foundational enkapsis, because the farm is dependent for its functioning on the eco-system in which it is situated.

Being focussed on expounding his theory of social structures, Dooyeweerd does not pay much attention to how enkapses function or how they are managed, in spite of the fact that he often points to the dynamic unfolding of the creation from the beginning, called into being by the Word of God to the fulfilment at the end of the ages, and the calling of humankind to be its responsible stewards. In reformational philosophy, this issue would be dealt with in terms of human functions and the direction of these functions towards good or evil.

10.3 Traditional Farming

The period of farming through trial and error along with the formation of traditions of what was considered good practice lasted, broadly speaking, until the beginning of the Industrial Revolution in the 18th century in Western countries (Ch 1). In most Third World countries, by contrast, traditional farming is still the most important agricultural activity. In general, traditional farming may use science and technology, as shown in Ch 1. In general, however, its emphasis falls on trying to secure a harvest.[305]

Traditional farms have tended to be predominately family based. The harvests produced by such farms serve the needs of the farmer and his family and/or

[305] E. Schuurman, *Het conflict tussen de industriële en de biologische landbouw, address to study conference,* Amsterdam, 2006 (cyclostyled).

may be sold to others or bartered in exchange for supplies from others in local communities. As a rule such farms have been small scale.

Some traditional farms, however, may be large-scale such as the latifundia of the Roman Empire, the large estates worked by serf labour in Eastern Europe and some large plantations in Latin America and other colonies of Western powers.

The most typical characteristic of traditional farming is that farmers tend to work by trial and error from a basis of accumulated wisdom. It is essentially a craft rather than a machine-based industry, even when scientific findings are incorporated into the tradition. Such farmers manage the enkapsis of trees and animals by careful husbandry so as to minimise the dangers of parasites and the depletion of soil fertility by rotating crops and grazing, small fields, small herds and general variety.

Hans Achterhuis refers to a study of coco-palms in African villages.[306] By respecting the tree as it is, it serves to supply the village with hundreds of products from medicines to lamps, milk, butter, baskets and furniture. The high stems ensure a circulation of air, which allows a micro-climate to exist under the tree suitable for the cultivation of other plants such as bananas and goats or cows. A coco-palm is planted when a son is born. By the time he gets married the tree yields an annual harvest of between 50 and 100 nuts. Houses are built so as to make use of the shadow cast by the trees. One does not plant the trees in large plantations. Rather they are scattered along roads or streams. In this way the coco-palms are integrated into the life of the village. They are part of a biological and cultural system.

By contrast, when Western agricultural experts come along, they look at the coco-palm as an object able to provide economic utility in the form of high yields of copra and palm oil. They introduce new varieties with short stems that grow faster than the traditional varieties. As the air-circulation of these dwarf-varieties is different, the micro-climate under the trees changes in such a way that it becomes impossible to keep goats under the tree or grow bananas in their shade. The composition of the soil changes and the water table is lowered. The new approach results in a mono-culture.

In traditional farming the benefits of the coco-palm, amongst other things, are discovered by a village community and are communicated to colleagues through social contacts rather than through the application of abstract science. Knowledge so acquired gets handed down from one farming generation to another.

Achterhuis relates another instance of the difference between traditional ways and modern Western practices, this time from India. The integrated farming practices of the past involved irrigation systems so complex that British experts were unable to understand let alone repair them. Thousands of villages had adequate food and water supplies for centuries. As soon as water

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[306] Hans Achterhuis, *Natuur Tussen Mythe en Techniek*, Ambo, Baarn, 1995, pp. 29-32.

was understood as H2O, or as an object to be manipulated, however, it became a scarce commodity, especially in conjunction with the growing of large staple commodities such as cotton. Western irrigation systems destroyed land by excess salinity.[307]

In Western Europe farming used to be traditional with an integration of forestry and arable cultures as well as animals (mixed-farming). Yet, as noted in Part I this was not necessarily a guarantee against famine. Whole villages were sometimes wiped out in England when harvests failed. Indeed, for centuries farmers have been subject to an 'iron triangle' of famines, infections (pests) and the destructions of war. Traditional farming, therefore, should not necessarily be appreciated as an example of proper stewardship.

Although in traditional agriculture there is broad similarity between farmers and the way in which they farm, the acceptance of resources as given in each region or locality allows for variability in farming, a feature reported by Mellor, although he ascribes this to a wide range of physical, economic and cultural factors:

> A striking characteristic of farms in low-income countries is their variability. Not only do farms vary considerably from Africa to Latin America and from the Philippines to Nepal, but they vary from one farm to another within a village.[308]

The emphasis on local production for surrounding communities and towns should be seen as a strength rather than a weakness of traditional agriculture, since it offers, usually, stable employment to local people, rather than uncertain work in congested and polluted towns.

Traditional farming should not be construed as inimical to the use of science. Scientific findings may be fitted into the general management of farms, without changing the structure of farming or its integration with the natural environment (eco-systems). Selective breeding techniques are a case in point. Whether or not scientific results are accepted is often a social issue to be decided upon by the community leaders. Rural village communities tend to have strong social controls and a keen sense of tradition. In some cases the farmers in such groups are considered as a separate social group. As the rhythm of nature requires them to follow a disciplined pattern of life, they tend to be disciplined people with a strongly developed practical sense. Innovations must be proven before they are prepared to try them.

The sense of tradition and identity amongst many farming communities has put a stamp on the nature of farm economics. If a farmer considers himself and his family members as stewards of the land endowed to them, and hopefully to be handed over to the next generation, their labour is basically a social obligation rather than a cost in money terms. Regardless of the size and value of the harvest, the family will husband the land. The same applies,

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[307] ibid., pp. 61-64.

[308] John W. Mellor, *The Economics of Agricultural Development*, Cornell University Press, Ithaca, New York, 1966, p. 133.

mutatis mutandis, to farm implements. Work animals such as horses or implements such as tractors must be maintained on the farm if any harvest is to be gathered. Even when returns are low, the farmer's pride in his farm and desire to hand it over to the next generation will keep him going as long as possible. As some part of the farm can always be used to grow food, the downturns in business fortunes can be borne without too much physical hardship.

However, if traditional farming begins to rely on debt finance, then, the financial burden contributes to a treadmill effect (Ch 3.13), because the debt servicing requirement becomes part of the fixed costs.

In many traditional societies there are major differences between large, wealthy land-owners and small tenant farmers or small-holders. The former tend to get subsidies and tax advantages and may exploit smaller tenant farmers under their control. They are not necessarily using such incentives to improve their farms.

The social institutions affecting agriculture are indeed a key determinant of farm productivity, especially the relationship of people to the land. Lappe and Collins found that small farms can be highly productive or not productive at all, depending on this relationship.[309] It is for this reason that a redistribution of land does not by itself improve production and productivity. Redistribution can be successful when it leads to a greater equality of land-holdings, so that those who work the land are either owners or people who benefit from their work on the farm. Lappe and Collins refer for successful redistribution schemes to Japan, China, Taiwan, Egypt, Cuba and Vietnam.[310]

Once farms are incorporated into the money circuits of a modern economy, the transformation of traditional farming tends to accelerate. It is not unusual, for example, that in traditional forms of farming, farms get smaller as a result of family farms being parcelled out to younger farmers through inheritance. This could spur the introduction of innovations or the sale of small farms to larger ones.

In Western countries traditional farms used to grow something of everything not only as part of a desire to be self-sufficient but also as a precaution against disappointing harvests of one or more products. One should not think, therefore, of traditional farming as static or averse to change, although this is often a popular or romantic idea people have of such farming. The innovations of the early Middle Ages, during the period from the 6th to the 9th century, illustrate this point. They emphasise too the importance of social institutions in farming practices. As pointed out by Thuillier the use of faster horses had the happy side effect of saving farmers a lot of time.[311] They could now afford to live at a longer distance from their land. Hence, farms at the outer edge of a

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[309] Frances Moore Lappe & Joseph Collins, *Food First; beyond the myth of scarcity*, Houghton Mifflin Company, Boston, 1977, p. 166.

[310] ibid., p. 167.

[311] Pierre Thuillier, op.cit., Fayard, Paris, pp. 115 ff.

community were abandoned and farmers congregated in or close to small villages and hamlets. They now had time to think and to do different things in addition to farming. From people who were almost part of the land, farmers became masters in charge of their farms, as long as they were not in the service of a feudal lord, of course.

Traditional farming does not necessarily excel in managing the enkapses involved in a farm. Animal welfare, for instance, might be sub-optimal. A traditional farmer could be lacking in insight as to what animal welfare requires. In animistic societies the belief that the soil or the birds could not be disturbed could stifle desirable changes.

Nevertheless, considering that traditional farming has a history spanning almost ten thousand years, it has a proven record of being able to supply large populations with sufficient food, by and large.

10.4 Industrial Farming

In contrast to traditional farming scientific-technical farming does not work by trial and error on the basis of the accumulated wisdom of previous generations, but rather by means of a systematic and abstract analysis of the functioning of soils, fertilisers, pesticides, plants and animals. In contrast to the *harvesting* emphasis of traditional farming, its emphasis falls on maximizing *production*.[312] Experiments are used to check hypotheses formulated on the basis of available scientific knowledge. Such experiments tend to be conducted on model farms under the control of agricultural research institutes or universities, often financed by Governments. The purpose is to gain control over the functioning of soils, plants and animals. The development of the milking machine may serve as an example. The earliest machines were rather crude and slow. On the basis of trial and error engineers and farmers were seeking improvements. However, in the 1950s a milking machine was developed in New Zealand which was based upon a study of the glandular and hormonal make-up of the cow (Ch 15).

Since agriculture is carried out by many farmers spread over a relatively large area in a country or region, modern technical research and development tends to be concentrated in research stations and universities. In addition to Government-financed research and development, large corporations, which either process farm products or supply machinery, fertilisers, chemical sprays, feed and other inputs play an important role in technical development. Since individual farmers are unable to influence the prices of the products they sell, innovations that are capable of reducing their costs per unit of production are always welcome. Suppliers, who are increasingly large business corporations, know this and set their marketing policies accordingly. Processors try to increase demand by technical innovations such as enhancing basic food products with special health promoting additives (nutraceuticals or tech-foods). Supplying farmers have little say in this. They need to trust processing firms that they will boost their pay-outs by going for 'added-value'.

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[312] Schuurman, ibid.

The separation between farm management and the process of technical innovation provides an analogy with the separation between the technical design function and the manufacturing process that is characteristic for modern scientific technology. It means that agricultural research and technical innovation have become increasingly autonomous. Farmers are virtually forced to adopt the new products and processes if they are to survive as farmers.

The trend of applying science and scientific technology to farming has accelerated the disappearance of the small family farm by requiring much more large-scale capital-intensive farming. Admittedly, the application of techniques such as these has enabled a large increase in agricultural productivity. The costs, however, are not counted as part of the normal farm accounting system. They may confront us suddenly as in the case of the BSE crisis or during the dust-bowl years in the American Western states during the 1930s.

Modern farming is, of course, not just a technical operation. It is closely integrated with the economics of business (maximisation of money profits) and with technology serving as the handmaiden of the profit and loss account. In other words one aims for technical innovations that can quickly increase farm profits. Innovations that would not yield such effect would not be adopted.

The special characteristics of modern farming, as represented by the treadmill (Ch 3.13), are associated in large part with monetisation and with internationalisation of farming through trade on the basis of a rigorous application of scientific technology (Ch 2). This provides an impetus to a growth of productivity and production in excess of the rather slow growth of demand. Large open rhizoids composed of research establishments, suppliers, farmers and large business processors/ distributors and supermarkets will compete aggressively to retain existing and capture new markets. Prices will always be under downward pressure. This applies also to the prices of more luxury specialised foods, including nutraceuticals, once they become part of the standard shopping basket. Farm rhizoids seek to escape from the treadmill by branching out to become suppliers of materials to the pharmaceutical industry or other industries. In this case, however, they become dependent on the requirements of such industries.

The economic characteristics of high fixed farm costs that in combination with price-inelastic demand drive the treadmill has given rise to a *phenomenon, which in cybernetics is known as a positive feedback loop.* It has made farmers very subservient to the demands of modern science and technology. The example of the introduction of GMOs in countries such as Argentina and Brazil (Ch 8.13) shows how far this goes.

The OECD has referred to the treadmill hypothesis, but noted that due to the increased mobility of factors of production, especially of labour, the relevance

of this hypothesis has diminished.[313] Nonetheless, its study shows that between 1973 and 1989 in the OECD as a whole growth in agricultural productivity, partial and total, has been larger than the corresponding productivities for the economy as a whole, particularly for labour productivity. The authors then conclude from this that '...technical change in agriculture has been more dramatic than for the rest of the economy.'[314]

This conclusion lends prima facie support to the treadmill hypothesis. Of course, the authors are correct in stating that such an effect depends on the shape of supply curves and the elasticity of demand for particular agricultural products.[315] Nevertheless, the startling discovery that technology has a more dramatic effect on agriculture than on other sectors is such that the treadmill hypothesis cannot be rejected. The fact that another table in the same publication indicates that over the same period 1973-1989 real output prices declined in all 18 countries (all significant agricultural producers) lends further support to the treadmill hypothesis, albeit in aggregate for agriculture as a whole.

It is because of the depressive effect of the positive feedback relationship, entailed in the treadmill hypothesis, on farm prices and incomes that Governments provide prices and income support to farmers in many countries (Ch 2 and 3).

10.5 The Impact of Technicism

Before concluding that industrial agriculture is formed and guided by technicism we should inquire as to whether it clearly displays the characteristics of technicism such as the projection of the abstractions of science into the technology that is applied. In addition, the application of technology should be carried out without being impeded by other normative principles or possible harmful effects on the kingdoms of things, plants and animals.

Scientist (zoologist) Colin Tudge has drawn attention to the close connection between science, technology and capital, which he characterises as a positive feedback loop or dynamo (note the technical metaphor) i.e. 'capital provides finance or scientific research which produces high technologies that generate more cash.'[316]

The faster the dynamo spins the more high technologies it throws off. These are agents of change:

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[313] OECD, *Technological Change and Structural Adjustment in OECD Agriculture:*, Paris, 1995, pp. 41 and 42.

[314] ibid., p. 19.

[315] ibid., p. 42.

[316] Colin Tudge, op.cit., p. 290.

> That is what they are for. The loop, in short, is the most powerful engine of technical, economic and hence social change the world has ever seen, or is ever liable to see.[317]

Key technical objects used in industrial farming such as tractors, harvesting combines, milking machines, silos, chemical fertilisers and pesticides have all originated in business enterprises or in research institutes financed by Governments. Thus, the research has not been undertaken by mere scientific curiosity or disinterestedness. In all likelihood such a commercial bias must be due to a marriage between technicism and economism.

Other abstractions are indeed projected into agriculture as surmised by Schuurman. Scientists take a particular function or problem and analyse it so as to find solutions either in the form of machinery (e.g. the scientifically designed milking machine referred to above), new seeds, fertilisers or procedures. The more one knows about the cow's milk production, the better one is able to grow productive grasses, direct the breeding of high-performing cows, and so on. Such solutions are generally applied to the point of creating major uniformity (all farmers grow ryegrass and maize), often in the form of monocultures. The findings and technologies are usually applied prescriptively. Farmers can only remain farmers if they are prepared to become part of expert systems.

The problems associated with the 'dynamo', to use Tudge's metaphor, tend to become only apparent over a period of time. The BSE crisis, for example, did not occur as soon as animal offal was fed to cows. Soil degradation, salinity, eutrophication of lakes and streams and genetic erosion, all take years to emerge as problems.

High capital requirements to finance the machinery lead to large-scale farming and the shift of unemployed workers to urban areas, where they are often faced with accommodation problems, long working hours and low pay.

Large-scale factory farming of battery hens, broiler chickens and pigs is highly productive but very undesirable in terms of animal welfare and the pollution of air and water. However, in all forms of industrial farming, productivity is high and growing year after year, so that surpluses are created for sale internationally. One may ask, for how long?

No doubt, the dynamo will be made to spin so as to find technical solutions for these problems. There is an on-going attempt to apply science and technology in order to keep control over the production process of agriculture.

10.6 Reversed Foundational Enkapses

Returning to the view that farming involves an intricate set of enkapses, the question raised by technicised agriculture is whether agriculture has become so dependent on science and technology, that a reverse foundational

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[317] ibid., p. 290.

enkapsis has arisen. Normally science and technology would be used to open up the object functions of plants and animals for use by human beings having regard to all normative principles applying to the way in which as humans we are called upon to be responsible stewards (aesthetic, symbolic, social, juridical, and ethical principles, amongst others). In this situation the welfare and integrity of the subjects of the kingdoms of things (landscapes, climate, water, soils), plants and animals would guide science and technology. Agriculture's soils, plants and animals, therefore, provide the foundation for the application of science and technology.

By contrast, modern large-scale mechanised and industrialised agriculture has become dependent on science, and technology. Some recent breeds of cows for example, cannot deliver their calves spontaneously anymore. They need a caesarean section, which is a medical technical act. When a farmer has to milk 300 cows twice a day he/she should have a rotary shed, milk tanks and access to electric power. Technical failures would cause considerable distress and damage. Thus, scientific technology has become the foundation for agriculture. One can also think of the cow's milking function. As a mother a cow needs to produce milk as food for her calf. By separating mother and calf, the farmer milks instead. In order to maximise the flow of milk one can breed cows that have larger udders, supported by a stronger skeleton. Progressing along this road for some time might lead to a cow that looks like a giant udder, to quote Tudge's example again. The latter would be a completely technicised cow. Closer to the present time, the USA allows the use of growth hormones (Bovine Somatotrophin) to boost milk production. The use of automatic milking too is designed to increase the flow of milk. In each case, the increase in production beyond the natural represents a dependence on technology.

The recent development and possible introduction of genetic engineering, leading to GMOs provides another example of technicisation. It has pitched the companies that initiated the research against all those who believe that this technology involves a major qualitative break with usual breeding methods. It is a process that seeks to technically innovate living organisms in the same way as one invents new technical objects using an-organic materials, by inserting exotic genes into the genomes of other organisms (animal genes into plants, for instance). Schuurman has analysed this as a category mistake inasmuch as anorganic nature tends towards levelling, against which technical inventions are directed, whereas organic nature thrives on differentiation and diversity.[318] Thus, it represents a major qualitative shift and a decisive break with the usual methods of selective breeding, on the basis of given species, which, of course, may also involve risks. Tudge has devoted a large part of his book to the problems of GMOs, emphasising the unquantifiable uncertainties of this technology. An exotic gene could disrupt the host genome in a very unpredictable and undesirable manner, perhaps after the lapse of a long period of time. The welfare of animals could be adversely affected. One has talked about creating brainless chickens. A few centuries from now we might engineer a pig that is just a

[318] E. Schuurman, *Faith and Hope in Technology*, op. cit., pp. 106/107.

huge uterus. A more immediate danger is that GMOs may spread into wild crops, with unknown effects or that viruses transfer genes horizontally between unrelated plants. Super weeds could be created, perhaps in the form of engineered crops.[319]

Thus far, the evidence from trials and farmed GMOs is not particularly encouraging. Jacques Testar has pointed out that the introduction of transgenic plants into the natural environment has already caused problems unforeseen by the experts. Sugarbeets made resistant to herbicides passed on the gene concerned to weeds. Modified rapeseed spread its pollen over a distance of kilometres rather than the maximum of 500 metres calculated by the experts and so generated fertile hybrids. Testar referred also to the case of transgenic plants that produced a toxin, which killed a parasite. Some surviving insects, however, managed to become resistant to this toxin. As a result, farmers had to apply much larger quantities of pesticides than previously. He compares this with the introduction of a foreign species into a different natural environment.[320] They tend to become dangerous pests. Examples such as the opossums imported from Australia into New Zealand and rabbits imported from Europe into Australia and New Zealand come to mind.[321] In each case the decisions were made without a proper analysis of the potential risks and uncertainties.

These cases show that the enkapsis of farms and eco-systems may be adversely affected by the introduction of pests, falling populations of microbes through an intensive use of chemical fertilisers and wrongly directed farming operations resulting in pollution. In an extreme case both the eco-system and farming may be destroyed.

The development and introduction of GMOs is a clear example of technicism inasmuch as it is undertaken without regard to long-term problems and without a detailed consideration of its effects on other aspects of reality (social, ethical, aesthetical, to name just these few).

10.7 The Impact of Economism

GMO's are also a good example of economism, if we understand this as a limitless search for on-going growth in material welfare, without being limited by other aspects such as the juridical, ethical, social, lingual, analytical, technical and aesthetical or by considering the possible wasting of the bounty of the kingdoms of things, plants and animals.

As in the case of technicism, economism depends for its influence on abstractions. In this case one abstracts the economic aspect, in particular the market and all it stands for, from the rest of reality. Business and investors

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[319] Tudge, op. cit., pp. 250-257.

[320] Jacques Testart, Espèces Transgéniques: ouvrir la boîte de Pandore?, *Manière de Voir*, no. 38, Mars-Avril 1998, Le Monde Diplomatique, Paris, pp.15-17.

[321] In July 1997 a refusal by the Deputy Director General of Agriculture in New Zealand to allow the importation of the calicivirus to deal with a rabbit plague caused many farmers to even threaten the unauthorised introduction of the virus; a case of economism.

focus in particular on gaining, accumulating and spending money by abstracting this activity from non-monetary aspects, unless constrained by Government regulations not to do so. Under neo-liberalism a general concern for economic growth, defined as real GDP per capita, relies on the corporate business sector as the engine of growth, assuming it is able to compete in free markets around the world. As noted in Chapters 8 and 9, corporate business uses scientific technology as a means of perpetual innovation and as a tool to keep ahead of the competition.

Money serves to accelerate growth by stimulating consumption and investment. A narrow focus on accounting in money terms for profits and losses means that the effects of the production process on stocks of natural resources, the fruitful employment of staff and on the state of the environment are ignored. Many of these are known technically as externalities. Indeed, they are seen as new business opportunities. Schemes through which permits to pollute are tradeable are a case in point.

The close involvement of business corporations in agribusiness implies that their narrow focus affects also farming communities, leading to a massive transfer to cities of people who used to find their livelihood on farms. As a result rural areas are de-populated and streams polluted in consequence of excessive application of fertilisers and an over-production of manure. The welfare of animals is similarly disregarded in the pursuit of technical innovations that would increase profits. The trading system is such that farmers and agribusiness have become linked to supermarkets, which are using their buying power to lower purchase prices. This, in turn, fosters large-scale farming.

Two examples may highlight the problems of economism. During the 1920s - 1960s it was generally believed by nutritionists that good diets should provide ample doses of protein. More recently, this has been found to be wrong. We only need small specific doses of protein as many vegetables provide it as well. However, the scientific finding led to farmers around the world happily increasing the supply of meat, using chemical nitrogen, which has reduced mirco-organisms in the soil and, thereby, the nutritional value of food.[322] As a result the population of livestock has expanded beyond the carrying capacity of many eco-systems to the detriment of horticulture.[323]

The second example is the breeding and growing of long-stem roses for sale to rich people in the USA and Europe. They are grown, however, in poor Third World countries at the expense of food production.[324] One has to think in this respect of Adam Smith's division of needs into the 'necessities, conveniences and elegancies of life' (Ch 5). With human stomachs having a limited capacity demand can only be increased by creating the finer things of life such as roses and foods fortified with medicines (nutraceuticals or techno-food).

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[322] Graham Harvey, We want real food,; why our food is deficient in minerals and nutrients- and what we can do about it, Constable, London, 2006.

[323] Tudge, op.cit., Chapter 4.

[324] Christian Schmidt-Hauer, Rosen für die reiche Welt, *Die Zeit*, Hamburg, 21 July 2005.

Under world-wide international trade, there is also a reversed foundational enkapsis. Normally, in traditional local or regionally based farming, any surplus production would be sold locally. Thus, trade would be dependent on agriculture. However, the much more specialised and diversified modern farming systems are dependent on the existence of trading networks for the sale of their produce. Without these, they would have to revert to local production with much less specialisation.

10.8 Dialectics

It should not be thought that technicism and economism are ruling without any opposition. Widespread resistance against the introduction of GMOs is a clear indication of disquiet about the direction our technical culture appears to be taking. Growing interest in biological farming, which is becoming much more sophisticated and which requires serious practitioners to be certified, is another. Faced with major problems of pollution and resource depletion, many countries have adopted legislation and regulations to safeguard their environment. The Kyoto Protocols, designed to reduce the emission of greenhouse gases, on the basis of 1990 emission levels, is another, albeit very weak, indication of a growing determination to come to grips with the problems.

In fact, right through the period of industrial farming there have been agricultural scientists who argued in favour of a much more balanced or outright organic, biological approach. In the Third World, biological traditional farming has remained predominant, albeit on a rapidly diminishing scale.

Schuurman sees such a call for alternatives in the light of the dynamics of the original creation, which involves an approach of humility that proceeds by taking into account all the normative principles that bear upon agriculture.[325] When we take the aspects of science, technology and economics as absolute and try to impose a secondary abstract world upon the original one, we engender distortions such that people begin a protest movement on the basis of neglected or suppressed aspects. If one is not careful, however, then the risk is that such opposition leads to new absolutisations. The only way to avoid such new problems is to substitute the creationally given dialectic for the one that has emerged from technicism and economism. This involves a careful and patient listening and searching for the right way. 'Nature' speaks to us by disclosing its potential to us.

A striking example of such disclosure is the biological solution found by the ICIPE Institute in Nairobi to the problem of the corn-borer which destroys between 15 and 40 percent of the African corn harvest. When farmers sow Desmodium (a pulse) between the maize, its smell draws the borer out of the corn stalk. It is then attracted to the Napier grass planted around the field, where it is killed by a sticky substance secreted by the grass. At the same time the Desmodium's root secretes a substance which blocks the growth of a

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[325] E. Schuurman, *The Technology of the Future*, op.cit., pp. 333-335.

parasitic plant called Striga Hermonthica, responsible for another 20 percent of the corn harvest. The alternative to this ingenious system would have been a GMO made resistant to the borer, as offered by Monsanto. Desmodium also retains water in the soil, binds nitrogen and prevents erosion, whilst its seeds can be sold. Thus, a new successful symbiotic enkapsis was found.[326]

Many attempts at resistance tend to be ambivalent as to the application of scientific technology. Thus, the goal of the movement of those who believe that people should be able to feed themselves, as represented, for instance, by the Confédération Paysanne in France is very sympathetic. It advocates import protection along with a prohibition to subsidise exports on the basis of a system of production quotas. This would have the effect of curtailing international trade and, hence, excessive specialisation of food production. However, this does not necessarily result in a new paradigm for biological agriculture. Farms could still be large-scale and there could still be intensively managed industrial farms on small areas of land. In principle, however, it could lead to higher employment on the land and a more stable type of farming. Trade would be more in the nature of residuals.

In general, the call for alternatives is made by a disparate group of people. It includes New Age approaches such as deep ecology (including playing Mozart's music to plants, and strict vegetarianism), bio-dynamic farming based on principles developed by theosophist Rudolph Steiner in the 1920s (planting by the phases of the moon) and permaculture (from permanent agriculture), developed by Australians Bill Mollison and David Holmgren in the 1970s. Nevertheless, as pointed out in Ch 2.13, biological farming has been growing, stimulated by various certification schemes.

Achterhuis asks whether we should really abandon the humanistic tradition and return to an animistic approach to nature, represented by, for instance, movements such as eco-feminism, which worship Mother Earth? Should we declare nature holy? In his view representatives of these movements are not returning to nature as such. They use technical terminology to plead their case (he uses terms such as: switching mechanisms, steering functions, planning functions as ways of correcting the course on which we have launched the world). According to Achterhuis every piece of nature is reduced in this approach to 'environment'.[327]

In his view the development of technology should cease to be seen as a completely autonomous process but rather as a social or cultural construction. Since the quantification and mechanisation of material reality was preceded by centuries of a mechanisation of culture and world-view, changes should be initiated through a different view of the world. This would entail a greater emphasis on sensibility, so that we experience the poetics of water rather than considering it simply as H2O. Without such a change in mentality, technocrats will say that they do what society wants them to do. At the same time, those opposing technocracy will say the same. We need a different

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[326] Christiane Grefe, Rettung von der Biofarm, *Die Zeit*, Hamburg, 6 June 2002.

[327] op. cit., pp. 58/59.

culture if we are to get out of such conflicts. Achterhuis invokes Lewis Mumford for this point of view as well as a number of philosophers like Michel Foucault and Norbert Elias.[328] New technologies can be incorporated into existing cultures so as to change and improve them instead of simply reinforcing their worst features. I agree with Achterhuis that the shape of technology should not be left to scientists and engineers. Innovations should be considered in the light of all relevant normative aspects, as discussed in the next section. This appears to be a more comprehensive approach.

Some proponents of industrial farming argue that faced with at least 825 million people who are under-nourished and with the world population expected to increase from the present 6 billion to 9 billion by 2050 (stabilising after that at that level) we need industrial farming and every possible technical innovation to at least double the current level of food production.

Those who are on the side of improving traditional, family based farming such as Colin Tudge believe that this objective can be achieved without going for high-tech farming, provided demand factors also change notably from an excess of meat consumption to healthier diets. In many areas of the world traditional farming has great scope for development. Again, the issue is not one of opposing low-tech and high-tech farming. The question is whether one is prepared to work towards a new normative paradigm for agriculture.

In general, as long as the debate focuses on issues of technology and, therefore, remains largely pragmatic, a basic break with technicism and economism seems unlikely. It is possible that biological farming would simply take the place of industrial farming with extensive international specialisation on large-scale farms under WTO rules of free trade. It is important, therefore, to remember Schuurman's view, quoted above, that biological agriculture should focus on harvesting rather than on maximising production.

One can only hope that traditional, locally based family farming will get a chance to prove itself as modern biological farming, aided by a wise use of scientific and technical insights as in the example from Kenya.

At the roots, a change in deep attitudes is called for, essentially a conversion.

10.9 Towards Sustainable Agriculture

The way out of the problems of technicism and economism must involve a renewed appreciation of the importance of the enkapses of agriculture, not only as originally given, but also as means of renewal. As indicated above this implies a return to the foundational enkapsis of science, technology and economics in which the soils, micro-organisms, plants and animals provide the foundation, without which it does not make sense to apply science and technology to agriculture. In addition, a new direction is called for that is marked by values such as nurturing, keeping, tending and harvesting, as

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[328] Achterhuis, op.cit., pp. 216-219.

suggested not only by Schuurman but also by Soule and Piper.[329] This contrasts with the values of production, increasing productivity, uniformity and technical control characteristic for industrial agriculture.

10.9.1 Current Approaches to Sustainability

Sustainability has become a catchword or bandwagon on which everybody jumps without a clear idea as to what it actually means. There are at least 24 definitions of sustainable development, a sure sign that there is consensus neither about the concept nor about its implementation.[330]

Achterhuis notes with regard to the definition of the Brundtland report (sustainable development must meet 'the needs of the present without compromising the ability of future generations to meet their own needs'), that there is nothing in it that has not already been said many times since the seventeenth century. This includes that we should be more efficient in using scarce natural resources and that we should act as stewards. Nature was already being destroyed on a large and massive scale in the 17th century. Warnings issued since then have not been heeded. Why have they not been heeded?[331] As the Brundtland report says the destruction of nature will eventually force us into a survival mode.

Just stating a definition of sustainability and handing it to practitioners is unlikely to have great effect, when a culture is dominated by technicism and economism. Similarly, an emphasis on the so-called three Ps of Profit, People and Planet is unlikely to see the train of Western culture switching onto a new track into a different direction. At best, one may expect some marginal changes for the better. A key problem is that the West thinks very short-term, whereas we are dealing with biological and geological time cycles that are very slow and, therefore, very long-term.

The ambiguity of current definitions is shown very well by the one put forward by the OECD in 1995 for agriculture, as follows:

> A sustainable agricultural system is one that interacts with natural physical and biological cycles in such a way that the values of the affected resources are enhanced, or at least not degraded. At the same time, sustainability also implies that returns to factor inputs used in farming are sufficient to ensure the continued commercial viability of farm operations.[332]

The natural cycles referred to may be centuries long, whereas commercial viability is measured in years in a competitive capital-based system. Nevertheless, the authors manage to find five practices they believe are compatible with their definition:

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[329] E. Schuurman, *inaugural address Wageningen*, op.cit., p. 28 and J.D. Soule and J. K. Piper, *Farming in Nature's Image; an Ecological Approach to Agriculture*, Island Press, Washington DC, 1992, p. 75.

[330] OECD, *Sustainable Agriculture; concepts, issues and policies in OECD countries*, Paris, 1995, pp. 11/12.

[331] Achterhuis, op. cit., p. 60.

[332] OECD, op.cit., p. 23.

1. conservation tillage to reduce soil disturbance;
2. rotations (the growing of two or more crops in sequence on the same piece of land);
3. intercropping (the growing of two or more crops simultaneously on the same piece of land);
4. silvipasture (combining trees with grassland);
5. scientific management practices (including precision application of fertilisers, integrated pest management and biological control).[333]

The first practice could involve a phasing out of ploughing in favour of precision drilling, using specialised new machinery as developed by Dr Baker of Massey University.[334] It could also mean the phasing out of tractors in favour of horses and mules as advocated by Wendell Berry in many publications to avoid the problem of soil compaction.[335] Interestingly, animals are absent from the five practices mentioned. With regard to rotations, intercropping and silviculture, we are not told whether GMOs are permissible or not.

Integrated pest management certainly is commendable, but raises many questions as to whether synthetic chemicals concerned should be patented or not. The OECD's report is very cavalier with regard to intensive farming practices by arguing that advances in technologies can reduce emissions of pollutants. Moreover such emissions are often less than those from less capital-intensive operations when expressed per kilogram of product and also they are economical in terms of land use.[336] The study fails to point out that intensive production of pork, poultry and eggs in developed European countries tends to rely on imports of supplies from countries such as Thailand and Malaysia where tropical forests have to be felled for their production. Thus, the problem with this study is that it only goes part of the way and fails to identify the deep-seated nature of the problems. It relies too much on finding technical solutions for the problems. Thus, it remains captive to the dream of progress through technology.

According to economic theory consumers could play their part to ensure sustainable farming by demanding only products produced sustainably. But how would they know? In practice, supermarkets tend to become their advocates by purchasing only from producers they believe produce soundly according to their criteria. This has been a factor in the opposition to GMOs in the UK. Nonetheless, consumers tend to eat what the shops make available. Eric Schlosser's chilling account of how McDonald and other franchise fast-food chains manipulate farmers, meat-works, staff and customers into eating basically unhealthy fatty food, leading not only to high rates of obesity, with a

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[333] op.cit., p.23.
[334] Jon Morgan, Time to Scrap the Plough, *The Dominion Post*, Wellington (NZ), 24 March 2005.
[335] Wendell Berry, Renewing Husbandry, *Orion*, September/October 2005.
[336] ibid., pp. 23-25.

significant risk of Type 2 Diabetes and early death, but also to a different allocation of farmland and farm products, should serve as a warning.[337]

10.9.2 A Cosmonomic Framework

So, how could we do better? As noted, in addition to the careful management of enkapses, we should pay attention to the modalities. This makes it possible to see the true multi-functionality of agriculture. A farm is a thing or an entity and as such it functions in all aspects of reality. A concise summary of functions, using the modality theory of Vollenhoven and Dooyeweerd goes as follows in order of lower to higher, as applied to a farm, and by drawing a contrast between industrial and biological farming.[338]

1. A farm is composed of *distinct units* such as barns, paddocks, milking sheds etc.

2. It occupies a certain *space* somewhere on land or in water (aqua-culture), along with other farms in a certain area. The earth as a whole provides an amazing diversity of soils, climates and landscapes. Industrial agriculture tends to ignore this by using the same (genetically modified) species everywhere. Biological agriculture would attempt to match particular species with particular local environments. One can also think here of the intertwinements of species of plants and animals and the interactions between them in a certain space.

3. The *movements* of the seasons will be a constant concern, often determining the rhythm of farm life. One can also think of the various tempos at which, for example, calves mature, pastures develop and trees grow. In industrial agriculture one may use artificial lighting to eliminate seasons and rhythms of day and night.

4. The land area includes soil prepared for the cultivation of plants or the grazing of animals such that *energy can be transformed*. Good soil may be considered as part of the capital of agriculture. Industrial farming tends to ignore the long-term health of soil by an indiscriminate use of chemical fertilisers, which deplete the humus content of soils and cause water pollution through run-off of nitrates and phosphates, to boost (short-term) productivity.

5. The *organic life* of plants and animals requires special care. For this reason, the use of *chemical* fertilisers and *chemical* pest controls (problems of resistance) is dangerous and should be discouraged. Biological controls of pests and natural fertilisers are to be preferred. The biological sciences should be called upon to provide the best plants, insects, birds and so on to combat pests.

6. Animals, *sentient* beings, need to have scope to express their feelings. This applies in particular to mating. In industrial agriculture one

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[337] Eric Schlosser, *Fast Food Gesellschaft; die dunkle Seite von McFood & Co.*, Riemann, München, 2002 (original *The Fast Food Nation*, 2001)

[338] Various sources of which in English: Herman Dooyeweerd, *A New Critique of Theoretical Thought*, op. cit. I have drawn upon a recent speech (6 January 2006) by Egbert Schuurman on the conflict between biological and industrial farming).

tends to separate the procreation processes from the animals. Artificial insemination helps to disseminate the productivity of the best bulls amongst a large number of herds, but it also increases the uniformity of the cow population and, thereby, depletes the gene pool. In nature, however, genetic diversity is essential to cope with outbreaks of new diseases.

7. The combination of plants, animals and buildings in the setting of a landscape will be *aesthetically pleasant or ugly*. Industrial agriculture often involves the use of uniform plants (silos, sheds) that intrude in landscapes.

8. Decisions on sowing and harvesting, on the type of animals and plants to be grown, are based upon an *analysis* of biological information, seasons and markets.

9. It is highly unlikely, if not impossible, to farm wild animals and wild plant populations. Farmers *shape the environment according to a free design* and use a range of technical implements to work the farm. They also build a certain objectivising relationship to plants and animals. This issue goes to the heart of managing enkapses responsibly. Agribusiness tends to take over this responsibility by prescribing technical 'solutions'.

10. They must *communicate* with animals, farm hands, colleagues, vets, government officials, buyers and producers of supplies and implements.

11. Usually, farming families have strong *social* bonds and regular *social* contact with neighbours, colleagues, staff and customers. As they live well apart from each other, separated by plots of land and have work patterns that are quite different from urban groups, they tend to form cohesive *social* groups, with their own leisure activities. In large rhizoids dominated by agribusiness such relationships hardly function, being technicised. Farmers must carry out prescriptions. In biological farming one would expect a growth of small rhizoids with interaction between customers and farmers.

12. To continue farming, the farm will *produce fruits* that can be sold at a profit, meaning that all costs must be covered. In industrial farming many costs are not recognised to the possible long-term detriment of agriculture (unknown diseases that might strike uniform plant species, for instance).

13. There will be *legal ownership* arrangements or tenancy agreements. Often these institutional features are different from those applying to industrial and commercial properties. This is an issue that requires careful consideration, because the current strong emphasis on private property may not serve the proper development of biological farming.

14. Farmers *care* for their customers, hands, livestock, plants and soil. In industrial agriculture, especially in a global environment such care is almost impossible, as agribusiness imposes technicised uniform care.

15. Farmers have *confidence* that the physical, organic and economic structures will allow farming to remain a profitable activity. This is more

likely to be so in biological farming, simply because it is more natural, than under industrial farming.

In the above I have deliberately placed the aesthetic modality before the analytic one as the first normative one. It suggests, amongst other things, that in our dealings with nature we first of all appreciate its aesthetic qualities rather than proceeding immediately with (scientific) analysis to penetrate all of its mysteries.[339]

In terms of Vollenhoven's specific contribution the modalities express the potential development of the kingdoms of things, plants, animals and people. Each kingdom has its own process of genesis through time. As things, plants, animals and people function according to these modalities they realise such potential either for good or evil.

In practice these functions will be exercised simultaneously. At any time there will be a farm in action, with grass growing and herds and flocks grazing. Ownership arrangements remain in force or reach the end of a term. The seasons keep changing and will dictate the flow of work to be undertaken.

A farm would generally be regarded as an economic entity, differing as such from a club (a social entity), a court (juridical entity), a family (ethical entity) or a church (faith-entity). The technical term for this is that an entity is qualified as economic, social, juridical, or ethical. The qualifying function is the highest function in which the entity functions as a subject.

Farmers specialise in growing things for distribution to others. They do not care for other human beings in the way parents love their children, although they will do so as parents themselves. Good farmers, however, will exercise care for their animals, plants and soil as well as for their technical assets. This is implied in the notion of economics as a striving for fruitfulness for use by humans. Fruits produced should be distributed equitably by means of reasonable prices, certainly in times of scarcity.

Multi-functionality is, of course, not confined to farms. It applies to all things and events in our world.

Each kingdom and each modality will force farmers to think before they start. If irrigation is needed, then, the on-going availability of water (sometimes fossil sources of water in aquifers are depleted) and the long-term problem of salinity should be considered. There will be other users of water who may contest irrigation rights. Soils may deteriorate over time, despite careful best practice (even slight wind erosion could amount to large quantities over time). At present, with the emission of greenhouse gases through industrial farming being acknowledged as a contributing factor to climate change, such emissions should be significantly curtailed.

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[339] D.L. Roper, *Gems Afire; the reformational contribution to aesthetic theory,* Issues 7, Association for Christian Scholarship/ Australia and New Zealand, November 1992.

In my view, it is a matter of identifying an appropriate cosmonomic framework (Ch 7.14.3 land 9.10). If a certain practice is contemplated, given what appear to be attractive economics, one starts in a global sense with the requirements in terms of things, plants and animals. How are soils, air and water quality affected? Is biodiversity affected and, if so, how? What is the effect on animal welfare?

Next, one starts with the modalities pertaining to the kingdom of people. What is the effect on aesthetics? What are the technical issues? How are clients informed? What are the effects on employees and their skills? Should extra land be purchased or irrigation rights or resource consents? Would the care of animals, plants and things be jeopardised? Is the practice proposed consistent with good stewardship over longer periods of time? It should be realised that the approach is not foolproof against mistakes. DDT might have made it, may be. To guard against this, an audit of practices should be regularly undertaken.

Each of these questions involves the management of the farm's enkapses. Yet, even when one proceeds in such a systematic and comprehensive manner, one lacks full control in a modern globalised economy. To give one blatant example, tapioca is grown in Thailand (at the expense of tropical rain forests), shipped to Rotterdam, transhipped by road to the South East region of the Netherlands and fed to pigs (Ch 14). The pigs are sent to meat-works when they have reached a certain size and shipped in carcase form to Italy for processing into Parma ham, which is sent to the Netherlands and elsewhere for sale to final consumers. What should Thai farmers have done? No doubt, the Dutch pig farmers enjoy making good profits from their pigs, as long as they are not hit by swine fever, but would not have any idea of the damage their activity is causing to tropical rain forests. If they had inquired how their feed was produced and how that affected their own environment through excessive manure, they might have concluded that they should find a different way of farming. The effects on the welfare of their pigs might have strengthened such a conclusion.

The systematic application of a comprehensive framework, therefore, runs counter to prevailing technicism and economism. It challenges us to develop a truly sustainable biological farming practice, which maintains the given capital of things (soils, water, minerals), microbes, plants (bio-diversity, gene-pool) and animals (welfare, diversity) whilst serving the needs of all people for healthy food.

10.9.3 The Garden-City Metaphor

Since a metaphor requires that we identify those properties of the image that can be transferred to the entity or event, which we want to enlighten, we should ask which properties of a garden should direct the development of a form of agriculture that is not marred by technicism and economism?

The following five features appear to be the relevant ones; each time an application to farming is made:

1. A garden involves a human intervention in the realms of things, plants and animals such that interactions between these three are achieved that allow the garden to function sustainably through time. In agriculture soil structures, hedges and meadows should support animal life. The soil, the water supply and other natural resources should not be mined, but maintained for long-term use.
2. Gardeners accept the landscape in which they establish a garden, although they may alter parts of it. The garden should fit into the landscape without appearing to be an alien intrusion. Similarly, the farm, its buildings, trees etc. should blend in with the landscape. Steep hill sides are not to be denuded. Erosion should be prevented.
3. A garden is maintained, nurtured and cared for such that it serves all people and animals dependent on it. Thus, on a farm the number of animals stocked should not exceed the farm's long-term carrying capacity. There should be an adequate return on labour supplied, without personnel being driven to physical and mental exhaustion and the farmer's family should be able to live from the farm's net revenue.
4. A garden has a rich variety of things, plants, animals and human-made constructions. Plants and animals are cared for according to their nature (as much as possible). Like gardeners farmers should seek to maintain biodiversity. Animal welfare should be a high priority. Battery hens should not to be allowed.
5. A garden belongs to a community of people, which may be as small as family or as large as a town or nation. As such it is to be enjoyed by that community and should serve the needs of strangers and the most vulnerable in that community. Concretely, the conditions regarding long-term land use are to be set communally. Land and water are to be considered as public goods. A balance between public and private ownership should be achieved.

Together these five features represent a direction or a way in which agriculture should be practised. We can also call this direction a regulative set of principles for agricultural practice. As such they are to be distinguished from the principles and rules which constitute agriculture as a practice.[340] The constitutive rules are found from a modal analysis of agriculture. Every farming practice will display the same constitution.

These constitutive rules are ways in which farmers and others have attempted to shape the normative principles pertaining to those modalities that require human activity (from the analytic one to the pistic one). They can be shaped in more than one way. If humans are irresponsible in carrying out farming, they will invoke reactions from the modalities inside the realms of things, plants and animals. Soils may get exhausted, for example, from overgrazing or

[340] I am indebted for this distinction to H. Jochemsen and G.Glas, *Verantwoord Medisch Handelen; proeve van een christelijke medische ethiek*, Buijten en Schipperheijn, Amsterdam, 1997, pp. 64-94.

inappropriate systems of irrigation. In biblical terms irresponsible behaviour invokes a judgement. The problems that arise might sound warning bells and lead to a different way of shaping normative principles. It is, therefore, important to get the direction right.

The search for sustainable farming, by heeding the cosmonomic framework, therefore, begins with the five directives, as they involve the broad principles for the realms of things, plants, animals and people. Does the proposed new practice or technology comply with these directives?

If the answer is affirmative, then, a more detailed audit is carried out by analysing the proposal in terms of the modalities as suggested above.

At the same time, the audit simulates the practice by making entries into a set of accounts. The idea is to identify all flows, stows and transformations of the farming practice, including the non-monetary ones. Thus, increases in the production of manure and its components are quantified. Changes in animal welfare will be descriptively recorded (Chapters 11 and 15 provide more detail on the concepts of flows, stows and transformations).

In many cases proposed new practices or technologies will involve regional or national issues. This is one reason for my suggestion that a move towards sustainable agricultural practice is done best on the basis of communal ownership over distinct ecosystems.

It stands to reason that the chances of a successful application of this heuristic (as responsible people we are called upon to search for the right way) cosmonomic framework are rather slim in the present global context. A reasonable system of import protection with a prohibition of export subsidisation is an important condition for sustainability, therefore.

Some will argue that this vision is unrealistic because it would lower the productivity of agriculture. Who would want to work on farms? The counter argument is that present agricultural systems are unable to feed the world. There are at least 825 million under-nourished people, especially in the poorer countries of the Third World. If these countries were able to protect their own agriculture and develop their agricultural resources, along the lines described, they would export less products grown on their land. They would also, however, import less and by having people working on their land in a meaningful way, such that they can see that the fruits are for their own people have less problems with urbanisation and pollution. In many countries on the periphery of the Sahara, local people have learnt how to increase their food production by a proper care for the soil, through an interaction between animals, plants and soil. As the population is able to grow, there are also more hands to increase food production and to expand the areas of fertile soils.

In the rich, First World, a new stewardship in agriculture would also have major benefits. Governments and agricultural organisations would show that there is meaningful work to be done in agriculture. Examples of successful

new farming practices would stimulate people to join in. To be sure, labour productivity in such new farming would be less than in modern industries. However, a feature of high labour productivity in such industries is that few hands are required. The more productive modern industry is the fewer workers they need.

By transforming modern agriculture into a knowledge-based caring local biological agriculture that produces top quality food, is job-rich, and handles its inputs in a sustainable manner, our whole culture may be stabilised and enriched. Smaller rhizoids centred on small towns and villages would provide an attractive environment for families to bring up children.

Wendell Berry has eloquently set forth the loss suffered by US industrial farming as compared with the old forms in a 1978 essay.[341] He argues that industrial agriculture has become a failure for two reasons:

1. The industrial vision is an oversimplification, because industrial farmers solve only one problem and that is production. In order to do this, they must solve any agricultural problem as if it were a problem in mechanics: "..as, for example, modern confinement-feeding techniques became possible only when animals could be considered as machines."[342] This vision excludes biology and human culture.
2. Its wastefulness. In non-industrial human cultures waste is virtually unknown, because in nature there is only reproduction. By contrast, in industrial production there is exhaustion and contamination. 'The energy industry, for instance, is not a cycle, but only a short arc between an empty hole and poisoned air'.[343]

When describing the features of an agricultural approach to farming, leading to proper solutions, he identifies four key characteristics of such an approach:

1. Scale. Fields can be too big to permit effective rotation of grazing.
2. Balance. Finding the correct ratio between people and land, plants and animals.
3. Diversity. Within the limits of nature having as many species as possible (back-up system).
4. Quality or health (good food, spiritual, political, cultural health).

Clearly, Berry works from a perspective on agriculture that is akin to the garden metaphor. This does not imply that he thereby has solved all problems. He does not address, for instance, the problem that would be raised by a transition from the current industrial farming to a modern form of subsistence farming. However, once a civilisation decides to move into a new direction, solutions for such problems would be sought and hopefully found.

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[341] Wendell Berry, *The Gift of Good Land; Further Essays Cultural and Agricultural*, North Point Press, San Francisco, 1981, pp. 113-124.
[342] ibid., p. 116.
[343] ibid., p. 117.

10.9.4 Communal Ownership

The social aspect should be considered in more detail since farmers do not work in isolation. They are affected by what colleagues are doing, sometimes at the other end of the world, as well as by demands from customers via processing companies. Since the management of soils, water and forests usually involves a whole region or even country, it would make sense to consider different ownership arrangements. Rather than private property as such one can think of land being under public ownership to be leased on a long-term basis to farmers, with rights of renewal and covenants as to the proper use of land, the introduction of new technology etc. Advisory bodies would be set up to work out the conditions for such leases and to explore the potential consequences of new technologies affecting land-use, plants and animals and farm production. Such bodies could also be in charge of expanding the accounting system of the farms in their area by incorporating all natural flows (minerals used and put out, gases emitted, water used, etc.). In this way a constructive dialogue between farmers, the agency charged with land management, the Government and international bodies and supermarkets would become possible. To put it another way, in view of the major issues involved, agriculture should be considered as a public good rather than a purely private commercial business. There is no need to persist with a Lockean concept of private property in the face of major impacts from farming that far exceed the boundaries of private property.

Such regional agricultural bodies could also enter into partnerships with large cities so as to develop food production, for instance, inside urban conglomerates, using unemployed labour, with proper training being provided and without dislodging existing market gardeners. To some extent such food production could be linked with urban processing facilities so as to reduce reliance on imports from abroad. In many large urban areas there is land that could be used productively in this sense. By severing the close integration in a global technicistic system of agribusiness, the problem of the treadmill is likely to be overcome.

It would seem to me that this approach is consistent with Schuurman's garden/city metaphor for cultural development, inasmuch as it has the possibility of watching out for old and new absolutisations that are harmful to both nature and culture.

10.10 Conclusion

Modern industrial farming is not managing the enkapses of anorganic things, plants and animals in farm structures responsibly. It is often harmful to the welfare of animals, emits large quantities of greenhouse gases, wastes rare resources of soil and genes and deprives many people of meaningful work. Indeed, the original foundational enkapsis, whereby farmers call on science and technology to help run their farm is now being reversed so that a farm can only be run according to scientific/technological designs. This is the effect of technicism.

A growing dependence on international trade and the provision of capital as well as a waste of natural resources indicates economism.

Biological farming has many advantages by comparison but could simply become a milder form of industrial farming under an international free trade regime with extreme specialisation. A growing number of dairy farmers in New Zealand have been switching to the production of 'organic' milk since they have detected strong demand for it. If this were done on a large scale, there would still be a danger of mono-cultures. Large-scale organic farming might not be entirely immune to technicism and economism. In most cases, however, biological farming at present is more in danger of biologism (worshipping nature). .

Approaches to sustainability in terms of legal definitions are unlikely to reverse technicism and economism as powerful cultural motivations in modern agriculture. Long-term sustainability requires a different approach, not so much in terms of another definition, but rather by means of a comprehensive heuristic cosmonomic framework and by means of new forms of communal instead of Lockean private ownership arrangements.

Part III will focus especially upon the way economic life is socially organised into rhizoids and how these rhizoids show the impact of culture in a broad sense on economic life. Conversely, they might be shaped by a different cultural direction. This approach will shed light on current attempts to remove all barriers to international trade in agricultural products in the context of the WTO. Economic life is richer and more complex than is assumed by abstract neo-classical theory.

PART THREE: RHIZOIDS, TRADE AND AGRICULTURE

Introduction

Part Three focuses on international trade in agricultural products, using the concepts of rhizoid theory. Chapter 11 will set out the details of rhizoid theory. Chapter 12 considers current approaches to international trade (free trade/protection) and the arguments used by those wanting trade in agricultural products to be free. This leads to a consideration of the relationship between the First and the Third World and its colonial background. The chapter ends with the question whether trade in agricultural products should be free or subject to restrictions in some way. What guidance will the metaphor of the garden provide? In view of the significance of the WTO at present the result of this investigation must then be tested on this institution and international trade agreements in general. This is the task of Chapter 13. It turns out that the WTO projects theoretical abstractions such as the perceived benefits of free trade derived by economic science from the theory of international trade (relative comparative advantage) onto international trading relationships. In contrast, rhizoid theory requires a detailed examination of all relationships governing the management of flows, stows and transformations in their international setting before conclusions about the benefits or otherwise of international trade can be drawn.

CHAPTER ELEVEN: RHIZOIDS

11.1 Introduction

Neo-classical economics (Ch 7) is a mechanical system, driven by the utility function of consumers. Once their preferences are known, available income and prices will determine the equilibrium of consumers, and producers will adjust their production plans accordingly, given the prices of the factors of production and their production function. Neither people nor money is required to make this system work. With sufficient knowledge a price vector can be struck that will ensure equilibrium in all markets at the same time. Any outcome is possible if only the appropriate prices are set. Thus, there is no place in this model for the power wielded by corporate business firms or for social processes. In the real world, these play, of course, a major role. TNCs do not simply take the preferences of consumers for granted. They aim to control such functions by advertising and market research. Although the theory of monopolistic competition has made a valuable correction to the theory in this respect, it offers neither a detailed analysis of the inter-relationships between firms and groups of consumers nor an account of their attempts to control flows of capital and essential raw materials.

In order to deal with the dynamic problems, not only of farming, but also of business and technology in general, a theory is needed that provides the tools to analyse these problems and for identifying possible solutions.

A key requirement of such a theory is that the core meaning of the economic modality should be able to provide a normative direction. Above we have argued that this core meaning can be stated intuitively as 'fruitfulness', or 'abundance' with as a negative counterpart 'wastefulness'. This chapter seeks to demonstrate that rhizoid theory is able to satisfy this requirement. It is a theory that has been developed on the basis of the flow of funds theory of Copeland.[344]

11. 2 Definitions

Lepper and Simons define a rhizoid

> *as a pattern of social relationships; as a pattern of behaviour, which a person may or may not conform to at a point in time and space or as the means by which we enter into social discourse with one another. As such they are independent of the people using it.*[345] *They are coherent and persistent in the sense that the feedbacks they contain ensure that*

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344 Morris A. Copeland, *A study of Moneyflows in the United States,* National Bureau of Economic Research, New York, 1952.

345 John Lepper and Petrus Simons, *Systems of Economic Relationships; Three Essays on Rhizoids and Their Applications to Social Science,* Integrated Economic Services Ltd., Wellington, 1996, pp. 9 and 24.

the relationships of which they are composed form an identifiable structure, which endures through time.[346]

As stated, the definition identifies rhizoids as *social* rather than economic phenomena. As will be shown below rhizoids play an important role in economic life, because they involve interactions between individuals and between institutions, communities and other organisations on the basis of conventions and rules for the mutual benefit of participants. They do not require hierarchical relationships. Participants are co-ordinated with each other in inter-individual relationships. Some rhizoids are specifically social in character such as sport clubs and friendship societies or stamp collector clubs, each with national and international relationships. Others are specifically organised for economic purposes. In the theory of modalities, the economic one follows the social one and, therefore, cannot exist without the specific contribution of social relationships. The latter can be used to describe economic realities similar to the way physical relationships are described by means of mathematics.

A more generic definition is, therefore:

Rhizoids are combinations of inter-individual and/or inter-communal relationships.

This definition is based upon Herman Dooyeweerd's theory of society. He draws a distinction between natural communities such as marriage and family and institutions such as the state and the church on the one hand and voluntary organisations on the other. Membership of the former is involuntary, inasmuch as we do not choose in which family we are born, whilst we are subjects of the state in whose territory we live. Voluntary organisations are those which we decide to join or to leave as we please. Whilst voluntary organisations may well feature hierarchical relationships of authority and freedom, these are usually laid down in a constitution to which members voluntarily subscribe. By contrast, institutions such as the state and natural communities such as nuclear families invariably have such relationships. Individual persons as well as institutions, communities and organisations enter into a wide variety of relationships, varying from superficial encounters in the street to all types of economic competition. They vary from the readers of a book (inter-individual relationship between author and readers) to the clients doing their shopping in a supermarket. As Dooyeweerd put it:

> By inter-individual or inter-communal relationships I mean such in which individual persons or communities function in co-ordination without being united into a solidary whole. Such relationships may show the character of mutual neutrality, of approachment, free co-operation or antagonisms, competition or contest.[347]

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[346] ibid., p. 10.

[347] Herman Dooyeweerd, op.cit., vol. 3, pp. 177ff.

When applying this to industries, Dooyeweerd noted that these are not communities. Rather, individual enterprises enter into a wide range of relationships in which they retain their own identity and independence. In a differentiated society there is division of labour. The counterpart of such a division is interdependence because no enterprise would be able to function without supplies from others and without being able to sell to others. Thus, society is not an organised community under a single authority. On the contrary, society displays a wide variety of intertwining relationships between communities and institutions, between individual persons, organisations and enterprises. They deal with each other in a co-ordinated fashion either co-operatively, in a neutral manner, antagonistically or competitively.[348] People may well organise themselves in order to promote their common interests. Trade unions, cartels and other forms of business organisations come to mind. A business company intertwines at least two organisations. One the one hand, the shareholders contribute capital and appoint and control (part of) the management. On the other hand there is an organisation of management and staff to carry out the specific functions of the business.

In the course of this argument Dooyeweerd provides an economic description of an inter-individual relationship in terms of the wood industry. It encompasses a wide intertwinement of all types of trades and enterprises that are directly and indirectly involved in it and this world-wide. It would be very strange if the parts of this industry tried to be self-sufficient. This would result in no furniture here and an abundance of wood somewhere else. Such self-sufficiency would prevent the exercise of the human cultural task. Thus, the enterprises of an international industry are mutually interdependent. This interdependence extends also to relationships between industries such as the wood and steel industries.[349]

I note here that rhizoids will involve various types of enkapses. A dairy co-operative, for instance, will bind farms as well as chemical processing plants into its structure.

General equilibrium theory focuses on this general interdependence, but it does so exclusively by means of interacting prices rather than by analysing whether the interdependent relationships provide fruitful or wasteful economic outcomes for society as a whole.

In the definition, the word combination refers to networks. They occur in many forms and may include cartels, the circle of clients of a bakery, the firms and households connected to a power generator or telephone exchange or farmers who set up a co-operative for the processing and marketing of dairy produce. Some are local, others cover a nation and some extend around the globe or use satellites in space.

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[348] Herman Dooyeweerd, *Vernieuwing en Bezinning*, J.B. van den Brink, Zutphen, 1959 (reprint of articles written between 1946-1948), pp. 230-261.

[349] ibid., p. 255.

The emphasis on combinations of relationships, or networks, allows the retention of the features of persistence, coherence and identifiable structures emphasised by Lepper and Simons. These authors have chosen the word rhizoids for these combinations to express the idea that, in an economic sense, they involve the technical and economic processes of using things (chemicals, water, air), plants and animals and their products for a wide range of human purposes. *The shape of these processes depends crucially on social arrangements, pricing structures, legal constructions, the ethos of a society or group and basic beliefs held by groups and societies.*

Despite being persistent, coherent and identifiable, the network combinations that are so characteristic of social and economic life are also remarkably flexible and able to make new connections under the pressure of competition, technical and political change. Since the features of persistent, coherent and flexible adaptable networks are also found in the root structures of plants, the name *rhizoid* seemed to be the most appropriate. The French philosopher Giles de Leuze characterised thinking in terms of networks of ideas as thinking in terms of *rhizomes* rather than binary structures.[350]

Even isolated individuals are influenced by and depend on rhizoids. By way of example, let us assume that Robinson Crusoe is forced to spend the rest of his life alone on his island and is unable to trade with others. He survives by using knowledge he acquired at his local school, in trading and dealing with other people or on board the ship he sailed on.

Inter-individual and inter-communal relationships are essential to all economic relationships. Whether we study the purchase patterns of families, the buying and selling at an auction, the growing of plants and animals for sale to others, the saving and investment processes of the shoe industry over a certain period, in each case there are inter-individual and inter-communal relationships involved. They might be person-to-person, or family-to-trader, firm-to-firm, state-to-state or state-to-business. Such inter-individual relationships may be used for exchange of goods and services against money or of gifts or the operation of production processes.

Rhizoids, however, are not just single or fleeting exchanges between individuals. They take place in certain patterns and have built into them ways of maintaining, correcting or changing such patterns.

A few examples may suffice.

a) A so-called primitive society of hunters/gatherers will have a rhizoid as the members selected to be hunters/gatherers come together and decide to carry out their tasks in certain patterns. Their relationships to the rest of the society are regulated by ritual administered by specially selected priests. The hunters must comply with the rules, which are ritually conveyed to them. The ritual and other traditions will have a long history, being handed down from one generation to another and reflecting the faith

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[350] Giles de Leuze and Félix Guattari, *Mille Plateaux,* Les Éditions de Minuit, Paris, 1980.

of the community. Their purpose is to keep the rhizoid functioning as a way of obtaining sufficient food and to prevent it from destruction by neighbouring villages or evil powers. Hunting and gathering patterns might well be subject to limited change in the light of shifting animal or plant populations.

b) The Hanseatic League (1150-1669) was a combination of inter-individual relationships, especially between cities, which controlled the trade between Russia and Western Europe via the Baltic Sea. It was organised by merchants, defended and protected by political power (cities such as Lübeck, Riga and Dantzig played a key role), constrained by legal, social and technical regulations and with restrictions on entry. The regulations designed by participants were to secure the stability of the rhizoid and of the capital invested in it. One reason for the success of the League was the use of one language (a form of low German) and a major social, religious and cultural similarity amongst the participating cities. Although successful over a long period the League succumbed to superior competitors in the 17th century, notably Dutch grain traders. By then the economic centre of Europe had shifted from the North to the South. One can argue that the League's conduct of war exceeded the limit of a rhizoid as this is a specific function of a state.

c) The advent of modern communication technology (satellites, telephone, television, video, Internet, e-mail, all using computers) has enabled large companies to set up surveillance systems around the world to detect what competitors are doing and to analyse the purchasing patterns of customers, particularly potential customers. In this way, they seek to control their markets. Rhizoids are not necessarily organised for friendly purposes. Free competition is usually incompatible with freely-choosing consumers who are busy equalising marginal utilities. Large companies much prefer to force them into purchasing patterns beneficial to their profit and loss accounts, even if that results in pollution or a waste of precious resources.

These few examples show the importance of mapping the combinations of inter-individual relationships that constitute rhizoids. They will include relationships with political authorities as well as with suppliers and customers. One can only talk about a rhizoid if it involves a combination of inter-individual and inter-communal relationships such that decisions can be made to organise, defend, expand, transform or terminate the combination. A market working through rules and prices is one way of maintaining a rhizoid.

The focus of this chapter is on *economic* rhizoids. Economic rhizoids are formed and maintained in order to obtain, safeguard or transform economic resources (to be defined more closely in the following).

A business enterprise is a special type of rhizoid. It is a combination of inter-individual relationships because a group of people come together voluntarily to establish by contract a pool of capital, skills and contacts for the purpose of carrying out a business venture in the hope of financial gain. The relationship

between management and staff in such an enterprise is another type of inter-individual relationship incorporated into a business and involving a hierarchy of managers and employees. A business enterprise tends to continue operating even when managers or key staff leave or die, provided replacements can be found. TNCs are very large rhizoids in which the inter-individual relationships may extend across the globe and involve any number of industries. Some may be so large that they are able to exercise considerable political and financial power in particular countries.

Combinations of business enterprises or single business enterprises engage in a variety of market relationships such as competition, oligopoly, monopolistic competition, monopoly or monopsony. Generally, TNCs tend to compete on the basis of defending or increasing market shares. The larger the share of a particular market, the larger the scale of operations and the lower unit costs will tend to be. Low costs may then also be secured through enhanced buying power in supply markets. By being able to dictate technical standards and to form stable networks of dealers and franchises around the world, a large market share enables a TNC to maintain and defend its economic power. Nevertheless, other TNCs will have an incentive to challenge established TNCs by means of technical innovation and/or by offering lower prices. The latter might be achieved by locating production facilities in parts of the world where there is a large supply of surplus labour or low environmental standards. In a world of free trade, competition between business enterprises tends to drive prices down and to eliminate 'inefficient', high-cost, producers.

TNCs may decide to deploy market relationships within their own organisation in order to facilitate their management.

Combinations of inter-individual relationships may be formed not only by individual persons and business firms, but also by communities that is to say by those societal structures of which one becomes a member by birth. Families, states and churches (if they practise infant baptism) are such communities. A family which runs a farm runs a rhizoid as it engages in relationships with staff either from within the family or from without and enters into contractual relationships with suppliers and customers. Churches have established monastic orders such as the Cistercians, which operated like modern TNCs during the Middle Ages. Such organisations are founded in order to function like communities marked by mutual care and solidarity.

In recent times the trend has been a movement from communities and community-like structures to inter-individual relationships, partly as a result of individualisation processes. Thus, whereas in the past inter-individual relationships were at the margin of society nowadays communities have become marginal. Yet, the development of gangs and the growing awareness by many of their regional and ethnic roots in the face of globalisation indicates that the communities and inter-individual relationships presuppose each

other.[351] Indeed, there are types of rhizoids that function almost like communities.

In the light of these considerations, I propose to define economic rhizoids more precisely as follows:

> *Economic rhizoids are combinations of inter-individual and/or inter-communal relationships formed by people in order to develop the economic object functions of things, plants, animals and technical objects for the fruitfulness of human life.*

The idea of economic object function in the definition requires a more detailed explanation, especially because the development of economic object functions is at the core of what rhizoids are all about.

If one thinks of reality as comprised of four realms, in ascending order of complexity:

- things
- animals
- plants
- humans;

then, members of these realms can be seen as subjects therein. Within the realm of animals, animals are subjects possessed of degrees of freedom not available to plants or to human beings. In passing I note that viruses as protein-clad rogue genes, belong to the kingdom of things, being inert. But once they enter a cell, they become dynamically active and use the cell's machinery to make copies of themselves. This is in fact an example of a parasitic enkapsis.

When members of a higher realm use such subjects, they function as objects to them. Plants may make use of things such as rocks for protection or of salts for food. Animals will use plants for food or for the construction of nests. Humans may use things, plants and animals for a variety of purposes. A plant may be used for food (organic object function) or for decorating the living room (social function). Animals may be bred for the production of food (technical object function) or for sale in the market place (economic object function). They may also become objects of a legal dispute about ownership (juridical object function).

A precise definition of economic object function is:

> *Each element or member of the realms of material things, plants and animals possesses an economic object function inasmuch as it is able to be used by humans, along with their own technically formed objects, either wastefully or fruitfully.*

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[351] J. van der Stoep, *Door Netwerken Verbonden; een normatieve analyse van interactieve media*, rapport van het Instituut voor Cultuurethiek, Amersfoort, 1998, pp 45-47.

Economic-technical processes which result in pollution of water, air and soil to the point where they become dangerous or impossible to use for human purposes imply a wasteful use of the object functions of things with possible harmful consequences for plant and animal life as well. Rhizoids, which drive such processes, may themselves eventually be adversely affected, either because the resources they are misusing are disappearing or because the State intervenes and prohibits or restrains their wasteful activities. A wasteful use of natural resources implies a lack of care, which should be seen as a violation of an ethical norm. To put it another way, the economic norm to which rhizoids are subject must be fulfilled simultaneously with ethical and juridical norms.

11.3 Taxonomy of Industries

In terms of rhizoid theory, the statistical organisation of industries into groups ranging from primary industries to manufacturing, construction, utilities, trade and a range of service industries is inappropriate, because each of these groups is likely to be part of most rhizoids. The standard grouping is often used to illustrate a dynamic shift in time from a concentration on primary industries such as agriculture and mining in a particular economy to a domination by secondary industries such as manufacturing which then gives way to tertiary or service industries. Such a shift is marked by a change in the type of technologies employed. Industrialisation features the introduction of machinery as a way of generating added value. Of late, the emphasis upon information technologies has made services based upon the intelligent use of knowledge and production of information more profitable than manufacturing. Linked with this shift is a change in patterns of employment. When agriculture, hunting and mining are the predominant industries, most people are employed on the land or in mines. When an industrialisation project gets under way, farming tends to become more mechanised and labour moves into factories. Factory automation, in turn, makes people redundant whilst service industries start to employ relatively more people, for example in firms which prepare software to regulate manufacturing systems.

Underlying the standard classification is the idea of progress via technology. Until agriculture produces food in excess of its own requirements, it is judged to be impossible to establish manufacturing and service industries. In practice, however (Ch 1.3), agriculture and industry develop in parallel. For agriculture to produce a surplus, that can be delivered to towns it must have access to technology and knowledge.

The standard taxonomy does not sufficiently recognise that any type of economic activity uses services and technical objects. Utilities such as producers and distributors of electric power provide a vital input to practically all producers and consumers in a certain area. Services such as transport, communication and Government services likewise affect all to a greater or lesser extent. On the other hand, the classification has the advantage of making it possible to clearly identify every unit for statistical purposes as either a farm, or a factory or a service.

Yet another distinction is that between producers of final consumer goods and services, capital goods and raw materials. This classification recognises that a process of production requires the use of raw materials for transformation by means of capital equipment into goods useful to consumers or to other industries. The linkages between these distinct types of goods through stocks make for distinct differences in the behaviour of output and prices. Demand for final goods tends to be reasonably stable over time, but even slight fluctuations in final demand act much more strongly on the demand for capital goods and raw materials if stocks at every stage of the process are held as a fixed proportion of sales. For this reason, commodity producers face large price volatility. Yet they tend to have fairly stable output because herds and land are usually not amenable to rapid adjustment on the basis of short-term price movements.

In the Austrian capital theory the relationship between the prices of final goods and those of capital goods plays an important role. If interest rates fall, then the system has an incentive to install more capital relative to final demand. Over time, such an increase in round-about-ness is thought to raise production of final goods.[352]

The composition of an economy in terms of predominant types of industries such as commodity production or capital production will give policy-makers important clues as to the type of economic policy to be conducted. In general, a dependency on either commodities or capital goods is likely to generate high volatility in either outputs or in prices and outputs respectively.

Both classifications discussed share a major disadvantage inasmuch as they do not make it easy to discover whether a country's resources are used fruitfully or wastefully or whether alternative patterns of using them would be more economical in the long run. In either case it is difficult to know whether the combined talents of a population are deployed to best effect or whether there are incentives for people to move elsewhere or to reduce the size of their families.

In order to integrate resource economics with more traditional branches of economics such as micro and macro theory a more comprehensive classification is called for. This is attempted by rhizoid theory. The key idea is that production processes not only rely on given natural and human resources but also develop and transform such resources by means of social networks. Rhizoid theory aims at providing an analytic apparatus to identify and evaluate such networks and processes.

11.4 Rhizoid Concepts

The key concepts used in rhizoid theory are:

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[352] J. Goudriaan, *Economie in Zestien Bladzijden*, Amsterdam, 1952 has worked out these distinctions by establishing whether the statistical aggregates are either determinate or indeterminate.

- hoards or stocks
- flows
- stows
- transformations.

Each will be defined in turn.

11.4.1 Hoards or Stocks

A deposit of rare earth is a hoard for as long as there is no known technical, social or economic usage of such earth. Nobody wants it because nobody has any idea of its potential. Uranium fell into this category until the process of splitting atoms was discovered for the generation of energy. Thus, *hoards are defined as:*

things, plants, animals or technical objects, which cannot be made fruitful for human use on the basis of available knowledge, perceptions and/or belief systems.

The inclusion of humanly formed objects in this definition requires some clarification. Let us assume that watermills have been superseded entirely by other objects for the generation of energy. Still existing mills then may become purely a curiosity or at best a tourist attraction. In the latter case there may be tourism rhizoids, which use the social and economic object functions of the obsolete mills. From the point of energy production, however, they have become hoards. Should at some stage people desire to use water-mills again for the generation of power, then they would cease to be hoards. Such a reversion to an earlier technology is the reason for the use of the terms 'perceptions' and 'belief systems' in the definition. The decision to revert to an older technology may be inspired by a *belief* that the use of fossil fuels is damaging to the world's eco-system.

11.4.2 Stows

Stows are sets of things, animals, plants and humanly formed objects whose economic object functions are being used fruitfully or wastefully in human life, and which accumulate through time.

The coal deposits and coal reserves of a mining company, the forests planted and maintained by a plantation company or by the State, herds of cattle and flocks of sheep, the machinery in a factory, the warehouses and stocks of a wholesaler, the ships of a shipping company and the stock on the shelves of a supermarket are all examples of stows. Stows increase through the addition of new flows and decrease through the destruction, removal or sale of units. The reserves of a mining company might grow through the discovery of new deposits. The land used by a farm is a stow because it is husbanded in order to produce an annual flow of produce from plants and animals for use in human consumption (directly or indirectly).

11.4.3 Flows

A formal definition of flows is:

flows are all what is yielded by stows over a period of time.

Flows are generated by stows under human direction. A mine will convert its coal deposits into flows of coal suitable for sale. Whilst such a flow is produced, other concomitant flows also arise, for example, stone products (debris) which must be accumulated into a stow. Sometimes such concomitant stows can be used for special purposes such as the construction of roads. A herd of dairy cattle will yield a regular flow of milk by means of technical operators such as milking machines and rotary sheds as well as flows of energy. Dairy factories transform flows of milk into flows of butter, cheese and milk powder through a transformation by means of a large technical apparatus and specialised flows such as rennet and energy. The production of effluent during this transformation process is a concomitant, potentially polluting flow. When trees are cut stows of trees are transformed into flows of logs and through the operation of sawmills into timber. Builders use flows of timber in the construction of houses. The goods taken from the shelves and passing the check-outs form a flow for supermarkets (sales or turnover).

In all these processes there are return flows in the form of money and information. Customers pay for the goods they buy either from flows of income, stowed as deposits in bank accounts or wallets or from stows of bank credit. Eventually the original producers of the flows are paid in money. Part of the returning money flows may accumulate as stows of savings in their bank accounts and could so provide the means for the purchase of new plant or for the purchase of stows or flows designed to form new rhizoids. The origin (types of customers), size and shape of the return flow is an important source of information for the rhizoid participants. The size and shape of the return flows provide the means that enable the rhizoid to continue functioning.

The return flow of money and information through a rhizoid is never the same as the original product flow. First, the time periods are not necessarily the same and, second, money and information are different objects used for different purposes. For example, through the payments of remuneration from the return money flow in the form of wages, taxes, interest, dividends and royalties other rhizoids are fed or maintained. Moreover, the size of the return flow must be sufficient to allow the rhizoid to maintain the original flows.

11.4.4 Transformations

Transformations are defined as:

> *processes which are designed to convert flows or stows into different flows or stows by means of stows of technical objects and flows of energy.*

Flows are transformed in a number of ways into either stows or other flows. A flow of milk taken by tankers from farms is transformed by means of a flow of energy into flows of cheese, butter and milk-powders. The equipment used to this end is a stow formed from flows of materials and arranged according to a design or blueprint. Such a stow can be taken apart and used into different stows to enable different types of technical transformation. A different type of

transformation takes place when consumers of dairy produce buy the products in a supermarket and pay for them by parting with part of a money or credit flow. Eventually, a series of such transformations results in dairy-farmers receiving payment for their supply of milk. In turn, they will use this flow to pay for supplies and labour. Not only flows but also stows are capable of being transformed. A stow of grass gets transformed into a stow of silage over a period of time when stored in a special vat. Of course, flows may be either used or produced during such a process. Energy could be used to speed up the natural process or gases could be released during the transformation. Without energy flows technical transformation processes would be impossible.

The idea that a production process consists of combining labour and capital does not make any technical sense inasmuch as the crucial role of energy transformation is ignored.

The use of the term technical object in the definition includes money as a technical object to facilitate economic exchange and saving. It is a technical object with an economic purpose. Similarly, a car is a technical object with a social function or purpose. By contrast, a machine is a specific technical object designed to produce other technical objects. A machine is an active technical operator (a tool) whereas a piece of timber is a passive one destined to be put to use as part of a larger technical thing such as a house.[353]

11.4.5 Time

The examples from the dairy industry suggest that the process from production to consumption displays a certain rhythm in time. It is physically impossible to make butter or cheese before the cows have been milked. Although modern refrigeration techniques have increased the time periods of storage of both milk and dairy produce, farmers still work according to a seasonal pattern dictated by the biology of the cow and the climate.

In a wider sense time plays a critical role in the whole process of capital accumulation in society. The more capital is used in the production process the longer and the more complex the flows and transformations of raw materials, plants and animals into consumer goods will be. The reverse side of this is that over any period of time consumers will have a much larger menu of goods and services to choose from.

Lepper has worked out a logic of rhizoid relationships based upon time from which he concludes that there are only five logically valid statements possible, namely:

1. A hoard succeeds a flow.
2. A transformation succeeds a flow.
3. A stow succeeds a flow.

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[353] For a detailed discussion of these distinctions see S. Strijbos, *Het Technische Wereldbeeld*, Buijten en Schipperheijn, Amsterdam, 1988 Chapter 4.

4. A flow succeeds a transformation.
5. A flow succeeds a stow.[354]

The relationships enumerated are elementary, inasmuch as they leave out many flows or stows necessary for the succession to be possible in time. In most cases a concomitant flow of energy is called for to transform a flow or a stow. Similarly, concomitant flows of human labour, supervision, accounting and scientific knowledge are called for. Some of these may be the product of different rhizoids such as utility networks of power generation, scientific institutes or accounting practices.

11.4.6 Space

Lepper continues his discussion of the logic of relationships with the identification of rhizoid elements that are able to take place simultaneously.[355] He concludes to seven possibilities, namely:

1. A transformation coincides with another transformation.
2. A transformation coincides with a stow and vice versa.
3. A transformation coincides with a hoard and vice versa.
4. A flow coincides with a flow.
5. A hoard coincides with a hoard.
6. A hoard coincides with a stow and vice versa.
7. A stow coincides with a stow.

11.4.7 Static and Dynamic Relationships

Lepper points out that the two types of time and space relationships are complementary in the sense that, whereas, for instance, a transformation cannot succeed a transformation, a transformation can coincide with another transformation. He then writes:

> Since, it is possible to argue that "a c y" statements are about spatial relationships at a point in time and "a s x" statements are about dynamic relationships in the absence of a spatial relation it is clear that space and time or the static and dynamic are also complementary…The complementarity of the two sets of logically valid statements gives a basis for the notion that in any social phenomenon there is both a static and a dynamic aspect.[356]

Another approach to this issue is to consider that in each of the four realms of things, plants, animals and humans there are particular processes of genesis. In the material world, atoms tend to push out electrons. Plants multiply sexually or by the formation of new shoots or roots. In the animal kingdom there are specific sexually based procreation systems involving the nervous

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[354] John Lepper, Essay 2: Relationships, Reasoning and Rhizoids, in John Lepper and Petrus Simons, op.cit., pp. 24-26.

[355] ibid., pp. 26-28.

[356] ibid., p. 27.

system, hormones etc. Whilst the human body incorporates a procreation system which is animal-like, social and ethical relationships intervene in human procreation as well. From this genetic point of view there is always something dynamic about reality. It is never static.

At best we can talk about social/economic situations or rhizoids which have maintained their identity over a period of time. On the other hand, the same notion of genesis indicates that specific structures and relationships must be in place for genesis to take place. The distinction between structure and process should always be born in mind.

In technology one can refer to genesis in an analogical fashion, inasmuch as there are vintages of technology or successions of key technologies, for example, from clock-work instruments to steam technology to combustion engines and currently to bio-technical and information technologies. Each of such generations of technology has a powerful effect on the shape of society.

Transformations invariably require the use of technical objects or the use of technical operators. This is so even when a housewife allows a stow of food to perish. The transformation involved must take place within a pot or within a storage facility. By means of modern science and technology our capacity to intervene in natural processes of genesis has been increasing very significantly, especially on the basis of the discovery of DNA and RNA in the early 1960s. Plants and animals may be re-engineered by the implantation of genes that alter the natural capabilities of plants and animals. The uncertainties associated with these processes have barely been recognised or mapped. Genetic engineering should be seen as a transformation which is different from selective breeding practised over the centuries albeit with growing sophistication because it is based upon design of a different genetic blueprint rather than the selection of desirable features from a given set of genes.

11.4.8 Motivation and Incentives: Prices and Money

As descriptors of economic relationships rhizoids may be a fine tool, but can they serve to highlight the type of choices economic actors make? Do they provide incentives to actors? The focus on combinations of inter-individual relationships suggests that there should be incentives or motivations to form such combinations. People should see advantages in the establishment or operation of rhizoids, otherwise they would not be organised or operated. Clearly, if a rhizoid can be formed which enables the formation of a monopoly over an important stow such as oil or natural gas in a world starved of energy, then it seems likely that one day it will be organised. In the 1970s OPEC was formed with the intention of raising the price of crude oil in the reserves of the countries concerned in order to preserve them or to extract greater economic (money) returns from them. However, the control of OPEC was less than perfect as the members lacked control over oil companies and governments which suddenly had strong incentives to intensify exploration for oil, to economise on the use of energy and to develop alternative sources of energy.

This example highlights the importance of price determination within rhizoids. The more effective control leading parties in a rhizoid have over pricing decisions, the more close-knit the rhizoid will be. In the field of agriculture the co-ordination achieved by a small group of international grain merchants can be mentioned. For more than a century they have managed to control the grain trade, albeit by remaining competitors. The contacts and customs they established informally have been such that one can identify a world-wide grain rhizoid, especially if the key role of the US government is taken into account as well.

Pricing decisions have been very important in the agricultural policy of the European Union (formerly the EEC) since 1962. The system of import protection and price and sometimes volume controls (the milk quota since 1984, for instance) has been such that European agriculture within the European Union can be termed a rhizoid. The regular negotiations between member Governments, farm organisations, overseas countries and farm groups indicate a combination of inter-individual relationships.

The principal actors of a rhizoid always have an incentive to safeguard their stows and flows against competition from outsiders who may spoil their investment. Merchants may set up cartels to regulate prices, work out general terms of sale and standards of quality and even share profits. To safeguard their rhizoid they may try to get their products prescribed in requirements of Governments and other key users. Yet, if they are not careful competitors will threaten the rhizoid by offering much lower prices or by developing and offering alternative products or services. The reason for such action is clear. Once merchants have purchased stows of goods, they must sell lest they lose their investment. In order to sell customers must be available. Often the customers of competitors are the easiest targets available. Under free trade life is insecure as customers can always be tempted by lower prices from competitors. Free trade will have a tendency for prices to fall rather than to rise. To lessen this intrinsic insecurity and uncertainty one enters into combinations of inter-individual relationships or rhizoids.

The incentive to organise a rhizoid tends to arise on the basis of economic and social power or threats to the exercise of such power. In agriculture powerful rhizoids have been formed by strong social organisations of farmers which have established links with political powers. The treadmill hypothesis of farming may explain why such organisations have been established. A common defence is logical in an industry consisting of large numbers of individual farmers each with a substantial capital investment but with none able to control the price of their product and with combined production subject to high elasticity of supply and low price and income elasticity of demand.

An additional way of looking at prices within rhizoids is to see them as a particular way of using money. A price is always a number of money units per a unit of product or service. Since in the modern world no rhizoid is self-sufficient, actors maintain rhizoids on the basis of a return money flow, which they manipulate by means of prices. The more economic (market) power they possess the easier it is for them to do so. At the extreme they are monopolists

who are able to control both price and product flow. Rhizoids are means of forming market power in a very fluid, dynamic and interdependent world.

The money flows can be used to form stows of money in the form of depreciation allowances and reserves held at the various stages of the production process. These stows can be used to rejuvenate the rhizoid by timely replacement of worn out pieces of capital equipment or by developing extensions to the rhizoid (new types of product derived from research and technology) or by establishing or investing in other rhizoids. In an uncertain world of rapid change and on-going inroads into established markets by competitors such actions are almost mandatory.

Capitalism may be understood in this light as a system whereby what counts is only the flow of money and the accumulation of money or stows which are likely to retain or increase their monetary values. Thus, capitalism has no concern for bringing the economic object functions of things, plants, animals and technical objects (money excepted) to fruition. It values them only for their ability to maximise profits.

New transformations in the form of technical innovations are a powerful incentive to form rhizoids as they promise new sources of profits to be made or new markets to be captured. The formation of a company under limited liability in order to attract sufficient capital without exposing participants to the potential loss of all their assets is a way of reducing the uncertainty involved in a technical innovation. The company operates a rhizoid to exploit the innovation embodied in a new transformation or set of transformations connected by stows and flows. Such a new rhizoid might be a threat to other companies or rhizoids, thus inviting defensive strategies on their part.

However, there is also a possibility that the formation of new rhizoids provides new outlets for already existing rhizoids. This is the power of what has come to be known as atmosphere, conglomeration or economies of scope. The new investment implemented by the new rhizoid offers new opportunities for innovation and specialisation of already existing firms and rhizoids. A conglomeration can either grow through diversification or specialisation. The former possibility is represented by a large town with a wide variety of industries and services which feed on each other and the latter by single industries which attract specialised services such as the conglomeration of pig-farms in the South East of the Netherlands or Silicon valley in California.

11.4.9 Value

Value as an economic concept is an ethical anticipation. In the Middle Ages, scholastic theologians worked out elaborate ways of establishing 'just prices'. Rhizoids are systems of relationships, which can only endure over time if all key participants believe that they derive sufficient value from their existence. Thus, New Zealand dairy farmers believe that there is value in co-operative relationships. Value, therefore, has a wider meaning than 'just price', even though the farmers just mentioned may well believe that they will get a just price by entering co-operative relationships. Generally, whether or not a combination of inter-individual social-economic relationships has value to

participants depends on whether they perceive their participation as fruitful or wasteful.

In terms of the rhizoid definition, a rhizoid would not provide value if the economic object functions of things, plants, animals, human labour, as well as technical objects were wasted, severely distorted or destroyed for ever. No matter how high the monetary value or the utility derived by consumers from the final products, the rhizoid would have failed to produce true value. The loss of bio-diversity or clean water from a region through the operation of, for instance, an agricultural mono-culture, might be totally irreversible or would take hundreds of years to be re-generated. The high monetary value yielded by the rhizoid would then fail to be a reflection of the true value achieved which from the point of view of future generations should be described as negative.

The implication of this analysis is that consumers do not necessarily pay for the use of all stows and flows in the rhizoid. Taking the world as a unit of analysis, money pays only for the use of the flow of human labour either in the form of wages, profits or taxes. Machines and other technical operators extract minerals from the earth. Money is paid only to those involved in the manufacture and operation of the machines. Stows of minerals, plants and animals and flows of rain and sunshine are given to humankind. Nobody ever pays for them. They are gifts.

Indeed, it is possible to pump money into rhizoids by providing consumers with extra money. This might speed up the use of things, plants and animals. The extra money would raise wages and profits and result in higher stows in bank accounts.

At best, prices charged would express the value we attach to given stows and flows. The State or the United Nations could require producers, for instance, to pay a so-called resource tax for the extraction of minerals or the felling of trees. Producers would incorporate such a tax into their prices, so that eventually consumers would pay higher prices for final products. Whether they would buy less of the products, however, is another issue. They could just save less than otherwise. The state would collect the tax and spend it on wages to pay for the collection of the tax and on a variety of other programmes, each of which might lead to a higher usage of things, plants and animals. Should, for instance, the state spend it on research to reduce the waste of the precious resources or on recycling systems, then the tax would be spent on wages. The tax might alter the composition of flows of things, plants and animals and/or their pace, but would not eliminate them.

Thus, stewardship of stows and flows should be based upon their intrinsic value to actualise their proper object functions rather than upon the labour required to produce them. This could be achieved by the organisation of special rhizoids in which consumers establish links with accredited producers. These producers would then be subject to conditions for accreditation.

11.4.10 Duality of Production and Consumption

For the world as a whole production should be self-sufficient. Since Aristotle there has been a stream of economic theory which emphasised the production of a household. If the world is considered as a single household one could study the use of its resources in production. Classical economists studied the long-term development of resources, especially through the interplay with demographic developments. They emphasised production and distribution of resources. The marginal revolution of the 1870s initiated a different direction by emphasising the allocation of given resources on the basis of utility derived by consumers. Naturally, this shifted the attention to markets as tools of allocating resources. The result was an emphasis on choices made under the assumption that means available were scarce in the light of infinite wants.

In the light of rhizoid theory one can conclude that these two approaches are always inter-connected. There must be structures that allow production and transformation of flows from given resources before one can talk about offering choices to consumers. We have also seen that there is an influence from consumers to producers via flows of money and information, even though manipulated in various ways by producers and merchants operating within rhizoid structures. Moreover, decisions by households to produce always involve inter-individual relationships including those with future generations. Similarly, rhizoids include distribution arrangements between members.

11.4.11 Open and Closed Rhizoids

Closed rhizoids constantly replicate themselves, whereas open rhizoids constantly change into something new.[357] An example of the former is the network of a utility. Water or electric power is generated and distributed to the households and business firms in a certain district year after year, with little change in the technology used. The New Zealand dairy industry is an example of an open rhizoid. To survive technological innovations must be sought and implemented continuously. Farms become steadily larger and adopt new technologies for milking, breeding of calves etc. Nevertheless, both types are coherent and identifiable structures. Open rhizoids require in fact the presence of closed ones. Without the stability of utilities and infrastructure, innovating rhizoids would have to spend an inordinate amount of time to secure basic supplies. It should also be emphasised that the distinction between open and closed rhizoids is a relative one. As soon as we realise the importance of genesis and technical change, then even rhizoids, which appear to be self-replicating, may on closer inspection be subject to change, even if it is slow in time. However, over shorter periods of time, some rhizoids may well be closed in character.

An interesting intermediate form is what Lepper calls clopens, rhizoids which are neither open nor closed. This might well be the most important type.[358]

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[357] John Lepper, Essay 1, Progress on the Paradigms, in John Lepper and Petrus Simons, op.cit., pp. 11-16.

[358] ibid., pp. 41,42.

They are constantly operating at the onset of chaos. Lepper's example is that of merchants getting together or colluding to protect or organise their market. They may succeed in reducing competition amongst themselves, provided they work out a common pattern of behaviour to which all are able to consent. However, as soon as one or more of the participants believe that their colleagues are cheating or are becoming too dominating, they might threaten to leave and work to undermine the rhizoid from outside as a rogue trader or by joining a rhizoid selling a competing product. As long, however, as the threats from within remain potential, the original rhizoid may appear to be very stable and replicating itself. Threats from outside are more difficult to ward off, unless the original rhizoid is powerful enough to absorb or destroy the outsiders.

These distinctions apply in particular to the internal management of the rhizoids and should not be confused, therefore, with the distinction between open and closed systems. The latter involve the relationship between the rhizoid and its external environment. A bakery owned by a family may not change its technology for example, from one generation of bakers to another. The bakers change and worn-out equipment is replaced from time to time. Customers change in the same way. When a modern industrial bakery starts which sells through supermarkets, the old bakery manages to hold its own by advertising good old healthy bread from a 'hot' bakery. In this sense, the closed family bakery rhizoid is also a closed system using a negative feedback loop. However, the technically innovating industrial bakery may also be a closed system using negative feedback.

11.4.12 Conflicts in Rhizoids

Rhizoids will be organised in such a way that conflicts which might arise can be resolved according to pre-arranged procedures. It is also possible that they are formed in order to solve conflicts or to prevent conflicts. A good illustration of these issues is furnished by the theory underlying co-operatives. Van Dijk has pointed out that there are five historic reasons for the establishment of co-operatives, namely:

1. Countervailing power

Since farmers run small individual enterprises and tend to produce staple products they have individually no market power. By means of co-operative enterprises they are able to organise their own industrial transformation processes and/or to gain a position of power with regard to large international food chains and supermarkets. In each case the objective is to secure more stable or higher prices.

2. Market Access

Credit co-operatives are set up to ensure that members have access to loan finance as well as an incentive to keep surplus funds within their industry or region for the benefit of present and future colleagues. Confronted with large players on international markets co-operatives may be formed to ensure that many small members can confront such competition together. Another possibility is to obtain access to scientific

information or other precious information by forming a co-operative enterprise able to foot it with TNCs.

3. Economies of Scale
By setting up joint processing facilities farmers may be able to gain economies of scale and hence a lower cost-price in output markets. This is particularly attractive if output prices are government guaranteed.

4. Risk Management
Co-operatives can introduce quality grading systems and other qualitative controls. When quantitative growth is strong, this is an attractive way of preventing a fall in prices.

5. Preserving Employment and Improving Incomes
In Canada and the USA new co-operative agro-combinations have been formed to transform cereals into broilers, turkey and pork to counter the loss of employment and income in traditional farming.[359]

In addition, Van Dijk suggests a *sixth* reason. This is the need to achieve renewal and leadership in knowledge and marketing in order that knowledge-intensive agriculture be able to develop all of its resources to an optimal value (market as well as society-based value) on a sustainable basis.[360]

In each of the original five cases the rationale for establishing a co-operative is *defensive* in character, although once a position of market leadership is achieved, the co-operatives might well evolve *aggressive* strategies. How well they succeed in this could depend on how they manage internal conflicts.

Van Dijk signals a number of problems arising from the typical co-operative structure of two types of entrepreneurship which are intertwined in a co-operative arrangement, briefly the members and the co-operative business.[361] This arrangement is conflictive because each operates in different markets. The market for sugar-beet (supplied by members to their sugar factory) is different from the market for sugar products sold through supermarkets. If the supplying farmers insist on maximising their production, given the prices they expect to receive from their co-operative, then, the managers of the co-op will seek efficiency gains through larger economies of scale in order to be able to pay farmer members the price they expect. Production remains bulk-oriented and profit margins will be under downward pressure. If the managers had full control, they would aim to produce higher quality sugar products and restrict the quantity bought from farmers.

A similar tension arises if the co-operative enterprise wants to commit funds to R&D and the development of new products, whilst the members fear that such

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[359] G. van Dijk, *Sterft, Gij Oude Vormen? Cooperatief Ondernemerschap op de Drempel van de 21ste Eeuw*, Nijenrode University Press, Nijenrode, 1997.

[360] ibid., p. 20.

[361] ibid., pp. 16-18.

long-term development is risky and at the expense of their short-term profits. Gains would be to the benefit of future generations. The benefits the present generation enjoys from the investment by previous generations are not so highly appreciated (horizon-problem). Another frequent problem arises from the desire of the co-operative to diversify by investment in a related product, innovation or market. The members, however, may not wish to invest their capital in such diversification as they have no idea of the risks involved and prefer to stick to their own line of work (portfolio problem).

Van Dijk concludes his review by analysing six new forms of co-operatives.

1. First, a co-operative could issue shares tradeable on the stock exchange. The danger is that the short-term profitability requirements attached to such shares would endanger the long-term nature of the co-operative.
2. Second, a co-operative might establish or acquire daughter enterprises, which it could have quoted on the stock exchange. This construction overcomes both the horizon and the portfolio problem.
3. Third, the co-operative takes over the leadership of the whole enterprise and makes contracts with member suppliers against a compensation for reduced transaction costs (co-maker allowance).
4. Fourth, the co-operative enterprise is again in a lead-role but in the sense that it determines what members should supply and when. Rights of supply also entail a duty to supply.
5. Fifth, membership of the co-operative is by means of tradeable investment shares. Purchase of such participations provides a right of supply. It would be possible to allow sale of such shares without a right of supply. Thus, regional councils or district councils could become involved.
6. Sixth, the co-operative enterprise remains a clear extension of the work of the members, for example an auction to market their products without an additional transformation.

Looking at these problems in terms of rhizoid theory one should say, *first, that co-operatives are indeed rhizoids inasmuch as they are a special type of a combination of inter-individual relationships. Second, they are defensive rhizoids because they put another transformation between the flows and stows* as they leave the farm-gate and the place where consumers buy. Whilst the transformations on the farm and those operated by the co-operative enterprise and those of its subsidiaries may coincide, they may cause nonetheless problems of control and objective between the farmers and the managers of the co-op if these transformations and the resulting flows are not fully integrated. The problems Van Dijk has highlighted such as the portfolio and horizon problem are only problems because the rhizoid has allowed different objectives for each of its key transformations to be developed without proper consultation or involvement of the members. They are failures in managing the information flows within the rhizoid.

It is also possible that the real problem is not located within the rhizoids but in the external market situation. Many farming co-operatives aim to improve the lot of their members by adding more value to their base farm products such as milk or animals in the hope that the added value products will find a more price elastic market which pays higher prices. However, if all enterprises world-wide in a particular industry were trying to do this, then, the supply of the value-added products would rise whilst the supply of the more basic products would disappear. Since consumers' limited ability to absorb food products applies to higher value products just as well as to lower-value products, then the price inelasticity of the latter is simply transferred to the higher value products.

The conflicts about pollution analysed by Coase may also be analysed by means of rhizoid theory. Coase suggested that when actor A causes a negative externality to actor B, then negotiations between A and B would determine the extent of the externality.[362] Coase assumes that there are no transaction costs involved in such negotiations and that the offending party is not liable for the externality because A and B are neighbours. As soon as either A or B moves, the problem disappears. By contrast, Pigou had argued that the Government should impose a levy on A's production so that the higher cost to A would reduce or eliminate the externality. Anyhow, this theorem has proved useful to highlight some problems in the organisation of co-operative banking systems. If a banking co-operative is formed from individual local banks who retain most of their autonomy, then the brand and name of the bank could suffer damage on account of inconsistent practices between member banks or inept management by such members.[363] Hence, banks operating under limited liability tend to circumscribe their branches more tightly, albeit by ensuring that their ability to make decisions is not unduly restrained. Kanning imagines that negotiations between head office and branches would take place to determine the scope of the branch's autonomy, given head office's concern to maintain the bank's effectiveness and good reputation.

In rhizoid theory there are no externalities. What is called an externality is another flow and/or stow. The soot produced by blast furnaces and distributed over a wide area is a flow caused by the industrial transformation and deposited as a stow on the surrounding fields and houses. If the Government acted on behalf of the affected residents and worked out a deal with the company, the problem might be reduced or compensation might be paid to the residents, but the basic transformation would still be functioning as before because a) the blast furnaces cannot be moved quickly b) alterations to the equipment are very costly and c) the profit made is so high that any costs of compensation would be relatively low. If the party suffering the externality were employees of the company they might not be prepared to move elsewhere very quickly. With adequate processes for consultations between

[362] Ronald Coase, The Problem of Social Cost, *Journal of Economic Literature*, 1960.

[363] Walter Kanning, Het Coase-theorema en de Co-operatieve Organisatie, *Economisch Statistische Berichten*, vol. 78/1993-no. 3932, 13 Oktober 1993, pp. 940-942.

management and staff the problem would be discussed and hopefully solved. Without taking into account the nature of the inter-individual relationships in conjunction with the flows and transformations causing the externality it makes no sense to assume whether or not there are transaction costs. The offending flow will only cease if the company is compelled to change the transformation concerned or to halt or to remove it. To this end the affected residents might organise their own rhizoid to organise action or accept the problem as an indispensable cost associated with the benefits the factory brings them. In some cases the factory might pay higher wages to the employees/affected residents to avert the formation of a countervailing rhizoid. Whatever happens there will be costs, regardless of any costs associated with any negotiations.

11.5 Properties of Rhizoids

Rhizoids function in all modalities and, therefore, display a rich variety of properties. The following is a brief sketch of these.

11.5.1 Uniqueness

If every rhizoid is dependent upon and interact with many others as well as with States, families and voluntary organisations, then, how should individual rhizoids be identified? Individual families, farms and business firms may well take part in and belong to a variety of rhizoids at any one time. The more differentiated a society is the more rhizoids there will be and the more they will be intertwined. This suggests, however, that they can be counted and that some will be larger than others. In a country such as New Zealand the stows of land are used to produce flows of meat, timber, dairy products, fruit and vegetables and wine. Within each of these sectors distinct rhizoids have been organised.

The complexity of the stows and flows is such that a State will never be able to control all of the rhizoids in its territory. Totalitarian states are bound to fail in attempts to control an economy differentiated in rhizoids.

11.5.2 Extension

Many rhizoids extend across national boundaries, although very often this is a matter of choice. The decisive choice may well have been made far into the past. The New Zealand economy was deliberately organised as an export economy in the latter half of the 19th century, first to gain access to money flows by selling produce to Australian colonies, later to gain access to industrial products from the UK. The stows of pastoral land have become so large relative to the population that it might take many years to achieve a different pattern of rhizoids.

Flows that take place through time and space such as the annual milk flow are dependent also on many concomitant flows such as flows of sunshine, rainfall, calves, farm labour, the services provided by vets, flows of energy, knowledge, technical objects, money and information. Some of these flows result from stows accumulated over centuries such as the knowledge of cheese-making. Some are part of global flows, especially information,

knowledge and transport services. Some flows, calves and culled cows for instance, are inputs into other rhizoids such as the meat rhizoid. The complexities of time and space are such that a market economy, understood as a vector of prices determined by the interplay of demand and supply cannot guarantee that a set of stows and flows are formed that provide outcomes such as full employment or a sustainable long-term resource use. Gifts of key stows fall outside the measurement set (money and prices) of a modern capitalist economy, as seen above.

The many inter-relationships and inter-dependencies of rhizoids are such that in a mathematical sense it is unlikely that there will be many smooth continuous functions, as suggested by neo-classical economics. Zig-zag functions (all corners) are more likely.

11.5.3 Persistence

Rhizoids tend to carry on regardless of the individuals that operate in them over time. Dairy farmers tend to be interested in handing over their farms to their natural heirs or sell them to other dairy farmers. Similarly, processing plants have a succession of management and employees. Nevertheless, rhizoids can contract and disappear or are transformed into or absorbed by other rhizoids. For example, should meat prices rise consistently more rapidly than prices of dairy products, then, dairy farms would be gradually converted to sheep and beef farms or vice versa. Similarly, pasture land capable of both meat and dairy production could be converted to the growing of vegetables or forests. Such changes, however, are never instantaneous. Investment in capital equipment, financial constraints, the nature of stows etc. are factors which make for considerable inertia in rhizoid structures.

11.5.4 Interaction

Since rhizoids are never self-sufficient they must interact with other rhizoids, states, institutions and communities as well as having to rely on communication and interaction between its own participants. Such interaction depends on energy. A town, for instance, can be considered as an intersection of rhizoids. Infrastructure networks such as telephone, power, tram and roadway systems allow people to meet and communicate. A business in such a town will be able to contract a wide variety of expert services at comparatively low cost. Each time a new business sets up the availability of goods increases and the scope for expert services widens. The strength and scope of interaction intensifies continually.

The problem of many rural areas is an absence of such interaction. The networks are too extensive and weak to allow intensive interaction. It takes time and effort to get expert services. As farming becomes more large-scale, more services migrate to the urban areas, resulting in the problem of rural desertification. The problem of regional economic development is that many poor regions lack the energy of interacting rhizoids. To overcome this one needs to put new rhizoids in place.

The modern trend of big business to shed many extraneous functions and to concentrate on what they call their 'core-competency' can also be understood

in the light of the interactive power of closely located rhizoids. When bound within a business conglomerate, services lose their capacity to interact and develop. It is cheaper in the end to out-source services. The counterpart to this, however, is that the power retained by large business empires in many locations is such that they dominate the services they 'out-source' and impose terms that are not conducive to the growth of interacting, independent rhizoids.

11.5.5 Growth

Rhizoids are never static. They seek to grow by processes of investment and saving. By ploughing back part of profits earned into new technology one hopes to retain capital invested in a rhizoid. The idea that capital invested should yield a certain rate of profit, lest it be withdrawn and invested elsewhere, is indeed a 'growth-norm'. As a result of such a 'norm' it is possible that some rhizoids grow at the expense of others. When higher returns on capital invested appear to be available from dairy farming, pastures are converted from sheep- and beef-farming into dairy land. Such a move makes it difficult to take advantage of a more strongly growing demand for meat, should this occur over a longer period of time. Once capital is sunk into an industry it is difficult to withdraw it quickly.

11.5.6 Perceptions

Participants in rhizoids tend to have views on the well-being of their rhizoid. They may be motivated by fear of the future. They might think that they are doing fine or that their fortunes might decline. Feelings of insecurity could motivate them to re-organise their rhizoid or to leave it. Again the New Zealand dairy industry offers good examples. Faced with a world market tending to be in over-supply they formed a mega-co-operative by amalgamating all dairy co-ops and the New Zealand Dairy Board into a new co-operative called Fonterra, in order to benefit from economies of scale and, hence, lower costs of operation. It is remarkable that two of the smallest co-ops refused to join the mega-co-op. They have consistently received higher returns than members of the larger co-ops because they followed a strategy of making top quality products for niche dairy markets. In contrast, the larger co-ops have believed that their strength lied in large-scale production.

11.5.7 Analysis

Thus, perceptions of the markets confronting them may lead rhizoid members to different analyses of their future and, hence, different strategies. Analysis plays also a role in the emphasis upon scientific analysis and technology as means to identifying and developing new products and/or in improving the production process. Rhizoids, which ignore the potential of scientific research tend to lose out in competition with others in the modern world. The major investments required to develop new products are such that large corporate enterprises try to corner markets and, therefore, to either control or destroy rhizoids.

11.5.8 Technical Power

People form rhizoids in the belief that the new possibilities of combining inter-individual relationships are worthwhile. Some rhizoids come into being

because of technical developments such as the invention of electricity. The power generated by large powers stations must be distributed via power lines to houses and factories. Thus, a network of generators, distributors and users is formed. Individual participants may hardly be aware that they are part of a power-distribution rhizoid. In other cases, rhizoids are designed to organise and develop a market. The emphasis may be either on production and marketing or on consumption. The New Zealand dairy industry, organised by farmers and their co-ops is an example of the former inasmuch as their rhizoid has been formed, first to supply the UK market and, later, a variety of export markets. A supermarket is an example of the latter as the management seeks to serve a large number of customers on the basis of what they are likely to buy. The more customers they can attract, the larger their buying power. Again buying power is used to increase the number of customers and the amounts they spend. Thus, some large supermarket chains have decided not to put genetically modified food on their shelves.

11.5.9 Communication

Brand names, images, slogans are used to differentiate rhizoids and their products in the minds of customers. Fernleaf and Anchor are dairy brands of long-standing in the New Zealand dairy rhizoid.

11.5.10 Social

Social networks are vital to the formation and success of rhizoids. Without social contacts they would be unable to exist. Rhizoids differ as to their degree of openness. Some form networks that are limited only by technical capacity. Many depend on relationships with an unknown number of customers. Important is also the nature of relationships with other rhizoids either those that produce and market similar products or those that produce quite different products or services. It is conceivable that a key ingredient for a production process may be produced by another rhizoid that refuses to supply it, thus forcing the rhizoid to find a substitute or to alter the production process. One can think of rennet imported by New Zealand dairy companies up to the First World War. The outbreak of war meant that efforts had to be made to manufacture rennet in New Zealand.

11.5.11 Economic

In modern economies profitability and productivity are key elements in the life of rhizoids. In many cases the drive to improve profitability over-rides all other considerations. With hot capital flows moving around the globe at the speed of light interest rates and exchange rates have become extremely volatile. This undermines the security especially of those rhizoids dependent on large amounts of money capital for their existence. The need to replace highly capital intensive processing equipment has been a motivation for the formation of a dairy mega-co-operative in New Zealand. The search for higher productivity to safeguard the capital employed has caused many rhizoids and large corporates to get rid of human labour. The latter have been unable or unwilling to organise rhizoids to develop other types of employment. As shown above, the return flows of money from customers to owners of capital invested in rhizoids have become much more important than the long-term development of stows of natural gifts of materials, plants and animals for the

welfare and fruitfulness of human life. Waste and destruction of such gifts as well as of human labour has become a regular feature of human life. The tendency to set up markets for the right to pollute, which is meant to stimulate the installation of cleaner production processes, is a cynical way of dealing with such problems.

11.5.12 Style
Rhizoids display a certain style in their functioning. The way New Zealand butter is packed and sold alludes to features of New Zealand life. The butter is tasty. The packing has pictures of New Zealand ferns. The self-effacing nature of New Zealand farmers comes through in the way they market their produce.

11.5.13 Rules
Rhizoids must put some discipline upon their participants in the form of rules and conventions for trading and procedures for resolving disputes.

11.5.14 Ethics
Rhizoids function well if they observe friendly relations with customers, supply truthful information and provide good care to employees, animals and plants involved in them. Building long-term relations with customers and suppliers may not appear to be profitable in the short-run but pays off in the long run.

11.5.15 Trust
Rhizoids that break trust or in which participants do not trust each other will disintegrate sooner or later.

11. 6 Conclusion

An examination of the combinations of inter-individual relationships through which a great deal of economic life is shaped provides a contrast to the reductionist mechanical model of neo-classical economic theory.

In terms of practice, rhizoids are becoming extended world-wide. Relationships incorporated into them are transformed into technical or economic relationships. Rhizoids expand or are destroyed through new scientific discoveries and applications thereof into technology. They serve as 'fertilisers' for companies to expand their market shares and profit potential. Modern industrial agriculture is highly dependent upon international trade and an on-going search for economies of scale through such trade. Each farm becomes a technical/economic unit within a world-wide open rhizoid and, therefore, subject to constant change and uncertainty with little scope to develop more sustainable forms of agriculture in the context of local closed rhizoids.

We now turn to the implications for international trade.

CHAPTER TWELVE: RHIZOIDS AND THEORY OF INTERNATIONAL TRADE

12.1 Introduction

People of neo-liberal persuasion believe that agriculture should enjoy protection from the State neither against imports nor in terms of incomes (deficiency payments). Nor should the State subsidise the export of agricultural surpluses. Since Third world countries want to have access to the markets of the First World for their agricultural products, they too are opposed to import protection and export subsidies provided by the USA, Canada and the EU. Countries that provide little or no protection to their agricultural industries believe that their export returns are artificially depressed on account of the protection provided by others. These issues have been debated by the WTO since agriculture became subject to its jurisdiction in the Uruguay Round which concluded in 1994.

Despite protecting and subsidising their agricultural sectors, the USA and the European Union (EU) like to be known as supporters of free trade principles. They justify the exception for agriculture in terms of security of food supplies, and the need to protect landscapes and nature.

The question that should be asked is *whether there is a deeper reason for conflicts about international trade*? Why is the nation-state involved in the flow of goods and services? Why has free trade become a norm? What is the role played by economic theory in the arguments pro and contra free trade? What is the role of colonialism, if any, in the debates? Does technicism play a role and, if so, what is it? And what is the role, if any, of economism?

This chapter begins with a brief review of how economic theory and models are used in advice to policy-makers. To show the abstract nature of the free trade advice the history of colonialism and its relevance for the debate on trade in agricultural products is briefly reviewed. This is followed by a discussion of the clash between modern and traditional agriculture. We then ask why nation-states should or should not determine import protection. Why would they share their sovereignty with international bodies such as the WTO? However, given the present predilection for free trade the operation of agriculture in a setting of open rhizoids and under the working of the treadmill is discussed. What would happen if free trade were introduced? Before a conclusion is drawn a brief scenario of the introduction of complete free trade is sketched.

12.2 Economic Models

In the light of the discussion of the economic theory of international trade (Ch 7) one can expect that economists will advise that free trade will lead to higher economic welfare for all countries involved. They will buttress such advice with the results of economic models, which may be either partial equilibrium or general equilibrium models. Such models are constructed by means of

statistical data of demand and supply and a specification of demand and supply functions derived from econometric analysis of the data.

Exercises of trade liberalisation, across the world, with respect to agriculture, using the GTAP model, for instance, indicate that reductions in import protection, without compensating farmers through higher domestic support would increase welfare, the volume of trade as well as world prices.[364]

However, economists rarely pause to question the results of their models, in spite of the limited view of the world underlying them. They do not consider the effects of changes in protection on farmers, on rural communities, on employment and unemployment, on the distribution of income, on social cohesion or on the natural environment, animal welfare or bio-diversity. The methodology abstracts from the social interactions, the long and complex chains from suppliers to farmers and from farmers to processors and distributors. It also abstracts from the financial relationships in these chains.

The agricultural rhizoids that have been formed over the years will be able to adapt to changes in import protection in ways that may well be different from the reactions modelled by economists. They certainly will do what they can to defend their investments of capital and knowledge, to mention just these. Such defence may take a variety of forms. One would expect a scenario analysis to at least surmise how rhizoids might react as a way of testing the results of the model runs.

A second observation regarding the relationship between economic theory and international trade relationship is that since the 1980s the policy climate around the world has become definitely neo-liberal in character (Ch 9.2). Thus, the abstract theoretical concept of free trade has become a policy prescription, adopted by both right-wing and left-wing political parties and governments around the world.

However, if policies are based upon a theory which is based upon a distorted view of reality, then, one is likely to see results that differ from what was expected. It is as if one tries to unlock a door with the wrong key. Rather than conclude that the key is wrong, many people believe so passionately in the virtues of free trade, that when countries practice some form of protection, they decry such practice as harmful to everybody. Thus, Berthelot notes that the first two pages of an official communication by the USA to the WTO of 23rd June 2000 use the word distortion no less than 15 times. Distortions occur because national prices are higher than world market prices.[365]

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[364] For example, Allan N. Rae, The Current Round of Agricultural Trade Negotiations: Why Bother About Domestic Support?, paper contributed to the *Conference of New Zealand Agricultural and Resource Economics Society*, Blenheim, July 2001.

[365] Berthelot, op. cit. p. 69.

12.3 Colonialism

The history of colonialism shows how complex open trading rhizoids have developed. This may serve as a warning against the simplicity of the free trade doctrine based upon relative comparative advantage. A few examples should suffice.

12.3.1 The Spice Trade

In the 16th century the Portuguese discovered the Spice Islands in what is now Indonesia. Soon, the wonderful properties claimed for nutmeg, cloves and pepper triggered a frantic search for these islands by the English and the Dutch. Merchants in these countries invested large sums of money into fleets that had to search for the islands and their riches. Many sailors lost their lives on these long journeys into the tropics. Indirectly, this trade lead to the establishment of English and Dutch East India companies (under Government charters) for trade with the East Indies. Having located the islands, it was only a matter of bartering with the natives to acquire the coveted spices and ship them back to the home countries where the cargoes were sold at very high prices. However, soon a trade war broke out between the English and the Dutch, with massive loss of lives. As the Dutch had put more capital at risk in the form of larger fleets and were more ruthless than the English, they won the war. They were prepared to destroy the nutmeg trees on the island of Run, when they realised that the English had a just claim to it. The spices trade was essentially based on acquiring access to the stows of trees bearing spices on some small islands in the East Indies.[366] Neither the Portuguese, nor the English or Dutch were prepared to meet with the native populations (they called them 'savages') on an equal footing. They were the means to the fruits. Once the Dutch had acquired full control, they shipped most of the population as slaves to Java. However, when the English were able to return to the Islands during the Napoleonic wars, they removed much of the special soil and trees to Ceylon and other parts of their empire. The nutmeg rhizoid was a colonising one, in which one party treated the other as a means to an end and aimed to incorporate their stows into its own economic and political system. Clearly, if the local people in the Banda islands had been paid a proper price in gold or silver coins, they could not have done much with such money, unless they were willing to become part of the Western trading and production system.

12.3.2 The Great Plains

The Great Plains in the USA were not originally grain producing areas. They were transformed through settlers, mainly British, moving West and clearing forests, vegetation and Bison herds, not to mention Indian nomadic tribes. Influenced by John Locke's theory of property they believed that the Indians, being hunters and gatherers, had no rightful claim to the lands they occupied. Railway lines had to be laid out, villages founded, stores and farm houses built and so on. The state of technology played a key role in this as well as the motivation of settlers and railway companies to make money. Overseas investors (in Great Britain notably) provided the capital for these ventures.

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[366] Giles Milton, op.cit.

Once the grain started flowing to Europe, it triggered major changes in transformations and flows over there. Many small farmers could not compete with cheap imports and had to cease farming. Many defended themselves through the formation of farm co-operatives. Some countries reversed their free trade policies and erected tariffs to protect their farmers as well as the security of their food supplies.

On the prairies of North America, the introduction of modern farming, modelled upon industrial techniques of removing constraints such as depletion of nutrients by means of modern chemical fertilisers and chemical weed control has had long-term destructive effects, as stated by Soule and Piper:

> Over a short 100 years of applying monoculture farming to the native prairies of North America, 50 percent of the topsoil's latent productivity has slipped away. In contrast, the native prairie built and maintained soils and supported large populations of grazers.[367]

The new settlers colonised the prairies not only in the sense of taking the land forcefully, but also in the sense of introducing a farming system based upon a technicistic/economistic approach that aimed at technically extracting maximum yields as quickly as possible, without regard to the features of the eco-systems involved.

12.3.3 The British Empire and Free Trade

In each of the two previous examples, the main customer groups were located in the centre of the world's trading and economic systems of the time. This is logical since wealth tends to accumulate most rapidly in centres of activity, where specialisation (division of labour) can take place to a high degree. As productivity increases and wages rise accordingly, it becomes attractive for merchants to seek new outlets there, by building trading circuits between the centre and outlying areas. The story of the nutmeg trade shows that such relationships tend to be dominated by the centre, without regard to the long-term interests of the periphery.[368]

The centre will also have to deal with the effects of its ideologies and policies on its own population and industry. Thus, in Britain the Anti-Corn-Law League, founded by Richard Cobden and John Bright in the 1830s, lobbied for a removal of import duties on wheat, driven by the ideology known as Manchester liberalism, inspired by John Locke's concept of liberty, private property and small state.[369] These industrialists believed that the wages they had to pay could be lowered by means of cheaper imported grains once the import protection afforded by the Corn Laws was removed. They did not have to worry about the availability of export markets for their manufactures.

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[367] Judith D. Soule and Jon K. Piper, *Farming in Nature's Image; an Ecological Approach to Agriculture*, Island Press, Washington D.C., 1992, p. 145.

[368] Fernand Braudel, op.cit., vol. 2, p. 155.

[369] J.A. Schumpeter, op. cit., p. 301.

Economists supported the action against the protection of domestic agriculture through import duties on grain. David Ricardo wrote his Principles in part to fight the Corn Laws.[370] His argument was that import protection had compelled landlords to put less and less fertile land in production in order to produce sufficient grain for a growing population. In his Corn model, an expansion of agriculture brings about increasing marginal costs or diminishing returns, whereas manufacturing operates on the basis of constant costs (i.e. average and marginal costs are the same). At a given price for wheat, these facts then determine the distribution of the surplus between workers whose wages will always revert to their subsistence level, manufacturers (drawing profits) and landlords (earning rents). If import duties were removed, countries with a comparative advantage in producing corn, compared with England, would export corn to the UK, whereas the UK would be able to expand its export production of manufactures by taking advantage of its comparatively lower costs.

The technical advantages Britain had obtained as the country in which the Industrial Revolution took off, combined with financial and military supremacy and a growing colonial empire, conspired to give it a strong competitive advantage on the basis of free trade. It dominated the world market for many commodities. Historian Eric Hobsbawm notes:

> Free trade therefore seemed indispensable, for it allowed primary producers overseas to exchange their products for British manufactures, and thus reinforced the symbiosis between the United Kingdom and the underdeveloped world on which British economic power essentially rested.[371]

The gist of these remarks is that the push for free trade was part of an imperial design. Free trade principles were only invoked when it suited business interests.

Colonial Britain in the 19th century may be described as a rhizoid. It took in supplies from around the world, transformed them into flows of industrial goods that were exported far and wide. Institutions like Kew gardens played a key role, as its scientists acted as advisors to colonists who wanted to know how certain plants could be grown in particular colonies.[372] Produce grown in colonies would be shipped to England, whilst British industries would provide industrial goods to the 'developing' colonies. A monetary system centred in London and based on the gold standard ensured that capital for development could be assembled and invested and that trade-related payments flows could be administered effectively. Profits made were accumulated into financial stows that were transformed into flows of direct foreign investment or portfolio

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[370] David Ricardo, *The Principles of Political Economy and Taxation*, first published in 1817, J.M. Dent and Sons, London, 1962. D.P. O'Brien, *The Classical Economists*, Clarendon Press, Oxford, 1975, pp. 37-52.

[371] Eric Hobsbawm, *The Age of Empire 1875-1914*, Abacus, 1997 (first published 1987), pp. 39/40.

[372] Richard Drayton, *Nature's Government; Science, Imperial Britain, and the 'Improvement' of the World*, Yale University Press, New Haven and London, 2000.

investments. These created return flows of Sterling back into England where they were added to stows or transformed into flows of consumer goods, made either domestically or imported. It was a rapidly growing rhizoid, branching out widely and sucking in treasures from all over the world.

12.3.4 Modern Globalisation

After the Second World War, former imperial powers such as Great Britain, France and the Netherlands were forced to grant independence to their former colonies. Many of these became part of the Third World (also known as developing countries). The United States became a dominating power with effective control over international institutions such as the IMF and the World Bank.

Capital flowed to the Third World, especially during the 1970s in order to maintain or create new markets for industrial products. Many developing countries became highly indebted. Foreign aid often tended to support the lifestyle of the rich elites in the developing countries. The IMF tended to impose structural adjustment policies when countries developed what were believed to be unsustainable balance of payments deficits at prevailing exchange rates and had to devalue their currencies. Such adjustments involved a lowering of import barriers, the development of export industries and balancing the Government's budget. On the whole the terms of trade of developing countries trended downward. As the US ran up large foreign short-term debts, especially during the Vietnam War, it was forced to sever the link between the US$ and the price of gold in August 1971.

Since the 1970s TNCs have worked together with large financial groups to set up production in cheap (labour) developing countries. In this way one sought to escape from state regulation, especially environmental, and the actions of trade unions within First World countries. Since the collapse in 1973 of the Bretton Woods system of foreign exchange rates fixed in relation to the US$ international banks as well as the treasuries of TNCs have been able to generate large capital flows often of a speculative nature. Many countries have incurred massive foreign debts as a result. Fordist production has been shifted largely from the centre to countries on the periphery (South Korea, China, Taiwan, Mexico, Brazil, to name but a few).[373]

New communication technologies married to ever more powerful computers have stimulated globalisation, since the 1990s in particular. This allows control of remote production centres from head offices. Thus, it has become even more attractive to shift production from expensive First World to cheap Third World countries.

The competition between major industrial enterprises on the basis of technological innovation (increasing returns to scale) has created a tendency to produce more than the market can bear. This explains, in part, not only why economic recessions occur in the centre, but also why TNCs seek to increase

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[373] Philippe Norel, Malgré les Sanglots de l'Homme Blanc, *Manière de Voir 58*, pp.72-76, Le Monde Diplomatique, Paris, Juillet-Aout 2001.

their profits through financial speculation and through mergers with and acquisitions of other companies. Shifting production to cheaper countries is another strategy to maintain or enhance profitability. This may well involve debt finance. Thus 'competitive advantages' are created, either in the form of new outlets for their products or in the form of low wage costs.

In fact, since the late 1970s financial interests have become so strong that they dominate the real sphere of production and trade. Deregulation of financial markets around the world, coupled with neo-liberal policies in all main centres, which emphasise small states (privatisation), free markets, no controls on movements of foreign exchange and freely-floating exchange rates, have been contributing factors. Since there is no effective limit on the creation of debts, the interests of creditors have become paramount. Real interest rates must be positive. If a recession occurs in the real sphere, for instance, as a result of over-production, and company profits decline, central banks are supposed to lower nominal interest rates so as to maintain nominal financial values of shares and bonds.

In terms of rhizoid theory this means that financial rhizoids have been emerging whose only link with rhizoids producing goods and services is through the balance sheets of the latter. They accumulate stows of financial assets in the form of claims on companies, households, governments and other financial institutions. These stows must yield flows of interest payments and dividends. In addition, managers expect the value of monetary stows to increase over time, so that they can be transformed into stows of liquid money when required to return a capital gain over the initial investment. Managers of these rhizoids are afraid above all of financial recessions when, for instance, share prices tumble and balance sheets reliant on their equity values deteriorate so that creditors (banks) are forced to reduce the flow of credit. This might trigger a recession in the real sphere that would compound with the effects of the financial recession. Central bankers, aware of these risks and uncertainties, respond by attempting to forestall financial recessions through lowering interest rates.

Globalisation is run by rhizoids, with TNC's in the centre and with a strong backing of international institutions, which are supported in the main by the so-called G7 countries (USA, UK, France, Italy, Germany, Canada, Japan) and Russia (G8). The USA has a dominating influence on institutions such as the IMF, the World Bank and the United Nations. Countries that threaten its economic interests are quickly subjected to sanctions, threats and use of its superior military power, deployed not only in the States but also in 735 military bases around the world.

Globalisation has adversely impacted on the Third World. The rich countries of the North have been able to lend considerable sums of money to the poor countries of the South to such an extent that the latter have paid four times their original debt between 1982 and 1998. Toussaint refers to the oil-crisis of the 1970s as well as the first phases of financial deregulation in the 1970s as key reasons. The banks were flooded with so-called petrol-dollars at the time,

which they lent to Third World countries, often at negative rates of interest.[374] A change in US monetary policy in 1981-1982, aimed at combating inflation through a restriction of base money and a consequent rise in interest rates made servicing the debt burden very onerous. Indebted countries have been forced by the IMF and the World Bank to adjust their domestic policies so as to earn foreign exchange. Traditional farming and fishing had to be abandoned in favour of producing export crops for First World markets.

The rhizoids of agriculture in the US and Europe have acquired so much political influence, in conjunction with their suppliers and processing firms that they are able to displace or transform traditional rhizoids in developing countries, so much so that domestic agriculture needs to make way for the growing of export crops.

In recent years The Peoples Republic of China has become a major manufacturer of industrial goods, produced at extremely low wages under sweat-shop conditions, often under contract to TNCs. Adverse environmental effects are ignored, threatening ecological catastrophes. As the country has joined the WTO and must, therefore, lower its level of import protection, peasant farming is displaced by imports, whilst the expansion of manufacturing requires land that used to be farmed. Workers in industry are exploited to the point where they are burnt out by the time they are between 30 and 40.[375] The expansion requires large quantities of raw materials such as oil, logs, iron ore etc. from the rest of the world.

Transporting large quantities of agricultural produce around the world, of course, takes up resources of energy, clean water and clean air. The costs of the resulting pollution are not taken into account in the prices of this trade.

An even more insidious example of modern colonial practice is that large First World firms search for rare plants and animals as well as varieties of rice and other plants bred selectively by local farmers over centuries in the Third World, in order to patent their genetics for the development of new pharmaceutical and other products. Once patents are taken out, the inhabitants of the Third World have to pay for the use of the products developed on the basis of their own heritage.[376]

12.3.5 General

In a general sense the history of colonialism underlines the truth of Adam Smith's observation that the extent of the division of labour depends on the extent of the market. When existing markets have insufficient capacity to absorb production (at a profit), the system will search for new markets. However, this process is not necessarily advantageous to those who are

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[374] Eric Toussaint, La Spirale Infernale de la Dette, *Manière de Voir 58*, le Monde Diplomatique, Juillet-Aout 2001, pp.86-89.

[375] Isabel Hilton, Made in China. Die Arbeiter von Guangdong in der globalen Produktionsschlacht, *Lettre International*, vol. 69-Sommer 2005, Berlin, pp.34-46.

14. Jean-Claude Guillebaud, *Le Principe d'Humanité*, Seuil, Paris, 2001, pp. 193-221.

called upon to provide the new markets, especially if they happen to live in colonies.

Under conditions of modern technology the theory of relative comparative advantage has an in-built tendency towards colonialism or imperialism. The reason is that the recurrent crises at the centre of the world's economic system force the largest enterprises to create new markets and new sources of supply in peripheral countries. Thus, they seek to create new relative comparative advantages for themselves. However, to be at the periphery means that one cannot deal with the forces from the centre on equal terms. One is condemned to be hewers of wood and drawers of water.

Colonial powers may be very destructive when they set out to create new comparative advantages to achieve their ends. Many local cultures and peoples have been destroyed in the process. Britain and the Netherlands shipped black people from Africa to the West Indies and the Americas to serve as slaves on plantations of cotton, sugar and tobacco, as the original Indian peoples had been largely wiped out by diseases and military actions of the colonists.

This is not to deny that colonialism has also had good effects. Indeed, in many countries large areas of fertile land have been made productive for agriculture. Around the world crops developed by colonial powers have changed consumption patterns with products such as sugar, cotton, coffee, cacao, rubber and tobacco.

12.4 Clashes between Modern and Traditional Agriculture

Marc Dufumier has shown that Third World countries in Africa, Asia, Latin America and Oceania used to have agricultural systems that had been developed over centuries to blend in with the local conditions of environment and climate such that, apart from climactic disasters, they had sufficient not only to eat but also to support wider cultural endeavours, including cities.[377] In the following I draw on his section on Latin America.

He describes in detail how traditional systems were transformed by the introduction of Western large-scale modern agriculture, often as part of the establishment of colonial empires. The colonists took large areas of land and required the former peasants to work in mines and factories as well as on large plantations that worked for export to Europe and the UK. As a result the old systems could not be maintained, the original population became under-nourished, fell victim to imported diseases and often had to be replaced by imports of slaves from other countries. Many landless peasants squatted on land of the large proprietors. The economic depression of the 1930s plunged the plantation based exports into crisis, as demand for their products declined sharply. Local currencies were depreciated significantly, often in competition with other countries, making it profitable to set up manufacturing industries that enjoyed a fair degree of protection on the basis of profits accumulated in

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[377] Marc Dufumier, op.cit.

the past. After the Second World War, Argentina and Chile continued this policy of import substitution on the basis of high import protection. The policy enabled the formation of trade unions as well as middle classes. European and USA industries saw new markets opening up in Latin America for machinery and chemicals. Thus, they substituted such exports for exports of consumer goods. Often, countries concerned had to borrow foreign capital to finance their industrialisation. However, the process was constrained by domestic markets that had insufficient purchasing power.

Nevertheless, the urbanisation drew in large numbers of peasants, whilst the distribution of land remained highly unequal. In 1955 in Chile 2.2% of estates of at least 1,000 hectares accounted for 73.2% of the total.

The USA hoped that by creating a more prosperous group of farmers, they would minimise the danger of political unrest, enlarge the markets of manufacturers, in which US capital was at stake, improve the supply of food to cities and halt the outflow of poor peasants to urban conglomerates. Environmental problems that might arise from these policies were not considered.[378] The only group opposed to these policies were the old oligarchies, who had the support of the military and who retained the reins of government. As a result land reform failed or benefited only a small group of farmers.

In Chile the reform process was halted under the military regime of Pinochet. Nonetheless, they allowed the sale of titles to land allocated to 40,000 farmers.[379] Pinochet then adopted liberal economic reforms proposed by the 'Chicago Boys', economists trained by Milton Friedman at the University of Chicago. Import protection was removed in the belief that international trade would encourage the growth of industries based on Chile's comparative advantages such as very fertile land, steadily watered by melting snow from the Andes, long hours of sunshine, seasons opposite to those of the Northern hemisphere and plenty of cheap peasant labour. About a decade later during the 1980s, other Latin American countries were forced to implement similar policies under the structural adjustment programme of the IMF. The latter had to be called in to deal with the unsustainable foreign debts of these countries incurred on the basis of petro-dollars lent by banks that had acquired them from oil-rich countries, following the oil shocks of the 1970s. The low profitability of industries established under the import substitution policies was a key reason for the liberalisation. Dufumier rightly argues that one may also say that the policies had failed on account of half-hearted agricultural reform.[380]

The Chilean land redistribution, however, has passed by the descendants of the original population. Their numbers have increased, whilst they have lost land over the centuries. To cope with this, they have been dividing up the

[378] ibid., p. 377.

[379] ibid., p. 380.

[380] ibid., p. 383.

commons still under their control. As a result the areas under commercial cultivation have been expanding, whereas the commons used for grazing animals have become smaller, although the number of animals on them has been increasing, resulting in severe overgrazing and land degradation, so that they cease to act as a buffer for rainwater. Conflicts arise about access to water for irrigation. Thus, the cultivated areas suffer on account of receiving less manure from animals that used to graze on them overnight, so that the amount of humus in the soil diminishes, leading to a more unstable structure and erosion.

In general, in all the Andean countries, improved access to ports has not only enabled farmers at higher altitudes to be connected to overseas markets but has also exposed them to competition from imported cereals. As a result, they plant less grain and more crops (potatoes) that are less exposed to overseas competition. The danger is that the same crops are grown year after year, resulting in new weed and insect problems, necessitating, in turn, the application of chemical sprays. Most farmers need to find jobs off-farm either in towns or on large estates. High rates of unemployment make this difficult, however. Even in Chile, about 50,000 peasants abandon farming every year, but find it extremely difficult to get alternative employment. In order to be able to manage this problem, Chile has been given a delay of 18 years before all import tariffs on cereals and beef meat should be abolished as part of the Mercosur free trade treaty. In Bolivia and Equador, small farmers have resorted to growing drugs (coca) or coffee in areas of forest cleared by oil companies. Large numbers of them attempt to migrate to the USA or Europe. Once they succeed in getting work they remit money home, where it is used to improve the standard of living.[381]

I have related this story in some detail because it illustrates so well a number of issues:

1. A system of free market economics run by and for TNCs on the basis of expected rates of monetary profitability is essentially unstable. As a result of a drive for technical innovation so as to obtain and increase market share in combination with continual cost-cutting, particularly labour costs, neither import protection nor protection of agriculture can be accepted. The system keeps searching for new markets.

2. In the process of removing import barriers control shifts from the nation state to the TNCs, with farmers becoming dependent on their supplies, processing and marketing.

3. As such control is installed, agriculture as practiced for centuries in tune with local climate, geography and geology, is put under pressure or destroyed and farmers are forced to seek employment in cities where it might not be available.

[381] ibid., pp. 385-389.

4. Since the new science and technology-based agriculture is driven by the need to make capital invested profitable in the short-term, the long-term capacity of soil, plants and animals to sustain such agriculture is not considered and is likely to be jeopardised in one form or another.

5. Considering that over the next fifty years or so the world population is projected to grow from 6 to 9 billion, there will be large numbers of young people in the Third World who can find meaningful work neither on farms nor in cities. They will try to migrate to the First World. Since unemployment is endemic in those parts as well, they will remain at the bottom of the social ladder, congregate in ghettos etc, forcing the countries concerned to strengthen security and order. Thus, free trade in agricultural products calls forth a trend towards police states in rich countries who will demand that Third World countries control the mobility of people.

6. The economic system as a whole is prone to crises due to purchasing power distributed being insufficient to purchase total output. Technical innovations increase productivity per hour worked, so that the demand for labour and hence the production of money incomes to be spent on output produced decreases. To avert such crises, the TNCs are busy finding not only new markets but also engineering new needs (turning wants into needs via advertising).

7. Such crises will become more severe and longer lasting as the modern agriculture it has installed depletes and pollutes resources such as water, degrades soil structures, and through industrial farming of large numbers of poultry, pigs and cows, may cause bird-flu (which might trigger a human flue pandemic), swine fever and foot-and-mouth disease. Disasters involving genetic engineering, if any, could cause food shortages in large parts of the world.

8. The distribution of income and wealth becomes more unequal (profits and salary packages of management increase much more rapidly than wages), leading to social problems.

9. The on-going reluctance of the EU and the USA to stop protecting their agriculture and to abolish export subsidies should be seen in the light of their unwillingness to have their farm sector competed away by cheaper Third World imports. However, they are not afraid to compete unfairly against Third World countries' agriculture. This is nothing but another form of colonialism.

10. Attempts by the First World to prevent immigration from the Third World, if successful, would tend to render labour immobile across country borders. The same cannot be said of capital, however. The implication is that wages in Third World countries would continue to fall, with production shifting to urban conglomerates in the same countries, albeit without being able to employ all people. At the same time the rich countries could not absorb all the output from the Third World. They

would have a growing unemployment problem. They would re-introduce import protection and shift their agriculture to the production of energy (biomass) to overcome a growing shortage of oil.

11. It is possible that over a period of time, states will want to re-assert their control over the production of food and the ecology within their borders by means of import controls and the protection of nature. Thus, a dialectic emerges between freedom and control, between states and business corporations.

12. Running through the dialectic of business freedom and state control is a dialectic between industrial agriculture and organic indigenous based agriculture. As the problems and dangers of modern science/technology based agriculture become apparent, opposition to it grows with attempts to replace it by environmentally friendly organic agriculture. This dialectic might lead industrial farming to take over organic principles to some extent.

12.5 The Nation-State and Free Trade

This story about Latin America highlights that not all nation states that are members of the WTO (148) have full control over their international trade. For practically all countries economic control has been shifting to financial rhizoids in which large TNCs, banks and investment funds (including pension funds) and the G8 countries are at the centre. Economic control should not be seen, however, as divorced from political and military relationships. The USA has been trying to establish military and political control over Middle East oil reserves so as to be able to control the European and Japanese economies. It has also encircled China with military bases. China has built up a major stow of foreign exchange denominated in US Treasury Bills, so that it has the potential to let the US Dollar fall. Thus, the presence of key stows and the emergence of new manufacturing countries such as China and India leads to a re-configuration of political and military relationships.

Their size notwithstanding, TNCs need the willing co-operation of nation states, even though they might have to buy such willingness for money. Increasingly, there are signs that Third World countries are not prepared to accept all rulings of the rich countries. They have managed, for instance, to obtain permission to purchase generic medicine, whilst still under patent protection, as part of an emergency provision in WTO.

The question to be asked is whether there is a conflict between order and freedom as far as the relationship between nation states and international trade is concerned. To answer this question we should turn to Dooyeweerd's theory of enkapsis again (Ch 10). A state does not depend for its existence on business enterprises. However, when people get together to form a business corporation they need to comply with the law pertaining to such corporations and such law is administered by a state. Thus, there is a foundational enkapsis between the state and the corporation. States may impose legal restraints on international trade either in the form of tariffs and quotas or in the

form of prohibitions and penalties on infringements. This enkapsis is reversed, however, if a state becomes dependent for its existence on the capital and policy preferences of TNCs. This is an example of economism.

This may happen under Neo-liberalism and the Washington Consensus (Ch 9.2) if the private sector is able to incur a large balance of payments deficit and a high foreign debt. Overseas investors would then put pressure on the Government concerned to obtain flexible labour markets based on individual contracts, foreign exchange markets free from controls and a light regulatory regime (i.e. as little constraints on mining, discharge of pollution etc.). Governments should, however, protect private property (rule of law).

The influence of John Locke (1632-1704) on the formation of the Washington consensus is easily discernible. In his view the state should protect the inalienable and innate rights of the individual to property, life and liberty. The only boundary to the exercise of these rights within a state is the common good, understood as laws enacted by parliament and impartial judges, in other words as a formal 'rule of law'. Industrialists would appreciate this theory as it would justify the accumulation of property, without state interference, provided it was done under the formal rule of law. However, it can also be argued that if individual property rights were threatened by an influx of cheap imported products, leading to the demise of once profitable businesses, the state would be justified to protect the common good by import duties. Locke writes, for example:

> Political power, then, I take to be a right of making laws with penalties of death, and consequently all less penalties, for the regulating and preserving of property, and of employing the force of the community, in the execution of such laws, and in the defence of the commonwealth from foreign injury; and all this only for the public good.[382]

So, what does the idea of the 'public good' entail? Since Locke does not provide a clear idea of what it means, except in the form of formal criteria such as impartial judges and participation of citizens in government, it could be taken in the sense of protecting property rights against foreign imports. Indeed, business people might be in favour of free trade today and in favour of protectionism tomorrow, depending on how trade affects their profit and loss account.

Another ambiguity in Locke's statement is the concept of commonwealth. In his days, Britain had already built up colonial possessions around the world. These could be used to the advantage of the commonwealth. In the 19th century Britain's land-holding classes could live without having to rely on income from agriculture, as they had built up financial interests in domestic industry as well as in foreign ventures around the world.

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[382] John Locke, *Two Treatises of Government*, Book 2, a new edition corrected. London MDCCCXXI, pp. 189-192.

Despite having developed in the context of British imperial designs, the economic theory of international trade largely abstracts from nation-states, certainly from their positions of financial and military power in the world. In a sense this is not surprising since the physiocrats and Adam Smith reacted against mercantilism, under which for centuries states had sought to control foreign trade and economic life so as to be able to finance wars. They argued for freedom for commerce so as to increase the wealth of nations, to borrow Smith's phrase. In his view the further the network of markets could be spun the further the division of labour could be extended (Ch 5.11) and the greater as a result the economic cake would be.

This concept of freedom, therefore, had an ulterior motive. The idea was not to restore the freedom of economic actors to function responsibly in matters economic, but to increase the wealth of nations, the rate of economic growth to use a modern term.

Hobsbawm has underlined this point by linking the theoretical abstraction from nation states to liberalism, which as a political movement thought of the state as interfering with the `autonomous and self-acting operations of `the market'. Liberalised economies functioned and grew through the economic decisions of its basic particles:

> Moreover, such an economy recognised no frontiers, for it functioned best where nothing interfered with the free movement of the factors of production. Capitalism was thus not merely internationalist in practice, but internationalist in theory. The ideal of its theorists was an international division of labour which ensured the maximum growth of the economy.[383]

However this may be, modern theoretical economists believe so strongly in the benefits of free trade (Ch 7) that they tend to ignore factual evidence that import protection has allowed countries to grow more rapidly than those operating under free trade regimes.[384]

When discussing the difference between the theory of international trade, which recognises no nation states as such, and the existence of such states as centres that succeeded in attracting successful business companies, Hobsbawm notes that only developed states could do this, and not the rest of the globe:

> ... whose economies were politically or economically dependent on the developed 'core'. Either such regions had no choice, since a colonial power decided what was to happen to their economies, or an imperial economy was in a position to turn them into a banana or coffee republic. Or else, such economies were not usually interested in alternative development choices, since it clearly paid them to turn themselves into specialised producers of primary products for a world market constituted by the metropolitan states.[385]

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[383] *The Age of Empire*, op.cit, p. 41.

[384] Paul Bairoch, op.cit., gives many examples.

[385] ibid., p. 42.

Although the economic theory of dependency, which is part of the literature on developing economies, acknowledges this difference between centre and periphery, it is not part of the current public discourse of economists and business interests.

12.6 Agricultural Open Rhizoids and the Treadmill Problem

Modern agriculture has become increasingly subject to the powers of science, technology and economics (Ch 10). In practice this amounts to a growing dependence of farmers on the expertise of universities, agricultural extension services, veterinary skills and companies supplying a range of technically sophisticated implements, fertilisers, chemical pesticides, plants, seeds and animals. Of course, processors of farm produce, distributors and Governments will also impose their requirements on supplying farmers. This can go right up to supermarkets. Such subjection to expert systems has been called TATE, meaning Technical Administrative Task Environment by sociologist Benvenuti.[386]

The higher the profits made by farmers the easier it is for them to accept and to comply with TATE's demands. Guaranteed product prices are ideal for all involved in the system. Even when prices are fluctuating in sympathy with those on the world market, TATE will be important as a means of boosting productivity and production.

In order to start a production process, a farm must first organise its transformations. This requires:

1. Acquisition of land;
2. Preparation of land (ploughing, harrowing, irrigation, access roads);
3. Engaging staff (some may be family members);
4. Buying into processing firms (co-operatives) and or supplying co-operatives.

Once the land and pastures are ready, flows must be applied: seed, fertilisers, removal of weeds. Since these flows stand in a direct relationship to the size of the land, a farmer who wants to maximise his income cannot vary these flows very much. The costs of these flows are basically fixed. The more the farm has invested in steps 1-4 above, the less flexibility there is in applying these flows. Important flows that are not under the farmer's control are flows of sunshine and rain. They are indispensable if a flow of product is to be harvested, processed and shipped to users.

Each of the four steps has for centuries been embedded in social/cultural relationships and customs, often varying from one locality to another.

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[386] Quoted by Jan Douwe van der Ploeg, *De Virtuele Boer, set of essays*, cyclostyled. He refers to a 1990 publication, but without providing details.

Once the flows of harvested products have been sold, the farmer must await the financial outcome (return flow of money). If, over a period, prices are lower than expected when the farm's potential for transformations was established, the farmer is not in a position to adjust his production downward. He must still face his fixed costs. If a farmer is less efficient than his colleagues or burdened by high financing costs he may have to consider selling his farm to a more efficient larger neighbour. The land and its potential transformation will remain in production. The new owners are likely to have a lower cost structure and may employ less staff. The quantity of production may increase rather than diminish, despite lower prices.

The high price of agricultural land is due to the high marginal revenue product of the land rather than high average profitability.[387] This means that the extra revenue produced by one unit of land is very high in relation to the costs per unit of land (fixed costs divided by land area). Thus, when agricultural prices rise, the price of farmland rises accordingly. Farmers in these situations possess a very large capital, but enjoy only modest incomes. For this reason, farms tend to be handed over to the next generation on easy terms. Van Dijk et al. correctly conclude that if policy-makers want to reduce farm production in a free-market setting, then, the removal of guaranteed prices and greater competition from imports should lower product prices. If these lead to lower land prices, then, farms may be taken out of production. Surviving farms may be faced with a much exacerbated financing problem (land serves as collateral for mortgages).

In my view it is likely that farms close to the farms that wish to take land out of production and who are well capitalised (no mortgages) will buy extra land and thereby might lower their average costs of production if they can farm the extra land with most of their existing machinery. Thus, there will be a trend towards larger-scale farms, on which machinery of greater capacity can be used.

Van Dijk et al. note that production on very large farms, with growing overhead costs of organisation and management, working under conditions of cut-throat competition, does not serve the production of good quality food, sustainably produced. Large farming regions would impoverish. In order to prevent such costs the authors make a plea for a free-market system of price determination to the point where markets clear, coupled with fixed amounts of monetary support per hectare that is not related to the size and composition of production, subject to conditions for environmental management. In this way they believe that farmers will be able to enjoy a reasonable income, whilst overproduction is avoided. A shift to other forms of land-use would be encouraged.

Although this proposal appears to be effective in theory, it is questionable whether farmers would not regard the money received for their land as a reduction in their fixed costs and, hence, as a source of finance for the

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[387] G. van Dijk, J.de Veer en C.P. Veerman, EG-landbouwbeleid tussen vrije markt en vaste kosten, *Economisch Statistische Berichten*, vol. 77, no. 3864, 17 June 1992, pp. 598-601.

expansion of production. This is a problem associated with all forms of support that are not related to the volume of production or prices.

Assuming that such type of direct income support were not available, the proposition that lower import protection would lead to lower production does not necessarily follow. If all the land available remains in agricultural production, the larger more mechanised farms would increase their productivity and production to cope with the treadmill effect on their incomes. After a period surplus production might emerge again.

Another possibility is that the rhizoids expand by direct investment in areas where demand is high such as major urban areas. A good example is the US grain industry. US farmers in the Mid-West produce hard grains in large quantities, far beyond what is required by the US. The surplus is exported to many countries around the world. In recent years China has become an export destination. US firms such as McDonalds and Kentucky Fried Chicken have been selling their grain based meat products. To satisfy the growing demand for such products large industrial poultry farms have been set up that rely on the import of US grain.

The problems identified by Van Dijk et al. are characteristic of modern agriculture operated by open rhizoids. Key features are:

1. Exploitation of farms as other enterprises based upon capital (limited liability, for instance). This enables the mobilisation of capital via financial markets. Farmers may not live with their families on the farm anymore. They may live elsewhere, whilst managers run the farm. The family farm is in decline.
2. Farms are increasing in size and use little direct labour.
3. A shift to intensive industrial farming that uses little land (poultry, pigs, beef feedlots). Farms are located close to major transport routes and ports. This results at the same time in a major concentration of such enterprises. Such large-scale intensive farms tend to cause considerable pollution of water resources. Animals become things or pieces of capital, unknown to their owners. Similarly, land becomes part of capital invested. It is a tool to make money rather than a public good or heritage. These enterprises can quickly be shifted to other locations.
4. The output of such 'factories' can be sold to countries and regions far from the place of production, using modern means of transport and refrigeration.
5. Processing firms are becoming increasingly important.[388]

12.7 Technicism and Economism

The more open rhizoids expand the more closed agricultural rhizoids based around farms in certain localities dwindle in significance and are incorporated

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[388] Bertrand Hervieu, *Du droit des peoples à se nourrir eux-mêmes*, Flammarion, Paris, 1996, pp.55-81, for a detailed review of these issues with respect to France in particular.

into corporate networks where the main focus is on the profitable deployment of capital. This implies that under the operation of TATE, farms become part of an input-output structure that is dominated by output in monetary form. Inputs are organised so as to produce the largest possible output that can be sold profitably. It is typical for economistic forms of production that inputs are considered of less importance than outputs. Yet, in terms of the normative principle for acting economically (produce wholesome fruits/avoid waste), inputs are highly important. Should water in large areas be contaminated people and animals may be exposed to diseases and, in the long run, it might even become impossible to produce any outputs. In general, recent crises in agriculture such as BSE, Foot-and-Mouth Disease, the Dioxin scandal in Belgium, outbreaks of salmonella in various countries, swine fever in the Netherlands (Chapter 14), are all crises on the input side of agriculture.

A counter-argument in this connection is that the intensive farm production systems free land for the growing of crops. This is seen as important in the light of a rapid increase in the world's population. The relative decline in the importance of natural resources in primary production due to technological advances, is described by K. Anderson as follows:

> Farm chemicals-much maligned by some conservationists-raise crop yields and thereby reduce the arable land area needed to produce a tonne of grain. Intensive broiler, egg, and pig sheds and cattle feedlots-criticised by animal liberationists-reduce enormously the amount of land that would otherwise have to be trampled by cattle and sheep rather than cropped if all our meat supplies had to be grass-fed. Huge technological strides are also now being made that are changing fishing from a crude hunter-and gatherer activity to high-tech deep-sea operations and fish farming (aqua-culture).[389]

No doubt, Andersen is right in a very narrow sense. He ignores the fact that feedlots, poultry and pigs require grain (flows) and that they generate waste flows. To dispose of the latter land and water resources tend to be required, not to mention procedures/resources to avoid or minimise flows of pollutants. Anderson's article accepts technological progress without questioning. He refers, for instance, to the strong effect which agricultural research has on agricultural productivity.[390] The flow of this research continues to raise the flow of outputs from agriculture or reduces the need for inputs.

Especially, when rhizoids are set up for export purposes, the processing establishment imposes a TATE structure on farmers. Farmers have no personal relationship with their customers abroad. They will have a concern for the welfare of their animals, but at the same time they will have to ensure that they produce the maximum they are capable of. Most animals will never reach 'retirement age'.

If farmers become players in international technical/economic networks and are forced by these networks to use soils, plants and animals as technical

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[389] K. Anderson, Are Resource-Abundant Economies Disadvantaged?, *The Australian Journal of Agricultural and Resource Economics*, vol. 42, Issue 1, March 1998, pp.1-24.

[390] ibid.

operators to produce monetary profits we can say that we are dealing with technicised and economised structures that are deployed in the service of money. The effects of this system on the environment, on the welfare of animals and on the well-being of farmers are not evaluated, being externalities.

International (free) trade contributes significantly to this system as it is run by a variety of TNCs and supermarkets, far removed from farmers and their animals and plants. Capital can be invested or withdrawn depending on its returns. Existing closed indigenous rhizoids are broken up and parts of them incorporated into new open rhizoids. The farmers concerned are left to their own devices, forced to find alternative employment.

12.8 What if all protection was removed?

By way of scenario, let us suppose that all countries remove all forms of agricultural protection, so that each farm is able to produce for world markets. Existing rhizoids would respond quickly to the changed market outlook. Each will try to make the most of the new opportunities. Those that are based around large-scale farms in fertile plains endowed with good flows of sunshine, water and transport networks will be able to compete against supplies from far-away countries that are less well endowed and which are much smaller in size or not equipped with the latest technology. Thus, open rhizoids with farming cores in Latin America, Australia/New Zealand, USA, parts of Europe, Ukraine, Russia and parts of Asia and Africa, will do well. As their competition puts downward pressure on prices, a treadmill effect becomes noticeable. Rhizoids will seek to conquer competing rhizoids to reduce competition. Two or three very large dairy rhizoids centred in Europe and the USA could decide to remove the supplies from Australia and New Zealand by offering the farmers there a generous pension in return for ceasing to produce milk. They would take over the best of the remaining parts of the processing companies. Should the farmers refuse to accept, they may face a much reduced world market price at which they cannot survive. TNCs at the heart of modern agricultural rhizoids will use the advantages of free trade to expand their markets.

Farmers involved will be exposed to even greater demands to comply with the technical and economic requirements of suppliers and processors. Many Third World countries will see their peasant farming destroyed, with major social consequences also for the First World.

However, the large international rhizoids won't have it all their way. Smaller farms close to cities decide to supply organic produce of a quality far superior to what is offered by the large processors. Often they deliver it at home, which is much appreciated by the large numbers of retired and unemployed. They face a falling market and are forced to include smaller organic farms in their empires.

The financial interests of the large rhizoids would conspire with the working of the treadmill to strengthen technicism and economism in agriculture. At the same time the alternative organic farming movement would gather momentum as people prefer to buy good quality healthy food from well-known farmers in the neighbourhood, even when the price is high relative to what they have to pay for the products of industrial agriculture.

12.9 Free Trade and Higher Welfare

It may well be true that free trade as just surmised will lead to greater real GDP, perhaps even by head of the population around the world. However, this would not be a sufficient reason to support it. If we take the norm for economic life as a seeking of abundance, whilst avoiding waste, then, a wider set of criteria would have to be applied. We would wish to know whether the equality of the distributions of income and wealth would become higher or lower? Would environmental degradation be increased or decreased? Would the ability of people to feed themselves be enhanced or diminished? Would animal welfare be improved?

12.10 Conclusion

Conflicts about free trade between First and Third World countries have their origin in the persistence of colonial relationships under which the former provide manufactured goods and services in exchange for agricultural products and raw materials from the latter. Open rhizoids of agriculture competing under free trade rules tend to put farmers on a treadmill which strengthens technicism and economism, making farmers subservient to the demands of a Technical Administrative Task Environment (TATE). Such rhizoids are often destructive of closed rhizoids in Third World countries. One should not conclude, dogmatically, that free trade increases welfare for all. Whether it is beneficial or not should be determined on the basis of a much wider set of criteria, suggested by the normative economic principle, including effects on the distributions of income and wealth, the state of resources, etc.
There is a possibility that under complete free trade some new closed agricultural (organic) rhizoids might arise, although open rhizoids would expand to dominate most of the production and distribution system.

With respect to the question why nation-states should transfer their sovereign right to determine import protection to international bodies such as the WTO, it was found that if they were forced to do this in order to have access to capital and employment offered by TNCs, this would amount to a reversed foundational enkapsis or a case of economism. Normally, a business would have to comply with the law of the land (foundational enkapsis). The pressure to remove trade restrictions is likely to arise on account of the business companies' need to enlarge their scale of operations for both technical and economic reasons. Technicism and economism are thus intertwined.

CHAPTER 13: RHIZOIDS AND INTERNATIONAL TRADE AGREEMENTS

13.1 Introduction

The world economic crisis of the 1930s led to beggar-thy-neighbour policies, involving tariffs, quotas and competitive devaluations. Most countries set up tariff-barriers to agricultural imports and implemented domestic support policies for their agricultural sector.

After the Second World War, the Western powers decided to prevent a recurrence of the protectionist policies of the 1930s, regardless of the view that the crisis might have arisen as a result of trade liberalisation policies pursued during the 1920s (Ch 6).

This chapter outlines, first, the road followed by the international community towards the formation of the WTO in 1995. Second, it discusses some key features of the WTO; third, it examines the impact of technicism and economism on the problems of international trade agreements and, fourth, sketches an alternative road by means of rhizoid theory.

13.2 Towards the WTO

Initially, in 1944/45 the plan was to set up an International Trade Organisation (ITO) to ensure world-wide free trade as part of a post-War agenda. Central to this agenda was the belief that maintenance of full employment was essential to social harmony and democratic freedom. However, the USA objected to the formation of the ITO as it would be too powerful with respect to individual countries. When discussions were still under way, 23 countries decided in 1947 to reduce tariffs. They agreed to adopt a number of rules that were part of the draft constitution of the ITO, such as the most favoured nation clause, meaning that a concession made by a participating country to another participant should apply to all participants. All countries should be treated equally. The second key principle was that a good, once it had entered a country, should be treated identically with 'like' goods produced locally. Furthermore, the larger countries insisted in practice on the principle of reciprocity to the effect that concessions made by one nation should be matched by recipients. This set of rules, which boil down to ensuring non-discriminatory trade, became known as: GATT. It took effect as from 1948. A small secretariat was set up to administer the rules and protocols. However, the ITO never came into being.

Under the auspices of GATT a series of trade rounds were conducted designed to liberalise international trade in the sense of removing restrictions on international trade, reducing tariffs and quotas. These rounds took place in 1947, 1949, 1950-51, 1956, 1960-62, 1964-67and 1973-79. The last one held was the so-called Uruguay Round, which took place between 1986 and 1993. It led to the establishment in 1995 of the WTO as a body charged with the administration of GATT, the resolution of trade disputes and the preparation of further rounds of trade liberalisation. The WTO has all the form of the original ITO without its function to ensure the maintenance of full employment.

Instead, its focus on the functioning of international markets is no wider than that of the preceding GATT.

The GATT never encompassed all goods and services that are internationally traded. Textiles, leather, footwear, wood and paper as well as a number of light industrial manufactures and, last but not least, agricultural products, were exempted. It so happens that these are products exported by poorer countries. In other words GATT tended to favour the rich developed countries rather than the Third World countries. It was the intention of the Uruguay Round to remove these exemptions and to bring into the purview of GATT also non-tariff trade barriers, agriculture, intellectual property and trade in services.

It should not escape our notice that apart from the Uruguay Round all trade rounds took place during the period of the second Industrial Revolution and the recovery from the devastation caused by the Second World War. This revolution was marked by the widespread use of large-scale manufacturing processes, concentrated in large production complexes in major urban areas. Often these processes involved assembly-line methods of production. It stands to reason that the removal of trade barriers would have allowed the factories concerned to become much more large-scale as it would have allowed them to supply world markets. Employees, organised in trade unions, benefited from this system as they were able to obtain wage increases equal at least to increases in productivity and consumer prices. Employers were thus able to maintain their sales.

The availability of cheap energy (crude oil) stimulated the growth of this world-wide production system until the main oil producers decided to form a group (OPEC) that decided to raise the price of crude oil. They succeeded and in 1973 a major crisis erupted. Consumer prices rose sharply and production declined.

The Uruguay Round took place when the Third Industrial Revolution was already well under way. This revolution involves the widespread use of micro-processors, computers and telecommunications. The rapid development of the electronics industry and the growing power of personal computers have enabled a reorganisation of production processes. Design, control and production can be geographically separated. Production can be out-sourced to those who cost the least i.e. wage workers in Third World countries. People are regarded as a substitute for money. The less they cost, and the less are required per unit of output, the better for profits. In this world, trade unions have lost their power. As competition leads to further innovation and automation, national markets are too small to absorb the goods produced. Thus, an elimination of all forms of trade barriers, including those regulating foreign investment, is called for.

The automation of production makes people redundant. When real wages increase employers have an incentive to substitute capital in the form of machines for labour. The higher productivity that results should help them to conquer new export markets and this, in turn, should increase employment

again. This may result in higher unemployment elsewhere. But, application of the same recipe by the firms abroad that survive the export drive would then result in higher unemployment in the country that started this race. Overall unemployment would hardly decline. More likely it would rise as employers shifted production to countries offering lower wages as an easier way of conquering new markets. Lower labour productivity in those countries may be more than compensated for by lower wage rates and less social security provisions than apply in higher wage countries.

If, at the same time, as required by the WTO since the Uruguay Round, agricultural trade were liberalised unemployment in Third World countries would rise, as peasants would be unable to remain on their farms. Wages in urban areas in the Third World would fall even if more labour were demanded by First and Second World countries. Eventually, wages would be driven to zero, at which point the whole system would be in deep crisis.

Against this background it is understandable that the Uruguay Round widened the purview of the GATT Agreement. Members of the WTO are now able to complain about a wide range of barriers to international trade.

13.3 The WTO

Lori Wallach and Michelle Sforza have provided a detailed account of the first five years the WTO has been in operation.[391] Much of the information in this section is contained in their analysis. Rather than provide a long discourse on the detailed operation and rules of the WTO, I list the salient new features of the WTO, as compared to GATT:

1. The WTO is a free-standing organisation with legal personality and with self-executing enforcement, whereas under GATT there were only contracting parties who were only legally bound to the GATT rules to the extent they agreed in each instance. The WTO contains binding dispute procedures to enforce its trade rules. WTO enforcement can only be avoided if all members unanimously agree. Under GATT rulings on disputes and penalties for non-compliance had to be agreed upon by all parties, including the one that had lost. WTO panel rulings are automatically binding. Consensus is required to stop action.
2. If WTO finds a member country's law illegal, the member must change that law or face trade sanctions.
3. All panel discussions and documents are confidential.
4. Panelists are trade specialists selected by the WTO on the basis of their expertise and agreement with the WTO objective of promoting trade liberalisation.
5. The authors conclude from their analysis of the rulings made during the first 5 years that: '*no democratically achieved environmental, health,*

[391] Lori Wallach and Michelle Sforza, op.cit.

food safety or environmental law challenged at the WTO has ever been upheld. All have been declared barriers to trade.'[392]

6. Trade sanctions may be applied cross-sectorally, which may hit developing countries with little diversified export trade harder than others.
7. Appeals are possible from a lower dispute panel to the WTO's Appellate Body. However, the seven members of this Body are in fact employees of the WTO.
8. A member country may challenge another member country's laws if it believes that they nullify or impair any benefit to it from WTO.
9. New corporate property rights are created and protected by the Agreement on Trade Related Aspects of Intellectual Property (TRIPS), the Agreement on Trade Related Investment Measures (TRIMS) and the General Agreement on Trade in Services (GATS). However, rights of workers are not subject to protection. The 1996 WTO Singapore Ministerial Declaration noted that 'We reject the use of labour standards for protectionist purposes, and agree that the comparative advantage of countries, particularly low-wage developing countries, must in *no way* be put into question.'[393] The implication of this statement is that countries cannot discriminate against countries that abuse human rights or use child labour. The Most Favoured Nation Rule would prohibit this.
10. The treatment provided any member country must be provided to all members, regards of their human rights or labour records.
11. WTO rules prohibit distinguishing among non-product-related Production and Processing Methods, meaning that one cannot challenge a country on the basis of how products are manufactured, for example by means of slave labour.
12. The GATS Agreement requires WTO members to allow companies from other countries to establish a commercial presence (e.g. through mergers and acquisitions or subsidiaries); to provide services from one country to another and travel between countries to supply services. This could apply to the health care industry, where large monopolistic enterprises could be created, 'spanning the globe and literally holding the power of life and death'.[394]
13. The WTO Agreement on Government Procurement (AGP) prohibits non-commercial considerations in Governments' purchasing decisions.
14. There are no provisions to regulate competition for the benefit of consumers and entrepreneurs.
15. The Agreement on Agriculture (AA) as well as TRIPS and GATS have 10 to 15 year phase-in periods for developing countries for certain

[392] ibid., p. 197.

[393] ibid., p. 174.

[394] ibid., p. 166.

provisions. AA prohibits numerous internal support programmes and import controls used by developing countries to protect small producers and encourage self-sufficiency in food production. It permits, however, continuing export subsidies.

16. Uruguay Round tariff schedules provide for the escalation of tariff rates as value is added to a product. Thus, the lowest rate is for a raw commodity; the tariff rate increases with processing and manufacturing. Such tariff escalation provides and incentive for 'rip and ship' natural resource exploitation in poor countries. This is an advantage to countries needing natural resources and provides a disincentive to poor countries to industrialise.
17. TRIPS requires that members protect non-biological and microbiological processes for the production of plants and animals, meaning that plants and animals are patentable if they are cloned or genetically modified. Property claims on micro-organisms (human and animal cell lines, genes and umbilical cord cells) must be protected. Medical treatment is the only area explicitly excluded from TRIPS. All members must enact domestic legislation to enforce these new rights. Trademarks, copyrights, patents and logos of multi-national corporations are globally protected in this way. This must be achieved by 2005. The duration of patents has been put at 20 years, longer than applied in most countries. Pharmaceuticals, agricultural chemicals, plant varieties, seed germ-plasmas are all covered. The United Nations Development Program reported in 1999 that TRIPS make it much more costly for poor and developing countries to procure seeds for crops and to make medicines more accessible to the public. Article 27.3 (b) requires that members protect agribusiness ownership over plant varieties, including seeds. Corporations may receive patents on processes that have been used by indigenous groups for generations.
18. The Sanitary and Phytosanitary (SPS) Agreement sets strict limits on members' abilities to enact laws pertaining to food safety and such things as plant pests, animal diseases and quarantines. Measures that are based on insufficient scientific evidence are illegal. This runs counter to the precautionary principle that potentially dangerous goods must be proven safe before they are marketed. No country's SPS measures have been upheld by any WTO panel. Members should base their domestic SPS standards on international standards, guidelines or recommendations. Significantly different standards (often lower) from other countries may be declared to be equivalent to domestic standards. However, there are no objective procedural guidelines to make such equivalence determinations.
19. Article XX of GATT provides that a member is allowed to have laws that are deemed to be necessary for reasons of health or environment but that otherwise contravene WTO rules. However, the word 'necessary' has been interpreted to mean the least restrictive way to achieve the environmental goal.

In his preface to Wallach and Sforza, Ralph Nader argues that the WTO agreement promotes corporate managed trade rather than free trade. It allows corporate interests to view the globe as a common market and capital source.[395]

The introduction of a new disputes resolution procedure by WTO in 1995 (briefly, when a country calls for the resolution of a dispute a disputes panel is set up, consisting of three trade experts, who decide the case) has markedly increased the number of disputes. Up until April 1999, 160 disputes were brought before the WTO, compared with a total of 300 under GATT in the whole period of 1947-1994. The legal rules enunciated allow business to challenge laws issued by member countries in their public interest. The emphasis on new property rules, without any attention being given to human rights and conditions and remuneration of work is a reminder of John Locke's rule of law. However, contrary to what Locke expected such protection of property does not necessarily promote life and liberty, but often the opposite. To Locke's credit, I doubt whether he would have agreed to the secrecy of the disputes procedures in the WTO, given his concern for rules based upon proper parliamentary procedures.

In terms of agriculture, Wallach and Sforza note that the WTO strategy of transforming rural developing country subsistence economies into cash-driven market economies will have:

> alarming consequences for the 75% of the world's population still living on the land and depending on small-scale agriculture for their livelihoods. ...If the Uruguay Round pacts are fully implemented and the efficiency rates in production or food imports of western high-input farming are imposed on developing countries, 2 billion of the 3.1 billion people now living on the land would no longer be "needed" to participate in the agricultural sector.[396]

If the authors are right, and this is likely according to general trends during the past century, then, wage costs in developing countries will remain under strong downward pressure. In general, the various provisions just cited can be quoted in support of Edward Goldsmith's view that the world, especially the world of the least developed countries has become subject to informal colonialism.[397] By this he refers to the policies of developed countries, especially their banking sectors, to provide loans to developing countries, especially to their elites, in order to gain access to their natural resources and consumer markets. Such loans must be serviced in the currency of the lender, requiring the country concerned to export to world markets. However, if the loans are used to stimulate conspicuous consumption and major infrastructural works, then, export revenues will be insufficient to do so. This might put them into the hands of the IMF and, consequently, make them subject to its structural adjustment policies. This is simply a type of

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[395] ibid., p. X.

[396] ibid., p. 134.

[397] Edward Goldsmith, Seconde Jeunesse pour les Comptoirs Coloniaux, *Manière de Voir 58*, le Monde Diplomatique, Paris, Juillet-Aout 2001, pp. 77-83.

colonialism. Similarly, under pressure from the World Bank many developing countries have been forced to convert large areas of land into sugar production, whilst at the same time the European Union and the US protected its sugar industry and had to sell surpluses at subsidised prices on the world market. Little wonder that the terms of trade of developing countries have been under downward pressure.

If the claim of the authors that the WTO fosters managed corporate trade is correct, as I believe it is, then, we can assume that TNCs will continue to grow in size and importance. In 1991 there were some 37,000 multinational corporations with 170,000 foreign subsidiaries, whose sales were larger than the total value of world exports.[398] In actual fact, of these 37,000 corporations there are no more than about 200 that are truly operating on a global scale, being involved in primary, secondary and tertiary sectors.[399] Within this group there is an on-going movement of mergers and acquisitions, financed by debt to a large extent. Usually, such mergers result in restructuring and the dismissal of large numbers of employees. Such developments reflect a system of imperfect competition, marked by increasing returns to scale and scope and product differentiation.

13.4 Nature of Trade Agreements

GATT and WTO are designed to remove impediments to international trade that countries have put in place to protect their domestic markets against (cheaper) imports from other countries. This simple statement hides a number of important issues. Some non-tariff barriers are devised to correct market failures such as failures to protect the environment from industrial pollution or to protect vulnerable groups such as children from economic exploitation. In poor countries many people might work much longer hours than their counterparts in rich countries in order to achieve a minimum standard of living. Imposing the number of legal working hours of the rich upon the poor might not be considered just.

If the task of Government is understood as the maintenance and enhancement of the public interest rather than the protection of the private interests of a few, nation states would be justified in preventing environmental degradation and high income inequality as well as in promoting full employment. Obviously such policies have consequences for the pattern of international trade. If other countries felt aggrieved by such effects inasmuch as they would make it harder for them to carry out their policies of promoting the public interest, then, negotiations between countries to solve the problems would take place and hopefully result in agreements. Such agreements would be examples of proper societal relationships between nation-states.

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[398] S. Brakman and Ch. Van Marrewijk, Trade Policy Under Imperfect Competition: The Economics of Russian Roulette, *De Economist*, vol. 144, No.2, July 1996, pp. 223-258.

[399] Frederic F. Clairmont, Ces Deux Cents Sociétés qui controlent le Monde, *Manière de Voir 58*, op.cit., pp. 84-85.

GATT and WTO are also examples of societal relationships, albeit of a special kind. They are founded upon a particular economic theoretical belief that material prosperity will be maximised when all inter-country barriers to trade are removed and the invisible hand of the division of labour and pursuit of self-interest by producers and traders can do its presumed beneficial work.[400]

13.5 International Trade Theory

The economic theory underlying GATT and WTO has already been analysed in Chapter 7. Suffice it here to summarise the key features briefly:

1. Each country should be able to specialise its production on those things it can produce more cheaply than others (relative comparative advantage), given its endowment of resources.
2. Application of this principle extends the market (a higher degree of division of labour and specialisation) and, therefore, allows economic welfare to increase.
3. In the absence of barriers to trade imposed by nation-states, producers and traders will compete and thus be compelled to produce and sell at the lowest cost. Such competition will raise productivity.
4. The prevalence of imperfect competition in the form of product differentiation, increasing returns to scale and a growing importance of services, externalities, increases intra-industry international trade and raises the cost of import protection by much more than suggested by models based upon perfect competition.[401]

Being abundantly endowed with land, Australia, New Zealand and Argentina should specialise their production in land-based products. Such specialisation enables them to export agricultural and forest products and to import industrial products, which can be produced more cheaply by countries with a different endowment of resources, provided the terms of trade do not move against them. The tendency of agricultural production to expand beyond demand tends to curtail the purchasing power of such exports.

13.6 Theory Transferred to Practice

According to Schuurman (Ch 8.4 and 8.7) scientific knowledge should not be imposed upon practical reality without realising that the former is different from the latter. In his view, scientific knowledge is functional, universal, durable and gained free from particular interests, whereas practical reality is coherent, concrete/unique, changeable, with knowledge used for particular ends.

The economic knowledge summarised briefly in the four features above is scientific abstract knowledge. It abstracts from social, cultural, climatic,

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[400] It is worth noting that Adam Smith made his comment on the invisible hand in the context of a discussion on international trade.

[401] S. Brakman and Ch. Van Marrewijk, op. cit.

demographic, ethnic, religious, political and military differences between trading nations. Likewise it abstracts from differences between economic actors, such as the difference between peasants and business corporations, some of whom are obviously more powerful than others. Some have access to influential political figures or political parties and others buy such influence. It is also law-like knowledge that is easily understood as a prescription for practice: remove trade restrictions and economic welfare will increase. Finally, it ignores the changeable situation of trade over time.

By imposing the simple prescription of free trade upon international trading relationships and by allowing the world's richest countries to write and enforce the rules, practical life might be harmed rather than enriched. Although, formally, the members of the WTO make decisions by consensus when they negotiate a new multilateral trade agreement, in practice the larger and richer countries are able to shape a consensus in their favour. The panels that rule on disputes meet in secret, allowing pressure to be brought to bear on members. They have power to enforce their rulings, which can only be overturned if all other members agree to such a course of action.

If trade between countries becomes entirely free, that is to say outside the scope of Government intervention, then the nation states concerned lose part of their sovereignty. Since trade within nations remains subject to their laws, the companies involved in their export-and import business will consider all Government interventions and rules as barriers to trade. They will press for new trade rounds that remove such barriers. The history of GATT, especially during the Uruguay Round and the preparations for a new round under the WTO, shows that so-called non-tariff trade barriers loom ever larger in trade negotiations. They must be converted to tariffs and once that is done the tariffs must be reduced and removed. We may surmise that this process will continue until national governments themselves are perceived as trade barriers.

The prescriptive nature of scientific theoretical knowledge is reflected in the basic premise of GATT and WTO that import barriers should be eliminated. As mentioned above, the WTO has an elaborate dispute resolution procedure to facilitate this process. If a member country that believes that it cannot export to a certain country because of a perceived impediment, such as that the latter's environmental or social legislation is of a higher standard than its own, and, therefore, a non-tariff trade barrier, then it can call for a dispute panel to be set up. Disputes arise for all sorts of reasons. Indeed, the number and extent of disputes could become so large that the WTO itself will be considered a non-tariff barrier to international trade at some stage.

The growing use of the WTO dispute procedure is indicative of the transfer of law-like theoretical knowledge into practical life. In practice the civil law, administered by the courts of a country, applies to economic relationships should conflicts between contracting parties arise. It has always been understood that the courts should not be used to sue parties to commercial contracts frivolously, for example, for monetary gain. In the present commercial international arena, the danger is that the WTO disputes

procedure is used for securing material gains rather than for solving genuine problems that might arise due to the implementation of policies designed to promote a country's public interest. Wallach and Sforza document how the WTO Agreement on Technical Barriers to Trade has been used by a number of Governments to weaken the impact of other countries' rules with regard to public health and environmental standards.[402]

The implementation of free international trade gives scope to the extension of scientific technology across borders. Since this technology is embodied in machinery and laboratories of business corporations, the removal of tariffs and other barriers to international trade enables business to establish larger production capacities so as to achieve larger economies of scale and lower costs per unit of output. Such lowering of unit costs tends to compensate for higher costs of transport. Indeed the expansion of trade makes it economical to build larger ships, planes and trains. Transport costs per unit shipped, therefore, fall as well.

The importance of economies of scale is such that often it becomes economical to split up the production process of a particular product into a number of distinct operations located in different countries depending on the availability of supplies, raw materials and labour. The advent of advanced telecommunication and computers has encouraged this extended specialisation of production. One may see in this development an extension of the principle of neutral technical functions such as nuts and bolts that can be used for the production of a wide range of goods. The chassis of cars might be used for the construction of a number of different car models, for instance. The models can be produced in a number of countries. Again, the effects on the localities where the new plants are established are anything but neutral.

The marriage between scientific technology and the power of money (Ch 8,9), therefore, is deepened and strengthened by the liberalisation of international trade.

Scientific advice given by TNCs is not always reliable. Monsanto has always maintained, for example that its pesticide Round Up has no adverse effects on soil. Yet, it is highly toxic.[403] Nevertheless, potential users must rely on the information provided by producers without being able to check it, unless regulating authorities are sufficiently motivated and equipped to carry out such checks.

For many centuries inventions have enjoyed a temporary protection in the form of patents, enabling the firms or inventors concerned to recoup the, often high, costs of development. In recent times such patents are considered as intellectual property. The WTO has in fact strengthened the temporary monopoly of patents, as set out above. The danger is that only medicines are developed that the rich can afford. Such artificial scarcity that may shorten the

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[402] op. cit., pp. 12-50.

[403] *Le Monde Diplomatique,* Paris, Juillet 2001.

lives of millions of people is contrary to the economic norm of seeking abundance for all. The patent system may need amendment, therefore, for the sake of public health for both rich and poor.

Under the free-trade doctrine, those corporations that have developed new products to conquer new markets or to make markets of competitors obsolete will be able to argue that regulations of targeted countries opposing the introduction of those new products are barriers to trade and, therefore, should be removed.

In view of the major commercial interests at stake, it is to be expected that powerful innovating business corporations will spend large sums of money to persuade authorities as well as the public that their new products are entirely beneficial and that existing prohibitions are unreasonable and should be removed.

Thus, the hammer of free trade agreements is used to pave the way for business corporations to operate across the globe in the never-ending search for more money. It is for this reason that Wallach and Sforza believe that the WTO has been set up so as to promote corporate-managed trade.[404] The apparently general rules of the WTO appear to work in favour of large business corporations rather than in the public interest of the member states and their populations.

13.7 Networks

When production and consumption become part of network systems, costs become fixed costs rather than costs that vary with the volume of production. This has important consequences:

- Producers will want to have as many users for their system as possible in order to maximise profits.
- Consumers will increasingly be able to get access to services, such as various forms of software, by paying fixed fees on a time-basis.
- Very few people, however, will be required to run such network systems. A small group of highly qualified technicians will suffice.
- If the pool of consumers is small and if it is desirable to have a large number of them in order to lower costs per unit of time or service, network providers will seek to exclude other providers from their systems. This could take the form of exercising control over the physical infrastructure of networks (telephone lines, cables, railways, radio frequencies and satellites) such that others can only get access by paying very high fees. Large capital sums may be raised, borrowed and spent on securing networks and keeping competitors out of them. Whether or not there will be sufficient customers to earn sufficient fee income to pay interest and principal is a question not often asked. One assumes they will be connected to the system in due course.

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[404] op cit., p. 3.

- Young people and other groups may be exposed to broadcasts or narrow-casts from providers who can be located anywhere in the world.

Such network developments are not considered as part of the theory underpinning free-trade doctrines. Reality is changing more rapidly than theory.

13.8 Labour Standards

In 1999 when the WTO was about to initiate another trade round, the USA and the EU wanted to introduce labour standards into the agreements. However, the Third World countries strongly objected on the ground that it would be a blow against their export economies. Their costs of production would rise as a result. They saw this as a cynical device by the rich First World to reduce imports of final goods from the Third World.

Nonetheless, if properly supervised, an international agreement on minimum labour standards would be beneficial to all as it would prevent a race to the bottom.

13.9 International Rules

International trade agreements are cast in legal form to regulate economically qualified trade relationships. In the absence of a strong international juridical system of enforceable laws, institutions to rule on disputes arising under the agreements can easily be manipulated by the more powerful countries. Dispute panels set up under WTO rules are occupied by three experts in international trade. In most cases, they are citizens of the richer countries.

The principle of the most favoured nation clause has been extended during the Uruguay Round to para. 4 of Article 16 of the WTO, in these words 'Each member shall ensure the conformity of its laws, regulations and administrative procedures with its obligations as provided in the annexed Agreements.'

The annexed agreements refer to multilateral agreements relating to trade in goods and services and intellectual property rights. Korten has cited this clause to point out that it enables any member country to use another country's minimum standard in a certain area to attack higher standards applicable in another member country as an unfair trade barrier.[405] In other words, if country A imposes rules on imported goods to the effect of meeting social or environmental standards and these standards exceed those applying in other member countries, then, A's rules are in breach of WTO. If country A is so challenged it must prove to WTO panels that its restrictions are based upon purely scientific grounds. Otherwise, the rules must be abandoned. This issue played a role when in 1999 the WTO was asked to include enforcement of basic labour laws as a condition of global trade. Third and Second World

[405] Korten, op.cit., pp. 174ff.

countries objected strongly, arguing that the ILO should be the competent body for doing this.[406]

Another rule is that government bodies should not make purchases on political grounds. Thus, for example, local bodies that have adopted rules that they would not buy from countries like Myanmar, could be challenged under this rule, as documented by Klein.[407]

13.10 The Agricultural Agreement of the WTO

The Inclusion of agriculture in GATT was an important breakthrough, since it indicated recognition that domestic agricultural policies do link to international trade.[408]

The Uruguay Round specified 20 per cent reductions in domestic support expenditures from an agreed base (13.3% for developing countries), as calculated in the Aggregate Measurement of Support (AMS). Although the AMS was calculated on a product-by-product basis, it was the sum of those expenditures that was to be reduced by 20%. Qualifying policy instruments were grouped into three categories depending upon their perceived abilities to impact on production and to distort trade flows. These were:

1. The Amber Box, which includes market price support and input subsidies. The agreed expenditure reduction, on the basis of 1986-88 levels of expenditures, applied only to expenditures included in this box.
2. The Blue Box, including payments associated with production-limiting programmes where payments are based on fixed crop areas and yields, or fixed livestock numbers. The US and the EU have put in claims for this box, but in 2001 Japan did likewise for policy changes that would allow it not to measure in the AMS considerable support previously notified as market price support for rice.
3. The Green Box contains measures that are to be exempted from reductions. These are expenditures associated with programmes that have no, or at most minimal, trade-distorting effects or impacts on production such as government-funded general services, direct payments to producers, and payments associated with income insurance, disaster relief, environmental programmes and structural adjustment. Developing countries have been able to include a somewhat larger set of policies into this box.

The 1996 US FAIR Act replaced target prices, deficiency payments and set-aside with Production Flexibility Contracts and associated direct payments to farmers, so that its main crop payments could be moved from the blue to the green box. Japan and the EU are now the main proponents of retaining the

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[406] Naomi Klein, op.cit., p. 342,

[407] ibid., p. 415.

[408] I am indebted to Allan N. Rae, op.cit., for information.

blue box. The EU's reform proposals, a switch from price support to direct payments, will remain exempt from cuts so long as the blue box is retained.

Multi-functionality programmes, proposed by the EU, Japan and Korea, will be a major bone of contention, along with a variety of other bones. The current degree of import protection is indicated by the size of current agricultural tariffs at 64%, compared with 4% for non-agricultural items. In the EU and Japan agricultural tariffs range from 0% to 350% (EU sugarbeet) and from 0% to 322% (Japan dairy). The Cairns group and Third World countries want to negotiate the elimination over time of domestic support measures as well as a substantial reduction in tariffs in the hope of being able to increase their exports at higher world prices. Farmers so exposed to such competition would be likely, however, to sell out to larger farms or to buy larger farms in countries that offer cheap land. The treadmill would continue to move. Over time, world prices would fall again as production and productivity increased world-wide under the spur of competition. It is possible, however, that severe competitive pressures would make prices so volatile that the financing of innovations would become more difficult.

13.11 Opposition to WTO and 'Free Trade'

In November 1999 the WTO planned to launch another round of trade liberalisation in Seattle. Intensive discussions and negotiations had taken place in preparation. A detailed agenda had been circulated.

Much to the surprise of participants there were large groups of protesters present, some of whom became violent. Many opposition groups belonged to NGOs. Since 1990 the number of NGOs has been increasing dramatically from 6,000 to 26,000 in 1999. Some NGOs have a tripartite structure, meaning that they consist of representatives of national governments, international organisations and private groups. They are known as 'global public policy networks'. They make it possible to collect and marshal information that otherwise would not be accessible to governments and international organisations. They also help civil society to take an active interest in the work of these international bodies. To illustrate the importance of these organisations, suffice it to note that collectively they provide more foreign aid than all aid-providing organisations of the United Nations.

The opposition to WTO is based upon the following views:

1. Free trade endangers the environment.
2. Free trade endangers social justice.
3. Free trade leads to the imposition of American standards on the culture of others ('McDonaldisation' of the world).
4. The WTO deliberates and makes crucial decisions behind closed doors.
5. Globalisation leads to a more unequal distribution of income and wealth in the world in favour of the rich countries.

The NGOs prefer less trade and, instead, a greater protection of people and nature. Many of them subscribe to the Triple P principle for the conduct of business enterprises (People, Planet and Profit).

A few countries incorporate representatives of NGOs in their official WTO delegations (Sweden and the USA).

In order to achieve a more democratic institution as well as a greater influence on decision-making the Third World members would wish to introduce majority-rule. At present decision-making is by consensus. The so-called G7 countries, however, have resisted this demand, because they would then be over-ruled by Third World members.[409] The Vatican (with the position of permanent observer at the WTO) has joined the call for a greater influence of civil society. The Vatican would also like NGOs to have a consultative role in the WTO. Cardinal Martin (Vatican official) added that the poor countries should be given certain fundamental guarantees, for example that the rich should avoid protectionist measures in the agriculture and textile sectors.

With regard to social justice the European Commission had decided prior to the Seattle meetings of 1999 to propose that the WTO and the ILO (International Labour Organisation) would set up a joint forum to examine the relationship between trade policy, liberalisation of the market, foreign aid and social justice.

Since the Seattle protests, protesting, often violent, has become a regular feature of major international gatherings such as that of the Economic Forum in Davos, the G7 and G8 meetings and meetings of the leaders of the European Union.

In January 2001 a World Social Forum was held in Porto Allegre (Brazil) where 4,500 delegates and 20,000 participants gathered to discuss alternatives to neo-liberal globalisation. The following quote from a report of the gathering provides the flavour of the protest movement:

> The exploitation of the underdeveloped South by the imperialist North (crystallised in the former's US$2.6 trillion debt to the latter), the avoidable deaths of millions of children, the relentless spread of militarism, the juggernaut of environmental destruction, the uprooting of traditional communities and agriculture-whoever denounced the intolerable immorality and cruelty of the global status quo won stormy support.[410]

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[409] Nicola Dickmann, *Die Zeit*, "Viel Mehr als Bananen", 15 April 1999, pp.33/34.

[410] Dick Nichols, "World Social Forum Poses Alternative", *Green Left Weekly*, 7 February 2001, p.19.

13.12 Refutation of the Opposition's Critique

Anne Krueger, professor of economics at Stanford University and a former economist at the World Bank, has insisted that 'Globalisation helps improve labour and environmental standards in the developing world.'[411]

She constructs this argument as follows:

1. Poor countries are able to achieve more rapid gains in living standards for their people, and especially for the poor, when they have open trade policies and have access to markets in developed countries.
2. Child labour in poor countries is not because parents are cruel: it is because the alternative to child labour is starvation, or forced early marriages (for girls) or prostitution, or life in the streets as a beggar.
3. People choose schooling for their young when they can afford to do so, and the quickest path to that result is through more rapid economic growth.
4. For poor countries, access to markets and an open trade regime permits the rapid expansion of exports of labour-intensive goods, which in turn enables the rapid increase in employment of unskilled workers in good, well-paying jobs where they may receive training as well.
5. There is excess supply of labour in most developing countries such that people compete for jobs in the export sectors and there is little or no artificial suppression of wages.
6. Many now-developed countries, including Australia and the US, despoiled their environment during their early period of economic growth.
7. When we are rich enough we value a cleaner environment and are willing to commit public and private resources to improve it.
8. Pollution is greatest in developed countries as a result of high levels of production and consumption. In poor countries pollution involves unclean drinking water, inadequate sewage etc.

Krueger argues on the basis of traditional economic theory. Poor countries have a comparative advantage in the form of cheap labour and should be allowed to specialise in activities reliant on cheap labour. If the market is allowed to work it will generate a higher standard of living over time and this will yield the resources to clean up the environment. It is not clear how the countries concerned would be able to buy a larger amount of more luxury type goods if they sell their cheap labour and if the plants in which this labour is employed are constructed by means of foreign capital. Only if labour productivity rises in these factories would wages be able to rise. However, this would require new foreign investment. If there were other countries offering cheaper labour, then, the factories would simply migrate to them. There is

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[411] Anne Krueger, Anti-trade Zealots are off-track, in *Australian Financial Review* , 11 October 2000.

indeed evidence that countries offering cheap labour to TNCS compete amongst themselves for their factories.[412]

Another way of looking at Krueger's response is that she deploys a perspective of progress. By allowing the market and the price mechanism to work, poor countries will become richer and such increase in wealth will allow them to improve their standard of living as well as their environment. This is nothing but the theory of the invisible hand and the trickle down theory. In this case the trickling down effect is generated by the rich countries as they allow the poor countries to trade with them. This argument leaves many questions unanswered. For example, why have the poor countries become poor? Many of them had indigenous cultures and indigenous economies that were balanced and sustainable until the colonial powers of the West came along, subdued them by military force and started to incorporate them into their production and consumption networks as suppliers of cheap raw materials and cheap labour. More wealth accumulated in their parts of the world than in the colonies. When we consider the destruction of peasant agriculture and the forced migration of erstwhile peasants to the major urban conglomerations of the Third World, not to mention the huge burden of foreign loans imposed upon these countries, then, it appears that there is a great deal more 'trickling up' than 'trickling down'.

13.13 Does Rhizoid Theory Open a New Perspective?

According to rhizoid theory producers and traders seek to secure a regular flow of income by protecting their part of the chain from natural resources to consumer products through mutual agreements, technical innovations, financial reserves, political networks and links to other production/trading networks.

In theory trade relationships take place between willing partners either living in the same nation-state or in different nation-states. If a state imposes a tariff on the import of a good or service or provides a subsidy for the export of a good or service, international trade may be affected. However, *how rhizoids react to the imposition of a tariff* depends not only on the size of the tariff, the shape of the demand function and the reaction of local or potential local importers/producers but also *on the type of rhizoid involved.*

- If, say, the New Zealand dairy rhizoid wants to preserve the export market affected by the imposition of a tariff, it might decide to move its export product upmarket, offering a higher quality product that can be sold at a higher price, including the tariff. In order to be successful, a publicity campaign might be called for as well as changes to the domestic transformation and distribution process.
- Another tactic could be to locate a production facility inside the borders of the importing country that imposes the tariff. This could be advantageous, especially if supplies were to attract a lower or a nil tariff or that they could be obtained inside the importing country.

[412] Naomi Klein, op. cit., pp. 195-257.

- In some cases industry rhizoids might decide to abandon the export market concerned altogether and develop other markets in compensation, including perhaps the domestic market of the rhizoids.
- If rhizoids lack capital resources or lack access to capital markets, a suitable defence against the imposition of a tariff might be impossible and the rhizoid would have to incur losses or face its demise.

In each of these cases, the analysis considers not only the goods or services on which a tariff is imposed, but rather all the services, producers and workers involved in the production and marketing of that good or service. If the US imposes a special tariff, for example on lamb imported from Australia and New Zealand, leading to a fall in imports of lamb from those two countries, the question is what their lamb rhizoids will do. The following reactions are conceivable:

1. More lamb is offered to other existing markets, so that the price in those markets falls and demand increases. Lamb producers suffer a decline in profits, but may have gained a larger market elsewhere.
2. The rhizoids ask for a dispute panel to be set up under WTO (via their Government).
3. Lamb cuts of much higher quality are shipped to the US to gain a larger up-market share, resulting in the same or higher profits.
4. The rhizoids embark upon a major publicity campaign in the US for NZ and Australian lamb in order to maintain demand.
5. The rhizoids purchase stakes in the US lamb industry.
6. The rhizoids seek to develop new lamb markets elsewhere.
7. The rhizoids decide to switch from lamb to beef.
8. Broadly speaking, these reactions can be classified under the following headings:

   (I) Defensive (reaction 1)

   (II) Offensive (reactions 2, 3,4)

   (III) Co-operative (reactions 6,7)

It is possible that the US producers will withdraw from overseas markets where hitherto they had been competing with New Zealand and Australian suppliers as their domestic market is now much more profitable. In this case, the strategy of offering more New Zealand/Australian lamb in those markets would not result in lower prices or higher demand, unless consumers found the new product better in quality and shifted demand longer-term to the new supplies.

On the basis of such analysis one cannot say a priori that the imposition of a tariff by the US would be a disadvantage to lamb producers in the US, New Zealand and Australia. All might have gained eventually. The example highlights the advantage of a rhizoid being well organised and endowed with

reserve funds. A publicity drive in an overseas market is costly and is unlikely to be undertaken when a rhizoid consists of many uncoordinated members.

This brief analysis indicates that a priori one cannot say much about the effect of a tariff unless one is able to find out how rhizoids on either side of the border will react to the imposition of the tariff. The more far-flung a rhizoid is, with an extensive chain of flows and transformations, the more vulnerable it is to external interventions. Successful rhizoids, however, will have built in defences in the form of patents, financial reserves, pools of qualified employees, sets of inter-related flows and transformations and research facilities.

The longer the distance from production to final consumption is the more difficult it is for individual members of rhizoids to influence the working of the rhizoid as a whole, unless they occupy a key position in the system.

In actual fact, trade does not take place between countries but between residents of countries, some of which may be State-owned. Governments impose tariffs, quotas or outright prohibitions from their appreciation of the public interest. WTO agreements are basically an extension of such intervention.

In rhizoid theory one cannot say that tariffs are either good or bad. Nor can one say that free trade, if universally applied, would create conditions for a maximisation of economic welfare around the world. To find out whether free trade would have such an effect, one would have to have a detailed map of all important rhizoids and a clear idea as to how they would interact with each other consequent upon the introduction of free trade. Practically this is an impossible task. We can only make an approximation by setting out a scheme of possible interactions.

As suggested above, rhizoids can be created or organised for defensive, co-operative or offensive purposes.

Defensive

Members organise a defensive rhizoid to prevent outsiders from taking over their business. This might be done through legal structures or Government charters. There are cases where firms importing a particular product form a rhizoid to co-ordinate price setting, whilst customers are allocated to individual members of the group. They may do so to a) prevent cut-throat competition amongst themselves or b) to capture the market for their particular product rather than allow it to be taken by those who import a similar product from another country. The New Zealand dairy industry has been a defensive rhizoid for most of its history through a strong co-operative movement and by having a joint export marketing operation in the form of the NZ Dairy Board. In this way competition for overseas markets by individual co-operatives could be avoided.

Co-operative

Members of co-operative rhizoids agree to set joint quality standards, dispute procedures, training facilities, certification of work delivered and so on. Apart from that they compete amongst themselves. Importantly, co-operatives to process agricultural produce or to buy capital equipment jointly also belong to this category.

Aggressive

In this case rhizoids are formed in order to develop new markets, for example on the basis of new technologies that are too risky to be marketed or developed by a single firm. The European Airbus consortium of aircraft manufacturers falls into this category.

EU Agriculture

One reason why the Seattle conference in 1999 failed to initiate a new round of trade liberalisation was that the EU was perceived as being unwilling to offer meaningful concessions on agriculture. In recent years the EU has been changing the CAP towards a multifunctional agricultural sector that is capable of exporting without excessive subsidies and with safe methods of production. It should also be able to maintain employment in rural communities and to contribute to the preservation of natural resources and the natural heritage of the countryside. Multi-functionality would allow the CAP to replace its publicly funded farm income support policy by rewards for services for which consumers would pay either directly in the form of entrance fees to parks or a higher price for labelled products, produced in an acceptable manner, or indirectly via taxes to finance the preservation of landscapes. A deep liberalisation of trade would make it extremely difficult to maintain this range of benefits.[413]

Indeed, the consistent introduction of multi-functionality could be construed as a non-tariff barrier in terms of WTO. However, we may also see the CAP as a way of forming a European agricultural rhizoid aimed at self-sufficiency with exports as a type of safety valve and imports as complementary to its production. It is a rhizoid characterised by TATE, with a major role played by suppliers and processors as well as by farmer organisations, universities and Government departments. Opening up this whole structure to competition from imports would endanger employment and knowledge structures built up over long periods on the basis of a considerable investment of public money. Higher prices paid by consumers may reflect the costs of preserving and enhancing this system. The EU probably prefers to be selective as to the type of imports it is prepared to allow.

The EU rhizoid may be characterised as a primarily defensive rhizoid. By contrast, the US agricultural rhizoid is much more diverse, with the grain rhizoid being primarily aggressive and as such supported by Government export subsidies as well as income support systems through a system of Farm Bills enacted by the Federal Government. It is aggressive because it is

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[413] M. Keyzer and M. Merbis, WTO and the failure of Seattle, Notes and Communications, *De Economist*, vol.148/No 2, 2000, pp. 259-271.

based upon the need to conquer export markets for surplus production, whilst such surpluses are being maintained by Government support. Moreover, US corporate interests such as McDonald join in this export drive by developing tastes abroad for US grain-based products. Thus, the US prefers to have access to other countries' markets, whilst opposing foreign access to its own markets.

The New Zealand agricultural rhizoids have been defensive in character, aimed at keeping access to markets that over many years used to buy New Zealand products, especially the UK. The formation of Fonterra Dairy Group Ltd. might indicate a shift to a more aggressive stance.

Agricultural rhizoids in countries like China and Japan have been co-operative/defensive. Obviously, they do not allow foreign entry, or only under strong controls with regard to quality and need. Behind border controls, however, they are co-operative inasmuch as they work together with Government agencies to achieve self-sufficiency where possible.

In view of such differences between rhizoids, it is not surprising that a general agreement to liberalise agricultural markets is very difficult to achieve. Bi-lateral and regional agreements would be much easier to negotiate. This would enable participants to foster their own rhizoids, without facing sudden disruptions to key industries.

13.14 The Costs of Protection

Brakman and van Marrewijk have argued that the Heckscher-Ohlin model, assuming perfect competition, shows that the costs of protection against imports are rather small, but that in a dynamic world of imperfect competition the costs are much higher. They note, for instance, that the welfare costs as measured by Harberger triangles can only be measured if products are actually present.[414] However, protection could result in fewer goods of lower quality or to goods not being developed. Moreover, goods invented abroad might not become available.

Although the authors may well be right, one could also surmise that protection would foster innovation and development of innovations, precisely because of the absence of foreign made goods or because of the low quality of domestically produced goods. In theory one cannot come to any definitive conclusion one way or the other. Clearly, rhizoid theory cannot do this either. However, it allows the drawing of a road map, with attention being given to the actors involved and their interactions, towards a conclusion. It suggests that the country that chooses to introduce import protection must consider what will happen to the rhizoids affected. Would they be able to expand and to produce good quality substitutes? Are they supported by a good education and training system? Is the population creative? Could a new rhizoid be established in co-operation with existing rhizoids, without the latter being destroyed through a 'brain-drain', for instance?

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[414] op.cit., p. 238.

In the light of the literature referred to we should conclude the WTO is founded on a theory, which lacks a strong empirical underpinning. Because of this distance from reality, the WTO rules can be exploited by ruthlessly operating business corporations to conquer new markets and/or to destroy rhizoids and markets in countries that hitherto were not exposed to them.

In the light of the economic power exercised by TNCs in the modern world such that some have called it an empire of Global Capital, the WTO serves as one of their instruments to maintain and increase market shares and profits.[415] They use the WTO to further diminish the power of nation states.

13.15 Conclusion

The WTO is part of the Washington Consensus, the neo-liberal ideology of private property and free trade. It is based upon the belief that the abstract nature of the economic theory which underpins the free trade doctrine corresponds with practical reality. Projection of this abstraction into practice would strengthen the existing trend towards the technicisation of agriculture. The treadmill would keep turning and Third World farmers and agriculture would continue to be subservient to the First World. The benefits of removing import protection would accrue to farmers with large properties in countries that are able to have large-scale farming.

Rhizoid theory shows that import tariffs are not necessarily harmful to the country that imposes them. A detailed analysis of rhizoids involved in trade prior to the imposition of a tariff would have to be undertaken to determine costs and benefits. The public good of the imposing country should be one of the main criteria. A similar analysis would be called for in the case of an intended removal of protection. Potentially, this could destroy assets, accumulated knowledge and employment.

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[415] Wes Howard-Brook and Anthony Gwyther, *Unveiling Empire; reading Revelation then and now*, Orbis Books, New York, 1999, pp. 236-260.

PART IV: CASE STUDIES

As part of the preparation for this study two case studies have been undertaken. The first covers the outbreak of swine fever in the Dutch pork industry during 1997. As the drama unfolded it provided an illustration of both technicism and economism and their impact on the pork rhizoid. The second provides an overview of the development of the New Zealand dairy industry from 1950 to 2000, with an update of recent events. It aimed at testing the treadmill hypothesis with the industry considered as a rhizoid.

CHAPTER FOURTEEN: The Dutch Swine Fever Crisis of 1997

14.1 Background

During the 1950s one could not find a specific pork rhizoid in the Netherlands. Farmers often kept a few pigs on their farm and fed them with waste products from the farm or from the town nearby. On the poorer sandy soils in the South East corner of the country farms were usually small and carried out mixed farming of crops, a few cattle and some pigs. The price of the land was the lowest of all farm-types in the Netherlands during that period (Fl. 2,178 per hectare compared with Fl. 3,350 for river-clay areas). The small farmers in that area were usually poor. In 1950 the total number of pigs was less than 2 million nation-wide. By 1970 the number had risen to 6 million and by 1996 to more than 14 million. The number of people employed full-time on farms was estimated at 20,000 in 1996 and the number of employees indirectly employed full-time by the industry at 30,000, a total of 50,000 jobs.

In 1996 there were 21,245 pig farms carrying 14.419 million pigs. In total 24 million piglets were born every year, about one per second. Of these 20.8 million were raised for the production of pork; 18.1 million to be slaughtered in Dutch abattoirs and 2.7 million abroad and 3.2 million piglets were exported live.

There were only 8,000 farms specialised solely in pig-raising. An employee on such a farm could handle either 120 sows (production of piglets) or 1,200 pork pigs. The whole pig industry employed 16,000 men years in the primary sector, 13,000 in processing, 6,000 in transport and 17,000 in the retail trade. Export revenue in 1996 came to Fl 5.6 billion. Net added value was estimated to be between Fl 1 and Fl 1.5 billion per annum in the primary sector and at Fl3-Fl 4 billion for the whole chain. The trend towards larger scale farms has led to farms of 10,000 animals each.

The major change that made this expansion possible was the mechanisation of farming and the rigorous application of scientific knowledge. Farmers started to specialise their operations, striving to achieve large scale specialised and very intensive farming. The area of land per animal became very low. Given that the sandy soil in their area was not very fertile, the development of concentrated pig-farming by means of concrete boxes was logical as it was not dependent on the fertility of the soil. The pigs were fed not from wastes but from high-quality imported feeds such as tapioca and soy-beans. Since 1961 these could be imported from overseas, mainly through the nearby port of Rotterdam. At the same time trade liberalisation allowed the export of pigs and pork. Between 1960 and 1978 the export trebled, with Germany and Italy as main markets.[416] The expansion accelerated when in1978 the Dutch Government enacted legislation under which 50% of a new capital investment could be subsidised.[417]

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[416] These data are from Daphne Giesberger and Mathijs Bouman, Een Silicon Valley Vol Varkens, *Economisch Statistische Berichten*, vol. 82 no. 4119, 1997, pp.678-680.

[417] *Wet Investeringsrekeningen 1978.*

Giesbergen and Bouman wonder why the number of pigs became heavily concentrated in a small area notwithstanding the fact that the trade was not dependent on the availability of land, whilst the high demand for pig farms drove up the price of land to the highest in the country. In the period 1990-93 the price of land had risen to Fl 45,933 per ha, compared with Fl 47,067 in the river-clay areas. The answer was that the concentration of pig farms had allowed the construction of an efficient infrastructure of suppliers of feed (about 90 companies), specialised veterinarians, slaughter-houses and specialists in the breeding, fattening and trading (exporting) of pigs. Four of the five Dutch plants for the treatment of manure were established in the area. Co-operatives were set up which acted as knowledge centres for the benefit of members. Mention should also be made of specialised builders and construction firms.

Thus, the pig-farmers have obtained not only internal economies of scale, but also significant external economies, with consequent very low unit costs. Since they are competing with pig farmers in other parts of Europe (Germany and Italy in the main) on the home markets of the latter, low costs are essential to make exporting profitable, the more so since the product sold has remained a commodity in the form of carcasses or live pigs. Specialisation has taken the form of a) sow-farms which focus on the production of piglets b) farms which fatten piglets to pigs suitable for meat-processing. This specialisation proved to be a weakness in the rhizoid as it increased the chances of infection by the swine-fever virus during transport. The export is organised by transport firms establishing transit-areas where pigs are collected from the supplying farms and then combined in larger batches for export. During the swine-fever crisis it turned out that the required washing and dis-infecting procedures at these collection points often left much to be desired. In 1997 there were 45 such transit areas.

The farmers concerned have had a history of clashing with Government. Central Government has issued regulations governing the accommodation required for pigs (*Varkensbesluit*). Frequently, these were ignored. Similarly, transports of pigs must be notified. Often they were not. In response to the crisis the Minister decided to ignore farmers' promises and to actively check out farms for compliance with the law.

14.2 Tackling the Problems Caused by Expansion

The expansion of the industry was so brisk that towards the end of the 1980s major problems arose due to an excess production of manure and emission of ammonia which threatened to cause water pollution and led to the dying of forests (acidification). Local authorities (the provinces of Brabant and Limburg) issued regulations under a Central Government Act (*Interim Wet Ammoniak en Veehouderij*) which required farmers to account for manure on the basis of special entitlements. The number of pigs declined very slightly as a result. In 1989 local authorities imposed a maximum limit on the emission of ammonia allowed per farm in the form of ammonia rights. Such rights could be traded. Between 1989 and 1994 farmers could trade in manure entitlements but were not allowed to expand the number of pigs on their farm.

It thus became more profitable for a farmer who wanted to expand to buy another farm in another location (the travelling pig farmer).

Since 1994, however, a pig farmer has been allowed to increase the number of pigs provided that a) the extra pigs are put into Green-Label boxes which have a system for washing out ammonia (reported to reduce ammonia emitted by half), and b) the farmer buys out another farmer according to the number of pigs by which he intends to expand. In 1998, the Council of State of the Netherlands struck out the latter provision, because it believed that the requirement of using Green-Label stables was sufficient to reduce the emission of ammonia.[418] The local authorities concerned argued that the ammonia reduction policy had been devised in co-operation between Government bodies, environmental organisations and agricultural organisations. On the basis of provincial representations the central Government promised to put an amended Bill before parliament to give effect to the original ammonia-reduction policy.

It was reported in 1997 that in the village area of Someren, 60 farmers had sold their ammonia rights, whilst 20 farmers had expanded their operations. Farmers' representatives believed that the policies to reduce the excesses of phosphate and ammonia were successful. Phosphate spread out is estimated to have fallen by 30% since 1980 and ammonia by 40%.

The measures taken to improve the environment had the effect of increasing the production costs of farmers. They responded by increasing the scale of their operations, leading to a halving of the number of independent pig-farmers whilst the size of their operations doubled. The emission of harmful waste products per pig was reduced, but the overall number of pigs had increased. Some farmers responded by buying pig-fattening farms in Belgium.

Another effect of the measures taken was that the keeping of pigs for meat processing required much more manure-production rights than the rearing and fattening of piglets. Hence farmers shifted to the latter type of farming. In turn, this required the export of surplus piglets to fattening farms abroad. The measures encouraged the continuation of low-value commodity mass-production.

Concerns about the welfare of animals have led to increasingly stringent requirements for lorries transporting pigs. They must be provided, at least, with ventilators and drinking water installations. Such equipment has rendered the lorries unsuitable for other transport purposes. Some carriers branched out into the establishment of transit places for the export of pigs.

14.3 Rules of the European Union

The autonomy of farmers, and even of the Dutch Government, to regulate the pork rhizoid has been severely limited under the impact of the European Union. The Dutch Minister of Agriculture, for example must obtain permission

[418] The Council of State, amongst other things, deals with complaints from citizens against the way the Government acts by law or regulation.

from the European Commission in Brussels if he intends to implement a transport ban to deal with an outbreak of swine fever. Making such a request can be detrimental to the industry as export markets might be closed, resulting in lower prices. This is significant inasmuch as the presence of swine fever is difficult to detect. When symptoms appear samples must be taken and tested. This may take three weeks to allow incubation. Since symptoms are not always showing clearly, especially when older pigs are suspected, tests may turn out negative for a while. In some cases it can take two months to determine the presence of swine fever. Thus, transport bans might be imposed prematurely.

In 1991 the European Union forbade the vaccination of pigs against swine fever basically on the instigation of Denmark which feared a loss of export markets in Asian countries such as South Korea and Japan which strongly dislike eating pork from vaccinated animals. Similarly, the USA does not allow the import of meat from vaccinated pigs. Under such pressure the Dutch Government forbade the vaccination of pigs at the end of the 1980s. If it had required vaccination all export markets would have closed. Whilst the vaccination prohibition has saved the rhizoids many millions, the damage inflicted by the crisis of 1997 was a multiple of the savings so achieved. A lifting of the prohibition would have to be tackled through the World Trade Organisation.

Finally, the European Commission would normally pay half of the costs of measures taken with its approval. Should they be dissatisfied with the execution of the measures, then they might not pay their full share of the costs.

14.4 The 1997 Crisis

In February 1997 swine fever broke out and spread with great rapidity, partly because a lot of transport is involved as pigs are moved from breeders to fattening farms and then to abattoirs or to destinations abroad. Most of the pigs are exported either as carcasses or live. The fever was contracted through a lorry loaded with pigs which made a trip to an area in mid-Germany where swine fever was prevalent and had to return to the Netherlands. The frequent handling and transport of the animals required by the specialisation of farmers in breeders and fattening farms increased the chances of infection.

The Government reacted initially by ordering a preventive slaughtering of all pigs on the farm in question as well as on surrounding farms. Under pressure from farmers and on advice of veterinarians, the minister desisted very quickly from requiring the preventive slaughtering, although this turned out to have been the best strategy, and relied on a transport ban required by the European Commission covering the affected area, whilst prohibiting the export of live pigs. A transport ban has the disadvantage of keeping the virus alive. Subsequent to the initial outbreak it was found that, contrary to expectations, the virus was also transmitted via artificial insemination. The semen of an infected boar could be spread to a large number of sows. Thus, even the preventive clearing of affected farms might not have entirely eradicated the virus.

The animals destroyed were converted to fodder. The pigs had to be electrocuted on farms in specialised vehicles. In order to protect the butchers a low voltage had to be applied which did not kill the pigs quickly. A farmer reported that the spectacle made him sick.

Once the fever was established even the most stringent control measures failed to eradicate the virus from the area. Vets and control and destruction officers had to move from one farm to another. Moreover, no matter how clean the stables were, mice and birds were present and when their hosts had been destroyed moved to other farms where they spread the virus. Large numbers of pigs had to be destroyed. Farms which were free of the virus had other problems. They were not allowed to have their animals transported. Hence their pigs had to stay for much longer than usual in their boxes and became too large for them. They had to be slaughtered for that reason.

For these reasons, the Minister ordered preventive slaughtering as from early April.

Between 4 February 1997 and the end of 1997 425 outbreaks had been reported. About 9 million animals had been destroyed, most being healthy. A provisional estimate of the costs came to about Fl 3 billion. By the middle of November 1997 the pigs of 421 animals had been destroyed on the discovery of infection, whilst 1,200 farms had been cleared preventively and 1,500 had become empty in response to the Government's buy-out provisions. Under this regulation, fattening farmers could get rid of surplus animals which had become too big to fit into their boxes against a Government subsidy. Their stables became empty as they were unable to get a supply of new piglets under the transport ban. Thus, out of a total of 7,000 farms, 3,000 ceased to function. 2,500 people lost their jobs on farms and another 5,000 are estimated to become redundant in the near future. In the supplying and processing firms 800 jobs were lost, whilst the production of pig-meat declined by 25% to 1.4 million tonnes. A total of 15.7 million pigs were slaughtered which is 15% less than in 1996.

Naturally, the transport ban and the destruction of affected animals had an immediate effect on other links in the rhizoid. Abattoirs had to put staff on shorter hours. Some moved staff to abattoirs that were located farther from the most affected areas. By the end of May 134 abattoirs had about 5,000 staff working shorter hours. Under prevailing legislation Government compensation for reduced working is available for a maximum of four terms of 6 weeks each. However, the employees concerned lose their entitlements to unemployment benefits when they are put on reduced hours. One day lost per week because of shorter hours for example, means a loss of one week of entitlement to unemployment benefits. In order to minimise the need for reduced work time, the production was shifted as much as possible to abattoirs located outside the affected area. Staff involved re-located as well. As a result the need for reduction of working hours could be limited, sometimes to only 20% below normal work time. This created another problem, however, inasmuch as no permits could be issued for a reduction of

working hours of less than 20% of the average working week. In the absence of such a permit the Government would not pay unemployment benefits for the hours not worked. The trade unions argued, therefore, that these rules were not designed for a crisis which could last for more than a year. Moreover, they pointed out that in an industry based upon a chain of operations re-structuring should not be determined on the basis of one link, the pig-farmers, alone. All suppliers and processors and their employees should be part of a re-structuring plan. They pleaded for adding more value to the pigs by producing special cuts as well as bacon. Apart from job-losses as a result of the crisis, the trade union (*Voedingsbond*) was concerned about the loss of 2,000-3,400 jobs in consequence of the phosphate and ammonia reduction policy. They wanted assistance for re-training and extra education of employees involved.

It should be noted that many abattoirs imported animals from other countries, especially from Germany, despite the prevalence of swine fever in that country.

The peculiar nature of the problems caused for the existing facilities in the rhizoid was that there was only one abattoir able to slaughter heavy sows in the region. As a result many of such sows had to be destroyed. An alternative solution had been to transport them to abattoirs in the North of the country. Such transport, however, would increase the probability of spreading the virus. One considered also shifting the over-heavy sows to some empty piggeries in the area.

Pig-farmers in other parts of the Netherlands benefited from the crisis in the form of higher prices. This led to a Member of Parliament, representing a smaller Christian Party (*Reformatorisch Politieke Federatie*), Mr Stellingwerf, to propose the establishment of a solidarity fund fed by a levy on pork to be paid when the price rose above a pre-determined level. The fund could be used to compensate pig-farmers who lost their business as a result of the crisis. This proposal was rejected.

The authorities came to the conclusion that the number of pigs in the area was far too large and had to be reduced. One of the first strategies to achieve this objective was to kill piglets by injection, to be administered by a local vet, soon after birth. Farmers protested because this action would impair the hormone economy of the sows, even though they would receive a compensation of Fl 84 per piglet. They feared that they would become less fertile as a result. Nevertheless, the Lower House of Parliament approved this method of destruction. A total of 500,000 piglets had to be destroyed in this way. Pig-farmers were not obliged to participate. However, if they did not participate, then redundant animals which would be too big to fit in their boxes would be removed and destroyed at their own expense. The carcasses would be incinerated in ovens located close to Rotterdam. Farmers had to weigh up the chances of being able to sell their piglets after ten weeks at a value of Fl 160 per piglet or to accept the compensation with the risk of reduced fertility of their sows.

On 3 June 1997 the Government issued a regulation to the effect that no breeding was allowed for four months (insemination prohibition) in a circle with a radius of 10 km around one village, so as to dilute the density of the pig population. The 500-600 pig breeders within this circle would receive compensation. Some farmers ignored the ban. Checks by the Inspection Service found that some farmers had aborted their sows in order to hide the fact that they had been illegally inseminated. If the sows had been carrying the virus the abortions could have spread the virus.

On 12 November the insemination ban was lifted. It was realised, however, that incidental outbreaks were still likely to occur, especially through the so-called carrier-sow phenomenon. If a sow contracts the virus during pregnancy then she might be able to produce sufficient anti-bodies to overcome the disease. When the piglets in the sow's litter then contract the virus, they fail to recognise it as a dangerous intruder and, therefore, do not produce any anti-bodies. As a result, they will produce a great deal of virus. In order to detect such pigs a special screening was ordered in the autumn of 1997. On about 2,600 farms 214,000 blood samples were taken. Twelve infections were detected. Since there should not be any pregnant sows in the area subject to the insemination ban, any pigs born there within 4 months after the lifting of the ban would indicate a trespassing against the ban. The farmers concerned would be fined and would lose their animals. They would also forfeit the right to the subsidy made available as part of the insemination ban.

For most farmers the crisis involved a decline in the financial value of their farms. Since many had borrowed from banks against the security of their farms, the banks were faced with a fall in the value of the securities underpinning their loans. Moreover, many borrowers had problems meeting their debt service obligations. Government compensation applied only to the immediate problem such as the number of animals which had to be destroyed. Any damage incurred as a result of the destruction was not compensated for. The crisis was such that the so-called Stamping-Out Fund financed from contributions by Government and by a levy on slaughtered pigs raised by the semi-official *Produktschap voor Vlees en Vee* (a body responsible for the vertical organisation of the meat industry) soon ran dry. The Fund had a capital of Fl 100 million of which Fl 50 million could be used for an outbreak of swine fever. The transport prohibition meant that the levy could not be collected for about 40% of the stock of pigs, which was locked up. Moreover, no levy was payable on destroyed pigs. Thus, the *Produktschap* decided to increase the levy by 34% from Fl 1.86 per pig to Fl 2.50, a measure greeted by dismay by pig-farmers in the North of the country.

The pig farmers generally showed little solidarity with each other during the crisis. When, for instance a new infection was found in the Province of Gelderland in July and a complete transport ban imposed, 21 fines for trespasses were issued within a few days. Each trespass represented another possibility for disseminating the virus.

14.5 Government Attempts to Transform the Rhizoid

Soon conflicts arose between the farmers and their organisations and the Minister of Agriculture. The latter determined quite early on (July 97) that the number of pigs had to be reduced by 25% on the basis of the average number of pigs in 1996 or 1995 (at the farmer's choice) and with a simultaneous introduction of a quota system. Under such a system farmers would be able to trade their rights to a certain number of pigs, allowing smaller farmers to sell out to larger ones. The latter would thereby be able to increase their economies of scale. The parliament's Lower House passed a bill early in 1998 which provided for a reduction of 10% in the number of pigs during 1998 and, if still necessary for another 15% in 2000. The Government justified this legislation under the nitrate directive issued by the European Commission in 1991.The quota rights to a certain number of pigs would replace the existing manure rights. In this way the Government circumvented the European Union's rule that member states are not allowed to regulate a market on its own authority. The Act enabled the Government to buy up pig rights when farmers bought and sold pigs amongst themselves. In 1998 40% of traded pig rights would have been withdrawn by the Government and in 1999 60%. The selling farmer would have received financial compensation for the rights so lost. The increase in the percentage was designed to provide the farmers with an incentive to speed up the rationalisation of the industry. The more rights the Government could withdraw the less would be the need to order a generic herd reduction in 2000 for which no compensation was available. Farms which were equipped with Green Label boxes were exempt from the 10% generic reduction in 1998 but not from any generic reduction in 2000. In 1998 all conventional farms should have reduced their herds by 10%. Those who wished to continue with the same number had to buy pig rights from other farmers. During 1998 and 1999 the refurbishment of boxes could be postponed.

The Act stipulated also that pigs should have a mineral-poor diet so as to reduce the burden of phosphate on the environment. Farmers believed that this measure could lead to a reduction of 5% in the number of pigs. However, to be effective farmers had to adapt the feed stock to every distinct phase of the pig's life cycle. To facilitate the introduction of this system, farmers had to have a mineral-accounting system as from 1 January 1998.

Another regulation issued limited the number of farms from which a fattening farmer is allowed to buy piglets. From 8 during 1998 the number had to fall to 6 during 1999 and then to four and two in the following two years respectively.

The regulations prescribing the accommodation requirements for pigs were removed as from 1 January 1998 under pressure from parliament. The Minister promised to work out a new set of regulations.

Some smaller parties in the Lower House argued that such a general requirement of a quota reduction would hit the smallest farmers very hard. These are often run as family farms. The quota reduction might render them uneconomical. They preferred the Government to buy out farmers on the basis of individual need. The blunt generic reduction, without compensation,

would not be conducive to investment in animal welfare, pig-health and the environment.

It was also pointed out that the Act would hit farmers who had recently upgraded their piggeries and would now be compelled to depreciate them more rapidly than intended. Compliance with the Act would be much easier for farmers who had not invested anything on the renewal of their facilities. Provinces pleaded for a Government fund to destroy abandoned farms and to provide alternative employment. They feared that the Act would accelerate the trend towards large-scale farming and hence a drift of population to the towns. Destruction of older farms would be difficult because of the presence of asbestos.

Another uncertainty for farmers was whether they would be compensated for manure-production rights rendered unusable because of the legally imposed reduction in pig numbers. The sums involved were not small. One farmer had a Green Label stable under construction when the crisis erupted. This cost him Fl 100,000 extra. The required ammonia and phosphate rights had cost him Fl 350,000. These rights became useless as from 1 January 1998. He could put 5% less animals in this stable than intended (older farms had to cut 10%). In other words pig-farmers would have had to pay first to get quota from their colleagues and then for investing in new facilities.

Furthermore, farmers who lost their pigs in the crisis and wanted to start again would have needed to buy large numbers of piglets and feed. The large purchases of feed would have made them liable for a high bill of mineral right levy (introduced because of the application of the EU nitrate directive of 1991). The Minister said that he did not find such charges equitable.

To finance the reconstruction of the industry the Government put Fl 475 million on its Budget, some for farmers and some for abattoirs.

The Rabobank, a major financier, estimated that the 25% reduction would have amounted to the loss of 325,000 sows with an income loss of Fl 235 million as well as a loss of 1.8 million pigs, with an income loss of Fl 215 million. Farms would have lost 25% of their production rights and hence 25% of their effective value. The total loss for the sector would have amounted to Fl 1.7 billion. Farmers wanting to carry on would have incurred expenditures before earning much income. First, they would have had to buy pig rights from farmers wanting to exit the industry. The value of such rights was unknown as yet. Second, the farmer would have had to renew his enterprise to comply with new requirements regarding animal welfare, environment and hygiene. A farmer holding 2,400 meat pigs (a family farm) might have had to fork out Fl 720, 000 on the assumption that the new pig rights would be the same as the expired manure rights. The Rabobank believed that the only way in which financing could have been undertaken would have been to take pig rights as security for loans. The Bank could also foresee that many farmers would have had to take part-time jobs to get by.

In general terms the Minister of Agriculture, Van Aertsen, believed that the pig-farmers should have ensured that they themselves had full control over the organisation of their rhizoid from production to final product. This should have entailed the prevention of assembling pigs from a variety of farms (during transport) without appropriate checks. Farmers who would have withdrawn from the sector's rules and responsibility would have been hit by Government sanctions.

14.6 Influence of Consumer Markets on the Transformation of the Rhizoid

The external intertwining of the Dutch pig-rhizoid also became apparent during the crisis in a number of ways such as:

1. The European Commission paid about half of the costs and continued to rule out vaccination. They announced that the animal welfare on long lorry journeys would have to be studied. Particularly the animals should be able to drink while travelling.
2. Prices of pork and pigs rose.
3. Danish producers gained an advantage on Dutch export markets. Importing countries such as Germany have increased their own production.
4. English supermarket chains imposed conditions on pig-farming for their suppliers. From 1999 pigs would have had to live in groups and have sufficient space per animal, about 2-3 m2 per sow. This would have required a major change to the construction of Green Label boxes.

Clearly, the Dutch pork rhizoid would never be the same again.

Fattening farms almost would certainly disappear. They could be set up in Spain instead (Catalonia), although an outbreak of the virus occurred in 1997 caused by a shipment of Dutch piglets in May.

Pig farmers in Denmark also faced higher requirements from the British supermarkets. To finance the alterations to stables farmers there would have had to be offered about 20 cents (Fl) per kg extra on top of a current price of Fl 3 per kg. By contrast, British farmers who never participated in the move towards intensive pig farming were now meeting the requirements of their supermarkets, with their pigs free-ranging and able to root in the soil.

Mr. G. Helmer, General Manager of Dumeco, a co-operative of farmers which specialises in the slaughtering of pigs in a number of abattoirs in the South and East of the country, and which is the largest exporter of pig carcasses, believes that farmers in Bretagne and Westphalia might have been making the same mistakes as the Dutch, by building up huge concentrations of pig farms. Dumeco managed the crisis by shifting staff from closed abattoirs to those still open. Employees were transported by bus. Workers in the various abattoirs got to know each other much better. Helmer would have preferred to reduce the extent of the rhizoid by eliminating some transport links, and to

focus much more on producing added value products. Dumeco made arrangements with 500 farmers to the effect that they produced pigs for the supermarket chain Albert Heijn. They had to visit the supermarket management to hear what consumers wanted. The use of growth hormones, for instance, was not allowed by Albert Heijn.

Dumeco pays a special premium (co-maker's remuneration) to farmers who are prepared to provide a regular supply of pigs. Often farmers shop around in order to get the highest possible price for their animals. Dumeco hopes that the premium would discourage farmers from offering their animals to a variety of traders and abattoirs. Contracts with Dumeco can vary from a number of months to two years. To qualify farmers have to provide appropriate facilities for their pigs such as ample space, a ball to play with and a chain to fool around with in their stables. Moreover, farmers must keep records of medicines used, for inspection by health authorities, for without a guarantee that certain medicines are *not* used, the Japanese market would remain closed to Dutch pork.

Dumeco International had managed to break into the Japanese market in 1996 along with Kuhne and Heitz. They were able to continue supplying their Japanese contracts during the crisis.

Most importantly, the question will be whether the rhizoid will continue along the path of increasing scale. The example of Sweden teaches that densely populated stables are not necessarily advantageous to farmers. With a lesser number of fellow pigs, pigs are less stressed and, therefore, digest their food better. Being able to move more freely, they eat more and attain their slaughter weights more quickly. Moves toward such forms of production would be accompanied by the development of closed pig farms, which grow pigs to the maximum weight for meat processing rather than as piglets for sale to fattening farms.

In Denmark new pig-farmers must have a minimum number of acres of land for the cultivation of feed and for the disposal of manure. This is essentially how pigs used to be grown before the changes of the 1960s. If such a rule were introduced in the Netherlands the number of farms would decline. This will happen anyway, not only because of Government involvement but also because farmers who had pigs as well as dairy cattle decided to use compensation received to expand their dairy herds instead.

What seems certain is that farmers will move towards a closed type of pig farming to minimise transport and contact with other pigs. One farmer indicated that he wanted to increase the number of meat pigs from 880 to 1,540 and to reduce the number of sows from 180 to 120.This mix would enable him to offer 100 pigs per week to the abattoir, a number equal to the capacity of one lorry.

Most participants in the pork rhizoid want to see the future for their industry guided by the market. In the Dutch context there is a semi-official body which

is authorised to regulate the industry.[419] This body issued a set of rules in 1992 designed to control the quality of production from farm to shop. Feeding, hygiene and drug use were all strictly controlled. At present about 75% of all pig slaughtered are certified under these rules. Farmers, transport firms and abattoirs can be checked without prior warning. The body has also prescribed in detail how stable and lorries should be disinfected and cleaned. These rules are subject to sanctions and penalties. Participation, however, is voluntary. The *Produktschap* would like the Government to make the rules part of public law.

Although the slaughterhouses would be happy to run the rhizoid, with farmers as subservient suppliers, to be fully effective retailers should also play their part by ensuring that meat-cuts are produced which are preferred by consumers. It would help if they took a financial stake in the rhizoid. They tend to think, however, in terms of meat as a special in their shops to attract customers. With the meat companies in the driving seat, there will be a move to concentration of capacity, certainly to cope with the reduction in supplies which will come in the wake of the 1997 crisis. Eventually about three major companies, each with 30-40% of the market, are likely to remain, compared with the 17 companies at present.

Finally, the problems encountered by the Dutch rhizoid will lead to farmers re-locating to other pork rhizoids in areas such as Mecklenburg-Vorpommern in the former DDR. Since the unification of Germany in 1990/91, the stock of cattle, poultry and pigs in that Land has been halved. Employment in agriculture has fallen from 180,000 to about 25,000 since 1989. People have drifted from the rural areas to the towns. To turn the tide of rural de-population the Land Government has tried to persuade district authorities to encourage Dutch pig-farmers to re-settle. Apparently, the latter are not too keen for fear of discouraging tourists. However, larger Dutch pig-farmers had already set up mega-farms in this Land as well as in Spain before the crisis erupted.

The trend towards mega-farms, however, is to be discouraged according to Dutch farm leaders as well as by the local authorities in the South East of the country. The latter favour smaller family farms to prevent urbanisation. The Royal Netherlands Society for Veterinary Medicine has stressed the importance of the farmer as a carer for his animals. In their view the animal should never be reduced to raw material for the production of meat. The human dimension should be the criterion for the care of animals according to the farmers' organisation LTO. This would be achieved best by a family farm with 2 to 3 employees. Such a farm would not have more than 3,500 pigs (fattening farm).

If the manure is seen as a flow, then one should see it as a potential new rhizoid. Manure is produced not only by pig-farms but also by poultry-farms located in the same areas. In order to reduce its burden the industry has tried to export manure as such to surrounding countries. The outbreak of swine fever, however, has diminished the willingness of other countries to import

[419] Het Produktschap voor Vlees en Vee.

Dutch poultry manure. Plans are now afoot to incinerate poultry manure for the generation of electricity. Farmers who supply manure for this purpose would be exempted from the mineral-accounting regulations which apply equally to poultry and pig-farmers. In the UK two power stations are running on the basis of poultry manure.

14.7 Technicism and Economism in the Dutch Pork Rhizoid

Technicism came to expression in the increasingly large-scale of the piggeries. The drive towards large scale units required the use of special boxes for the pigs, automatic feeding systems and specialisation to fattening farms. The technical system completely disregarded the welfare of the pigs. They were forced to live as individuals rather than in groups. The handling of the crisis also showed the working of *technicism*. Large numbers of piglets had to be destroyed by injection, regardless of the welfare of their mothers. The problem of accumulating manure (phosphate and ammonia), resulting from the lack of sufficient land as well as from the rich food applied to stimulate rapid growth, had to be handled by technical means such as the development of Green-Label boxes. The potential flow of waste from the pig-raising was never properly considered until the problem had already arrived.

The individualism arising from the spontaneous development of the rhizoid without any governing or consultative body to consider all the ramifications of a dense pig-rhizoid in a region where farmers have only small plots of land, should be considered as another instance of *both technicism and economism*. It is the doctrine that individual producers should be able to compete by striving for lower costs through the intelligent technical ordering of the production process. It is this competitive individualism which, in the final analysis, led to the key problems of excess manure and the disaster of swine fever made worse by individual producers defying the transport ban or ignoring the regulations for notifying transport of pigs.

The desire to become rich by means of raising pigs on the basis of imported feed and without regard to the proper welfare of pigs, the consequences for the quality of soil and the effects on the producers of feed in countries such as Thailand (the production of tapioca has contributed to deforestation) and Brazil (where soya is grown in what used to be Amazon rain forests), is clearly an example of *economism*. The connections between soil, animals, plants and consumers were severed. Technology provided the basis for this. Without advanced transport and information systems it would not be possible to raise a massive number of pigs on a very small area of rather infertile land. It cannot be said, therefore, that the Netherlands had a comparative advantage which allowed them to specialise in the production of pigs for international trade. By exploiting the external economies of locating pig-farms in a cluster, it appeared possible to escape from the constraint of land. External economies enabled the pig-farmers to acquire a competitive advantage. The production of pigs became so large that exporting became a necessity for the survival of the rhizoid. The decision to dispense with vaccination was taken entirely on economic grounds (to be able to export eventually to Far East markets and to the USA), and in the knowledge that there existed a high risk of a devastating outbreak of swine fever. The industry knew that funds were available for such

a disaster both in the Netherlands and in the European Union. This was a clear case of moral hazard. Again such decisions were taken on the basis of an underlying *economistic* attitude.

Consumers were manifestly unaware of the problems associated with the relatively cheap pork chops they could buy in supermarkets. Large retail chains did not use their buying power to influence the producers to implement a better and more expensive way of producing pork meat cuts. The reaction of the British supermarkets was probably inspired more by opportunism rather than by principle. They were not averse to advertising free-range pork chops not affected by swine fever.

The Government of the Netherlands took decisive action to isolate the crisis and to re-structure the industry. In doing so, the officials were more concerned to solve the question: how do we handle this crisis and how do we get a lower number of pigs than by asking why pigs should be raised in large numbers. Even the reduction of 25% in the numbers of 1996 leaves a very large number of pigs in the South East corner of the Netherlands. Moreover, the re-structuring process is such that large-scale farmers are encouraged more vigorously than the small-scale family farmers.

CHAPTER FIFTEEN: NEW ZEALAND DAIRY INDUSTRY AFTER 1950 [420]

15.1 Introduction

This chapter seeks to examine the treadmill hypothesis (discussed in Chapter 3.13) in terms of the development of the New Zealand dairy industry over the period 1950-2000. Although the history of this industry is a very rich one, a complete history of the past 50 years would go far beyond the scope of this study.

15.2 The Treadmill Hypothesis

Farmers are unable to lower production when prices fall because their input-mix is determined by their choice of production. In agriculture there is no continuous degressively rising partial production function, because the means of production are complementary to the output-mix. Once a farmer has decided to grow grass for a herd of cows he is bound to use a certain quantity of fertilisers and silage and will have to consult the vet when the cows fall sick.[421]

The case for an increase in production and in productivity, consequent upon a fall in the price received, can be made both for given technology and for the introduction of new technology. Under the former, farmers will increase production by, for instance, putting more cows on their land or by bringing marginal land into production. Under the latter productivity is likely to rise more rapidly, so that output might increase more quickly, also when prices are stable or rising. J. de Hoogh and H.J. Silvis argue that the major increase in the productivity of agriculture in Western Europe after the Second World War was due to the *mechanisation and automation of production as well as to bio-technical innovations*. Given the substitution of machinery for human labour, many farms had insufficient land to employ the new machines. To compensate for the lack of land, farmers had an incentive to use more productive plants, weed-killers, fertilisers, water-control systems and disease-control. From this point of view, agricultural policies to stabilise prices and incomes are a derivative of general technical/economic developments. The authors do not deny that such policies too would have had the effect of increasing productivity.[422] Dale E. Hathaway throws more light on this subject by drawing attention to the fixity of assets deployed in agriculture. Following Glenn L. Johnson he argues that the salvage value of most assets used in agriculture lies below the costs of acquisition, whilst the value in agricultural

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[420] This chapter is based on a paper presented at the conference of the New Zealand Agricultural and Resource Economics Society, Blenheim, 5/6 July 2002, entitled *Is the New Zealand Dairy Industry Walking a Treadmill?* I thank my colleague John Lepper for comments on an earlier draft. Any remaining errors are my own responsibility. I have shortened the section on the treadmill, given that it has been dealt with in Ch 3.14 and added a section to indicate changes in recent years.

[421] J. de Hoogh and H.J. Silvis, *EU-Landbouwpolitiek van Binnen en van Buiten*, Wageningen Pers, 1998, p. 6.

[422] ibid., pp. 5-9.

use will be above the salvage value outside of the industry.[423] Hence, once acquired, assets tend to remain in agriculture. Hathaway applies this analysis also to farm labour. The cost of acquisition is the income a farmer could earn in an occupation elsewhere. It will be well above what he earns in agriculture. The salvage cost is what he could earn elsewhere once employed in agriculture. The older the farmer, the lower the salvage value will be.

For a large block of land the cost of development such that it could be used profitably for manufacturing or services would be very high indeed. It is, therefore, left in agriculture. The salvage value of smaller parts of the land, however, could be very high, tempting the farmer to sell them off to the highest bidder. Similarly, he or she might expect to reap a large salvage value of the land on retirement, especially when the value of land is pushed up under conditions of inflation. In other words, the train of logic runs opposite to that of other assets. Nevertheless, it explains why large tracts of land remain in agricultural production.

The general picture is that of agriculture as a *trap for assets*. Farmers have every incentive to acquire the latest technically advanced assets and once they have them they squeeze out of them every ounce of productivity they are capable of. Clearly, this provides the producers of such assets with an incentive to sell as many as possible of such assets to farmers. The on-going pressure on farmers to lower costs by initiating larger scale and more intensive production processes makes them captive to a *technicistic* and *economistic* society. The demands of technical progress and the profit motive tempt them to treat their animals and pastures as if they were mechanical instruments designed to maximise income and profit. Output becomes much more important than animals and inputs.[424]

Another inference of the treadmill theory is that when farmers operate under a guaranteed output price scheme, they will have an even greater incentive to increase their production and productivity. Such schemes appear to allow relief from the drudgery of moving on a treadmill.

15.3 Historic Background: the 1930s

After the introduction of refrigeration the NZ dairy industry developed very rapidly as it found a ready outlet for its products on the UK market. Prices tended to rise.

As the industry became organised, partly through the efforts of the Ministry of Agriculture and, partly, as farmers felt a need to defend their interests, systematic efforts were made to improve production and quality. Herd-testing, for example, began in 1910.

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[423] Dale E. Hathaway, *Government and Agriculture; Public Policy in a democratic Society*, MacMillan, New York, 1963, pp. 110-125.

[424] See Chapter 9.

During the First World War, the UK commandeered the production of NZ butter and cheese at fixed rather high prices. After 1922, however, when peace had returned and European production came on stream again, export prices began to fall. Both under rising and declining prices, production tended to increase. In the former case to benefit from improving fortunes and in the latter to defend one's income, especially if a high level of debt had to be financed, as Williams notes.[425] He points out that when export prices rise, costs tend to remain unchanged, so that profits increase. No doubt, that is true under a fixed exchange rate regime. Profits decline, however, when export prices fall in this situation. Farmers who had incurred debt in good times would face financial problems.

This was certainly the case when the Great Depression broke out. As various countries that used to buy New Zealand dairy products, such as the USA and Canada, imposed tariffs or closed their borders, the UK market was flooded and prices declined precipitately. In 1932 the UK convened a conference to deal with the problem. This led to the Ottawa Agreement under which countries that were part of the British Empire obtained preferential access to the British market, for example in the form of lower import tariffs. The New Zealand dairy industry was afforded special treatment inasmuch as it was not made subject to a tariff on the UK market during the three-year period 1932-1935. In 1934, however, the UK changed its policy by deciding that UK farmers would get a guaranteed return on milk used for manufacture-particularly for cheese production. As a result of this policy some types of English cheese were sold at a lower price than that of New Zealand cheese.[426]

The industry decided to take stock of the situation. A Royal Commission of Inquiry was appointed. Its report became available in 1934 and made many recommendations to improve the quality of product and the efficiency and hygiene of production. As these were put into effect, foundations were laid for the future development of the industry.

At the time the Royal Commission was busy making its inquiries, the industry had the following characteristics:

1. 213 butter factories.
2. 275 cheese factories.
3. 56 dual plants
4. 56,819 suppliers of butter.
5. 12,803 suppliers of cheese and dual plants.
6. 69,622 suppliers in total, with an average number of cows in milk of 23.9.
7. Cows produced on average 104.420 kg. butterfat at the pail.

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[425] D.O. Williams, General Survey of Markets and Price Movements, Chapter XXVIII, in *Agricultural Organization in New Zealand,* H. Belshaw et al., Melbourne University Press, Melbourne, 1936, pp. 620-622.

[426] "Farming During the World Crisis", editorial in Belshaw et al., op. cit., p. 801.

8. 435 co-operatives. The New Zealand Co-Operative Dairy Company was by far the largest (perhaps also in the world).
9. 99.9 % of cheese produced and 99% of butter went to the UK.[427]
10. The average pay-out for butterfat was 8.75 pence per lb. for butter and 9.75 pence per lb. for cheese.[428]
11. Since 1925 New Zealand dairy produce was marketed under the Fernleaf brand. The Anchor brand for butter was also used, however.
12. 25,178 milking machines (17 makes, of which only one was imported) and 55,625 separators were in use on farms.
13. In view of the rapid decline in prices, many farmers had problems in servicing their mortgages. Under the Mortgagors' and Tenants' Relief Legislation, lenders were able to obtain relief in the form of extensions to terms, reduced interest rates, capitalisation of arrears etc. Many co-operatives provided finance to their suppliers.
14. There were seven species of purebred cows: Jersey, Friesian, Ayrshire, Milking Shorthorn, Red Poll, Guernsey and Shorthorn; the latter three were very small in number, however.[429]

During the Great Depression dairying was regarded as an easy way to earn an income. Most of the 70,000 odd farmers were very small, even by the standards of the times. They included people who had lost jobs in the urban economy, but who had some land on which they could run one or two cows and sheep and beef farmers who decided to have some cows to supplement their income. The former were affectionately known as 'billycan' suppliers.

The reaction to the problems of the crisis were summarised by the head of the Department of Agriculture, E. J. Fawcett, as follows:

> The rapid and acute drop in the prices of dairy produce during the latter end of the 1929-30 season, and its continuance, has placed an entirely different complexion on the industry. Undoubtedly, the normal expenditure on maintenance has been temporarily restricted, but a Dominion-wide recognition of the fact that the surest and most economic method of reducing costs is to increase per acre production, has resulted in a rapid increase in total output. It is as yet too early to foresee the outcome of a lowered price level, but the country's dependence on the dairy industry to meet a large percentage of the interest on its external debt is fully recognised.[430]

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[427] F.B. Stephens, The Processing and Marketing of Dairy Produce, pp. 648-689 in Belshaw et al., op. cit. I have not been able to discover the reason for the discrepancies between the numbers of dairy factories in this text.

[428] Some data, especially regarding prices and productivity are taken from the statistical tables in A.H. Ward, *A Command of Co-Operatives*, The New Zealand Dairy Board, Wellington, 1975.

[429] H.G. Philpott, *A History of the New Zealand Dairy Industry 1840-1935*, Government Printer, Wellington, 1937, p. 367.

[430] E.J. Fawcett, Dairy Farming, p. 471 in Belshaw et al., op. cit.

In a sense this statement suggests that the author was unaware of the dynamics of a treadmill effect which this reaction to the crisis could bring about. Anyhow, the First Labour Government (1936-1939) decided to introduce a guaranteed price scheme for New Zealand dairy farmers. Under this scheme the Government guaranteed a price at the beginning of each season. The Dairy Board compulsorily acquired export produce and banked the receipts into an industry reserve account from which the farmers were paid. With various permutations it remained in force until its abolition in 1985/86. Until its abolition overdrafts on this account were charged at an interest rate of 1% p.a.

In the period following the Depression and the Second World War (which effectively ended for the industry in 1948 when the UK supply agreement was terminated) the industry would continue to wrestle with questions of market access, especially to the UK market and market stabilisation.

15.4 The Period 1950-2000

Around 1950, the number of suppliers had declined to 53,000. Most of them belonged to co-operatives. However, a large number, about 14,000, were townmilk suppliers. In those days the meat and wool industries were considered to be far more important than the dairy industry as earners of foreign exchange. It was the time of the Korean War and the associated wool boom.

For many years the meat industry was the chief pastoral industry, certainly in terms of export earnings and employment. Many dairy farms were converted to sheep and beef farms. During the early 1970s some agricultural experts doubted whether the dairy industry had much of a future.

Towards the end of the 1990s, however, the dairy industry was in the midst of a strong expansion, whereas wool had become a by-product of the meat industry and the size of the sheep and beef industry was shrinking rather than increasing. Many farmers had developed forestry on their farms or had sold out to forestry developers. Most pastoral farmers had to supplement their incomes from other pastoral farming with incomes from other jobs, including farm tourism.

Since 1950 seven key events have had a bearing on the international development of the dairy industry. These were:

1. The end of duty-free entry of dairy products into the UK and the introduction of quotas from 1961 onward.
2. The start of the CAP in the six EEC countries in 1962.
3. The entry of the UK into the European Economic Community in 1973. New Zealand negotiated a set of quotas of dairy produce that could be exported to the EEC (butter, cheese). The UK had foreshadowed this decision in 1964.

4. The implementation of a production quota system by the European Economic Community in 1984, designed to limit the annual production of milk.
5. Also in 1984 the New Zealand Government (Labour) started to remove all Government support for farmers.
6. The fall of the Iron Curtain in 1989 and the subsequent negotiations by former East Bloc countries to become members of the European Union. East Germany, an important dairy producer, became part of the EU through its merger with Western Germany.
7. The Uruguay Round, which included agriculture, and which ended in 1994, followed by the establishment of the WTO in 1995.

Each of these events has been a challenge to the New Zealand dairy industry. It has responded by improving its productivity, diversifying its exports and taking stakes in a wide variety of dairy industries overseas through the NZ Dairy Board. As a result of the Board's efforts New Zealand has become the largest international trader in dairy products. At one stage, it sold the EU's butterberg to the Soviet Union, which paid in part by a supply of Lada motorcars.

Within New Zealand the industry has been subject to constant technical change. A few of the major developments may be referred to.

It was around 1950 that the Artificial Breeding (AB) programme began. At the same time the mechanisation of farming led to the collection of milk from the farms by tankers, so that the widespread use of cream separators on farms came to an end. For much the same reason hand-stripping disappeared. Tractors became steadily more versatile and farmer-friendly (in 1948 Ferguson introduced the 3-point linkage). To handle cows on the farm a motorised backing gate became an essential tool along with trailers, mowers, grass harrows, spray pumps and booms, the high-pressure water hosing system and motor-bikes.

Under the guidance of Dr. C.P. McMeekan, who had became the head of the Ruakura research station in 1943, the milking process was closely studied. During the 1960s Mr. D. Phillips built a new type of milking machine that relied on a system of pneumatic pulsators, running on a vacuum. By providing differences in pulsation, the system was kind to cows and cups could be gently squeezed. Milking sheds that used this new machine did not have to be equipped with drive gear. Patents were registered for the various innovations of this machine. The National Dairy Association in Hawera was to manufacture the machine under license. However, traders of milking machines strongly objected that only one organisation could produce this machine. The Government agreed and made the patents public. As a result New Zealand could not benefit from this invention, which had put it far ahead of the rest of the world. Subsequent generations of milking machines everywhere now feature these innovations.[431]

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[431] I am indebted to Mr. D. Philips for this information about the Ruakura milking machine.

Milking sheds evolved from the walk-through model to the herringbone sheds during the 1970s and 1980s and rotary platform (1980s/1990s).

The rapid development of aircraft during ands after the Second World War led to the widespread introduction of aerial top-dressing of pastures with phosphate fertilisers during the 1950s.

Cows were, of course, not forgotten. From the review of the 1930s above it is clear that New Zealand had only a limited number of dairy breeds. In the 1960s the Government decided to bring in new cattle strains, preferably from outside the British gene pool.[432] However, this appears to have had a greater impact on the beef than on the dairy industry. The latter saw the introduction of Holstein cattle, crossed frequently with Friesians. Jerseys and Holstein-Friesians are by far the dominating breeds today.

P.W. Smallfield has drawn attention to the importance of research:

> Probably the greatest contribution to farming in the 1950s was the development of large and efficient research stations dealing with practically all problems of primary production; the Departments of Agriculture and Scientific and Industrial Research, Massey and Lincoln agricultural colleges and the dairy, meat and wool research institutes all made important contributions.[433]

Smallfield refers in this connection also to the increasing use of chemicals since the 1950s. In 1959 the Agricultural Chemicals Act was passed. It set up the Agricultural Chemicals Board to register and control the labelling and use of agricultural chemicals.[434]

Processing advanced with automation, the development of milk-powders and increasing sophistication in extracting more elements from milk for the production of ingredients, functional food and pharmaceutical products. Today's processing plants have considerably greater capacity than those of the early 1950s and are much more large-scale. Some of the world's largest cheese and milkpowder factories are located in New Zealand. It is significant that under the Dairy Board's control, companies tried to improve their pay-out by moving to larger scale processing units so as to reduce their unit costs below the industry average. One reason for this was that the Board determined its pay-out on the basis of average costs of production of all co-operatives. This triggered, therefore, a treadmill effect.

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[432] G. McLauchlan, *The Farming of New Zealand*, Australia and New Zealand Book Company, Auckland, 1981, p. 218.

[433] P.W. Smallfield, *The Grassland Revolution in New Zealand*, Hodder &Stoughton, Auckland, 1970, p. 129.

[434] ibid., p. 130.

15.5 The Dairy Rhizoid

Throughout the period under review the dairy industry remained a very cohesive and distinct rhizoid under the guidance of the NZ Dairy Board and the dairy co-operatives.

A rhizoid is defined as a combination of inter-personal relationships designed to run one or more transformations of things such as grass into milk and milk into a variety of dairy products. Stows and flows and the interactions between them are at the heart of rhizoid theory. For example, a flow of grass is transformed through the stow of cows into flows of milk, methane gas and cow pats. Flows of milk and dairy products are to be sold for profit and, thus, result in a return flow of money back to the initial producers and their suppliers. The right husbandry of stows and flows is of vital importance for the long-term sustainable development of a rhizoid.[435]

Recently, the importance of the gene-pool of cows has been stressed as a factor in long-term sustainability.[436] In terms of rhizoid theory this is a crucial stow. Over many years the rich diversity of the gene-pool has been reduced as a result of Artificial Insemination (AI) and the systematic selection of traits able to increase production of milk and meat. Indeed, the number of distinct breeds of cows has been falling around the world.

In order to achieve and improve the transformations and flows, farmers will relate to many service providers such as:

1. veterinarians;
2. soil scientists;
3. grassland experts;
4. herd testers;
5. accountants;
6. bankers;
7. directors and staff of dairy co-operatives;
8. Government officials
9. mechanics to repair machinery;
10. suppliers of tractors, harrows and other farm implements and of seed, medicines etc;
11. auctioneers;
12. sheep and beef-farmers;
13. growers of maize, lucerne;
14. share-milkers;

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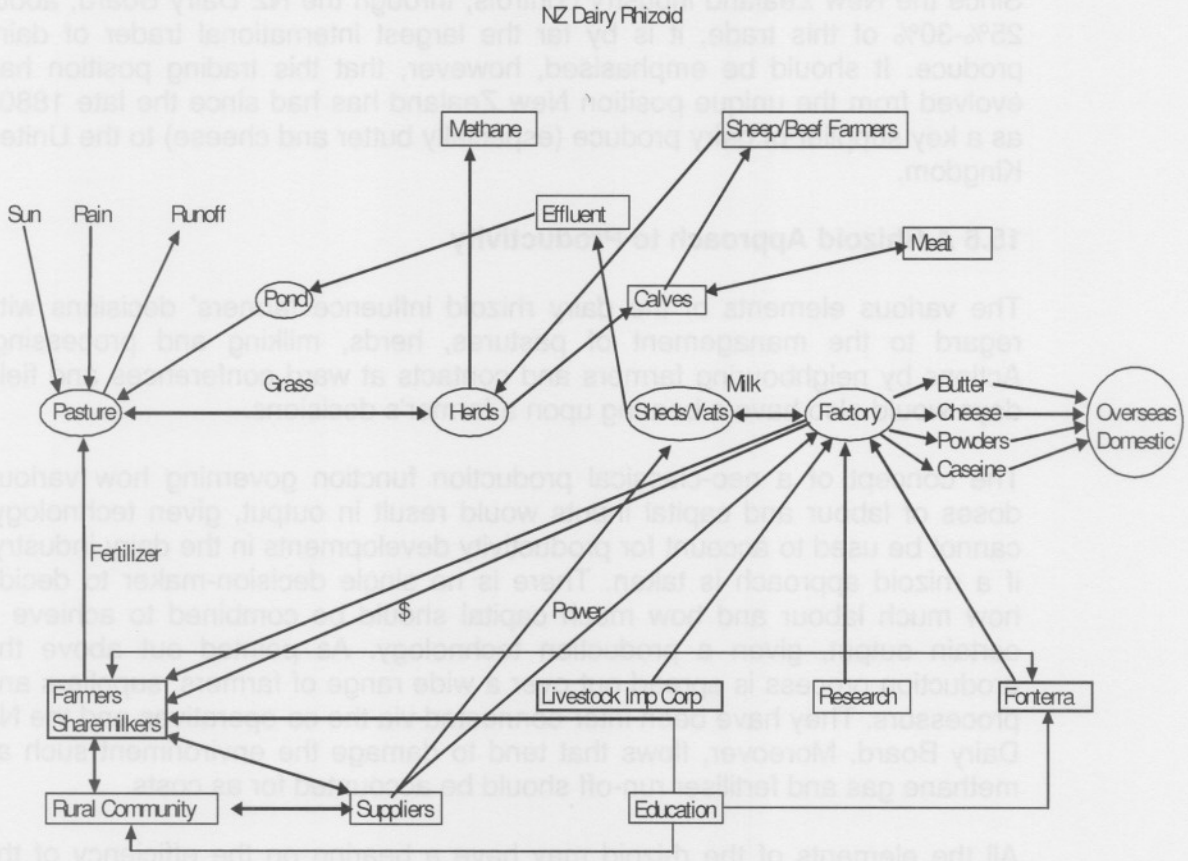
[435] See Chapter 11..

[436] For example, René Passet, *L'Économique et le Vivant*, Économica, Paris, 1996, p. 79.

15. neighbours;
16. and media.

One should not underestimate the number of suppliers to dairy farmers. The June 2002 issue of the *The Dairyman* listed 132 suppliers of a wide range of goods and services. This is by no means an exhaustive enumeration. Given that the industry has been doing relatively well, it has attracted the attention of many business people keen to make some money by supplying dairy farmers. If it were possible to trace the flow of money from overseas via the Fonterra Co-Operative Group (amalgamation of the NZ Dairy Board and most dairy co-operatives) to the farmers and from them to the suppliers it would be possible to estimate the total number of hours required to produce the output of the industry. Another way of putting it is that as farms become more large-scale, the dwindling number of farmers is serviced by a growing number of providers of goods and services required to keep the farmers going. To what extent this makes for a more efficient or a less efficient industry is a matter of empirical analysis.

Figure 1 sets out a diagram of the dairy rhizoid.



Please note that 'grass' and 'pasture' includes micro-organisms. This rhizoid is situated in a wider eco-system of rivers, forests etc.

The dairy rhizoid in New Zealand has become a very cohesive one especially since the end of the First World War and the Great Depression. Since it has had to export to survive its cohesiveness has allowed it to learn quickly and to adopt and develop the latest dairy technologies. Challenges such as the growing export surpluses on world markets since the establishment of the European Union and its predecessors, have put a premium on innovation and clever marketing. In the process the rhizoid has been changing very significantly, from small-scale to large scale.

Thus, the number of dairy co-ops declined from about 250 in 1950 to 4 at the end of 2000. In 2001 the two largest merged with the NZ Dairy Board to form Fonterra Co-Operative Group, with important stakes in the Australian dairy industry. Only two small co-operative companies: Tatua (Waikato) and Westland Dairy Co-operative (with a supply arrangement for Tatua) remained as independents.

It is a peculiar characteristic of the New Zealand dairy industry that it exports about 90% of its annual production. It is the only country with such a high ratio of exports. World-wide only 5% of dairy production is internationally traded. Since the New Zealand industry controls, through the NZ Dairy Board, about 25%-30% of this trade, it is by far the largest international trader of dairy produce. It should be emphasised, however, that this trading position has evolved from the unique position New Zealand has had since the late 1880s as a key supplier of dairy produce (especially butter and cheese) to the United Kingdom.

15.6 A Rhizoid Approach to Productivity

The various elements of the dairy rhizoid influence farmers' decisions with regard to the management of pastures, herds, milking and processing. Actions by neighbouring farmers and contacts at ward conferences and field days would also have a bearing upon a farmer's decisions.

The concept of a neo-classical production function governing how various doses of labour and capital inputs would result in output, given technology, cannot be used to account for productivity developments in the dairy industry, if a rhizoid approach is taken. There is no single decision-maker to decide how much labour and how much capital should be combined to achieve a certain output, given a production technology. As pointed out above the production process is spread out over a wide range of farmers, suppliers and processors. They have been inter-connected via the co-operatives and the NZ Dairy Board. Moreover, flows that tend to damage the environment such as methane gas and fertiliser run-off should be accounted for as costs.

All the elements of the rhizoid may have a bearing on the efficiency of the various transformations such as the conversion of fertilisers into grass, grass and water into milk, milk into cheese, butter and other dairy products. Veterinary science might discover a way of accelerating the fermentation process in a cow, for instance. A manufacturer may invent a better milking

shed or milking machine. One invention or improvement may have consequential effects in other parts of the rhizoid, so as to compounding the initial effect on productivity. The Government could put more or less money into combating tuberculosis by the eradication of opossums. In short, there is no systematic approach to innovation or to improving productivity in the rhizoid. There is even a possibility that some actors are not interested in improving their efficiency. A supplier of hoses, for instance, might enjoy a local monopoly and charge a high price for the product, albeit at the risk of being supplanted by a larger scale nation-wide manufacturer and distributor. Until this happens his local standing in the community may be so high that farmers accept his high price.

Over almost any period of time technical change in the dairy rhizoid occurs both in terms of new applications of existing technology as well as new inventions. New developments have a largely random character.

If we use a rhizoid approach, then, we must concentrate the measurement of productivity on key transformations. The reason is that transformations are set up to yield higher value flows. In the dairy rhizoid the key transformations are those of grass and other elements into milk by stows of cows, represented by butterfat or Milk Solids (MS) and the transformation of milk into dairy products. Since the latter is dependent on the former, it appears that the cow should be the unit for the measurement of productivity. A subsidiary measurement might be the production of MS per hectare of pasture. Indeed, the cow is at the receiving end of advances in scientific knowledge, technical developments, changes in management practices and so on. The effectiveness of the wide range of supplies as purchased and used by farmers must be shown in the output of MS per cow and per effective hectare.

Another way of approaching this is to imagine that the whole rhizoid came to a complete standstill one day. How would it be re-started? In some way the whole stow of technical blueprints, scientific and technical knowledge, practical skills of farmers and sharemilkers would have to be pressed into action once flows of sunshine, water and grass appeared again and new herds could be formed.

- *The quantity of milk produced per cow and per effective hectare would then reflect the success or otherwise of the combined effort of the rhizoid. Without grass, cows and milk there would not be a dairy rhizoid.*
- All this assumes that there is a suitable price for milk produced. The effectiveness of the production and marketing processes of the dairy companies has a particular bearing upon this price. *When the price per kg MS is multiplied by the output per cow, a gross measurement of productivity in money terms is obtained.*
- Given data limitations we cannot determine net productivity, i.e. by subtracting all costs incurred by the rhizoid to produce a kg MS. Although each individual farmer is able to do this quite readily, the sum of all these costs does not adequately measure all costs of all suppliers

incurred, for example, to keep labour and capital available even when it is not fully utilised. Nor are the flows measured that are not expressed in money terms such as discharges of effluent into waterways. A large increase in the output of MS per cow, given price, accompanied by severe environmental degradation, may not be sustainable and should, therefore, be discounted.

- If a large increase in output per cow is brought about by means of large purchases of supplies and power supplied by a variety of local monopolists, the farmer may be unable to put aside sufficient reserves to finance any expansion. Most of the profits would be enjoyed by other rhizoid participants, who may spend them on consumption.
- Something similar may occur in the processing transformation, if, for instance, the executives of the plant enrich themselves at the expense of the farmers or put aside such a large part of the money flow into their establishments that the farmers are unable to finance any improvement in their productivity. Expensive new processing plant would then have to process poor quality milk.

In general terms productivity may be defined as the economic measurement of a technical production process.[437] The rhizoid knows how to produce milk from pastures and herds of cows in a technical sense. There is no systematic effort undertaken, however, to measure the economic outcome of the technology deployed in any comprehensive sense.

In rhizoid theory there are no factors of production such as labour, capital and land. Those working apply their stows of knowledge to transform stows of milk (inside cows' udders), for instance, into flows of milk (i.e. by milking a cow either by hand or by means of a machine). Similarly, capital is composed of stows such as technical/scientific knowledge and practical knowledge of farmers and is embodied in a wide variety of machinery and laboratories on and off the farm.

In the neo-classical model of measuring productivity, pastures, herds and farm machinery would have to be treated as capital and farmers, sharemilkers and farm hands as labour. This is a far too limiting approach, inasmuch as it seeks to link a limited number of flows to a flow called output, without knowing much at all about what happens in the intervening transformations. Many important flows such as those contributed by suppliers and negative flows that diminish the ability of the environment to yield useful flows are ignored.

15.7 Testing the Treadmill Hypothesis

Our first task is to examine the data over the period 1950 to 2000 to find out whether it is consistent with the treadmill hypothesis. To do this I have calculated the annual change in the ratio of MS processed per cow, using the herd statistics of the NZ Livestock Corporation. I then have multiplied this

[437] I am indebted to H.van Riessen, philosopher of technology, for this definition. (Christelijke Encyclopedie, J.H. Kok, Kampen, 1960, vol. 5, page 512).

change in productivity by the annual change in the pay-out price, adjusted for inflation, received by suppliers of dairy co-operatives from their co-operatives. These include the cows of herds allocated to town-milk supply. I have assumed that milk supplied for towns (local consumption) is priced in sympathy with the pay-out received by members of dairy co-operatives. Industry representatives believe that this is a fair assumption. In order to remove seasonal factors, the annual changes are based upon 5 year moving averages.

Table 1 sets out the productivity per cow in terms of milkfat processed.

TABLE 1
INDICATORS NZ DAIRY INDUSTRY 1950-2000

PERIODS	COMPOUND ANNUAL GROWTH%		
	MILKFAT PER COW	REAL PAY-OUT	NUMBER OF COWS
1950-1960	+1.27	-2.8	+0.20
1960-1970	-1.38	-3.3	+2.09
1970-1980	+2.94	-0.7	-1.27
1980-1990	-0.03	+0.5	+1.24
1990-2000	+1.16	-2.0	+3.52
1950-2000	+0.74	-1.6	+1.15
1950-1973	+0.29	-1.8	+0.74
1973-1984	+2.14	-1.5	+0.08
1984-2000	+0.43	-1.6	+2.48

Source: Livestock Corporation of New Zealand.

With the exception of the decade 1960-1970 productivity, expressed as milkfat processed per cow, has been increasing steadily. Over the whole half century ending in 1999/2000 it rose at a rate of +0.74% compound per annum. It is understood that the indicator has been affected not only by deliberate efforts to increase productivity but also by natural factors such as droughts and floods and TB in cattle. On the human side, processing and marketing efforts are likely to have contributed to this rise. The tendency towards larger herds, the introduction of new processing facilities such as rotary sheds, milk trucks and of the milk train from Hawkes Bay to Hawera in the 1990s may have played a role as well. In fact, the average size of herds increased from 35 in 1950 to 124 in 1980 and 236 in 2000. The industry, therefore, is now much more large scale than it was in 1950.

This state of affairs highlights the need to approach key developments in the dairy industry from a rhizoid point of view. From the perspective of the dairy industry, the steady rise in productivity of 0.74% compound p.a. over the past 50 years would be seen as a measure of success. However, once all costs of this development were taken into account, it might be considered in a more sober light.

In contrast to productivity, the real company pay-out price fell at a compound rate of –1.65% p.a. over the whole 50 year period and, consequently, overwhelmed the rise in productivity. In general, the rhizoid has reacted to this by increasing the number of cows and reducing the number of herds. The pay-out price reflects, of course, not only movements in the world price of dairy products but also domestic influences as captured by movements in the Consumers Price Index, the index used for deflation purposes. In turn, this index is influenced by monetary and fiscal policy. For example, from 1994-1997 the New Zealand Dollar appreciated against the currencies of its major trading partners. This had the effect of lowering the New Zealand Dollar value of export revenue expressed in foreign currency (mostly US Dollars). On the other hand it reduced the price of imported inputs such as oil products, fertilisers and farm implements.

Table 2 sets out the total pay-out received, adjusted for inflation, during the same periods as used in Table 1.

TABLE 2
REAL DAIRY PAY-OUT 1950-2000

TOTAL DAIRY PAY-OUT	ADJUSTED FOR INFLATION 1950-2000 (1999 CPI)
YEAR	$MILLION
1950	1,612
1960	1,409
1970	1,160
1973	1,430
1980	1,129
1984	1,406
1990	1,346
2000	1,880

Source: Livestock Improvement Corporation, Statistics New Zealand.

In the light of this table the concerns about the future of the industry around 1970 are understandable. Considering the whole period 1950-2000 and using the real total pay-out of 1950 as a basis (index value 100) we can calculate for all years 1955-2000 a five year moving average index of total real pay-out. Table 3 sets out the index values for a number of years.

TABLE 3
INDEX of REAL PAY-OUT (1999 PRICES) 1950-2000 (1950=100)
Five Year Moving Averages

YEAR	INDEX
1960	92
1970	88
1980	69
1990	71
1991	66
1992	72

1993	78
1994	81
1995	83
1996	94
1997	98
1998	99
1999	100
2000	106

Tables 1-3 suggest that over a period of about 50 years the industry became large scale, and technologically advanced, with gross productivity increasing at a compound rate of +0.74% per annum and yet for most of the time receiving a total real income below the level enjoyed in the 1950s. Only during the second half of the 1990s was the level of the 1950s achieved again.

Especially during the second half of the 1990s the number of dairy co-operatives declined strongly as the two largest ones, New Zealand Dairy Group and Kiwi Dairies absorbed a number of smaller ones. Two co-ops, however, have declined to merge with the two largest ones. One of these is Tatua. It has always been a small co-operative, counting no more than 130 suppliers at present. Its game has been to produce high-value products based on the ingredients of milk, rather than milk powders, butter, cheese and casein. As a result it has consistently paid the highest price per kg of MS than other co-operatives. The second is Westland Dairy co-operative, situated on the West Coast of the South Island and a specialist cheese manufacturer. It produces products for Tatua.

Does the development of the past 6/7 years suggest that the industry has succeeded in increasing its scale, production and productivity at a rate that has been more rapid than the rate of price increase? If so, then the question is whether it may look forward to a future beyond the treadmill of the past? Would Fonterra Co-Operative Group be able to help secure such a future?

Before I attempt to answer this question, the treadmill hypothesis should be looked at from another angle. If dairy farmers were faced with a treadmill effect on their income and, consequently, re-organised their farms from small scale units to much larger units, then, the values of farms should have reflected their expectation that thereby they would improve the capital value of farms over time.

Data of the average value of dairy farms sold on the open market, along with the average production of milkfat/milksolids, the average size in hectares and the value of the farm per kg of MS has been collected only since 1969. During this 31year period the average size of farm sold rose from 57 hectares in 1969 to 80 hectares in 2000 and average production of MS increased from 17,108 kg to 48,309 kg. Over the same period the sale price expressed per kg of MS increased from $2.13 in 1969 to $20.3 in 2000.

Since the Labour Government of 1984-1990 dismantled practically all Government support for agriculture during its term of office, so that 'free trade' prevailed from 1986 onward, one might expect that productivity growth and the movement of farm values would show a clear difference between the periods 1969-1984 and 1984-2000. Table 4 shows the results.

TABLE 4
PRODUCTIVITY, FARM VALUES and INFLATION
1969/84, 1984/00 and 1990/00

Periods	CPI	Farm Sale Price	Milkfat per cow
	1999=1000	Per kg MS produced	
	Compound annual %	Compound Annual %	Compound Annual %
1969/84	11.7	12.58	1.40
1984/00	4.9	3.03	0.43
1990/00	2.0	4.97	1.16

Source: Valuation New Zealand/Livestock Improvement Corporation and Statistics New Zealand.

It appears that the growth in productivity was very high during the first period of 1969-1984, when New Zealand agriculture was strongly supported by the Government in the form of subsidies for fertiliser and loans on favourable terms. In the mid-1970s floor prices for all major commodities were introduced. In 1978 a supplementary price scheme was put in place, on top of the stabilisation schemes, to supplement low prices, whilst the Producer Boards could still impose levies when prices were high. In addition, there were Government-run extension, inspection and research services.[438] These were all corporatised and/or privatised during the period 1984-1993. However, the most drastic measures were taken during 1985-1987 when the Supplementary Minimum Price scheme, subsidies and easy credit terms were abolished. The changes were so radical that the Government was forced to underwrite a debt relief programme in 1986/1987.

We should not jump to the conclusion, however, that these support measures were the sole factor for the high increase in productivity during 1969-1984. A steady stream of technical innovations also made a contribution.

Farmers have been able to see the value of their farms rising more quickly than the movement in the CPI, except for the period of economic restructuring 1984-1990. After 1990 farm values have resumed a trend of increasing real value. Thus, farmers leaving the industry can expect a compensation for their investment over the years.

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[438] Listed in R.W.M. Johnson, *Reforming Farm Policy: Lessons from New Zealand, with a commentary by Richard Howarth*, Institute of Economic Affairs, London, 2000.

15.8 The Treadmill Again

The changes in the institutional framework since 1984, from Government involvement to private control, has not ended the working of TATE, an acronym which stands for Technical Administrative Task Environment and which has been dubbed by sociologist Benvenuti.[439] Under TATE individual farmers are directed by suppliers, processors, research institutions, farm extension services and Government regulations to implement new technologies and procedures aimed at maximising production.

Since the 1920s the New Zealand dairy industry has indeed been working under a TATE system. In 1924 the NZ Dairy Institute was set up to systematically research technical problems and improve the production of the industry on farm as well as in processing plants. Later on the Government sponsored research at Ruakura has played a key role. Of late, research has led to the production of cloned calves and bulls.

The establishment of the Livestock Corporation in 1948 by the NZ Dairy Board has given a strong impetus to a steady improvement of the genetic pool of the industry through systematic herd testing and AI. All results of herd testing and the application of AI are recorded into a national database.

Since the rate of increase in the price of farmland per hectare is the product of the rates of increase in MS produced per hectare and in the price for the farm per kg of MS produced, Table 4 indicates that rising productivity, expressed as the increase in MS per hectare, has played a comparatively minor role in the movement of prices for farmland.

The faith of farmers in dairying as a more profitable way of farming than sheep or beef farming may be the reason for the increasing trend in farm prices, especially during the 1990s, compared with the rate of increase in the Consumers Price Index. A monetary policy, which relied on interest rates and left the money supply free, might have contributed to this strong rise in the price of dairy land. Such a rise in prices over and above the more general rate of inflation, allows farmers to retire with a capital gain free of tax.

R.W.M. Johnson draws the conclusion that the lesson from New Zealand is that when the market mechanism is allowed to allocate resources, farmers are able to stand on their own feet and that post 1984 life resumed its normal course. He underpins this observation by the following points:

1. Agricultural markets adjust by themselves and land values will find their appropriate levels.
2. Prices of land have returned to a normal relationship with product earnings.

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[439] See Douwe Jan van der Ploeg, op.cit., p. 436.

3. The land market is less inflated due to market level charges for credit and the incorporation of risk into farm decision-making;
4. There is more flexibility between enterprises. There has been a decline in the production of sheep products and an expansion in cattle products, dairying and forestry.
5. The New Zealand reforms were unilateral. Research by the OECD shows that the benefits of agricultural policy liberalisation are maximised when countries deregulate multilaterally.[440]

If policy makers allow agricultural markets to adjust by themselves, then, they must also be willing to accept the consequences such as smaller rural populations and, possibly, environmental degradation. These are effects of the treadmill in operation. Johnson is right that the differences in the movements of land prices for dairy farms pre-and post 1984 have been comparatively minor. In other words the treadmill is working under both Government regulation and under a system of free markets. Table 4 suggests that the treadmill might actually go somewhat faster under regulation. However, this is not necessarily an argument in favour of a free market system. A judgement on this issue should be made not on the basis of dogmatism, *but on the basis of a dispassionate analysis of what a country wants to do with its base of fertile agricultural land.* Should it serve as a vehicle for a sustainable supply of food for the local population and for the longer-term development of regions and countries or should it be used as a means for earning foreign exchange to support the lifestyles of urban populations?

15.9 Events 2000-2005

Since the establishment of Fonterra in 2001 the industry has continued to expand. The number of cows has risen from 3,485,883 in the season 2000/01 to 3,867,659 in 2004/05, whereas the number of herds fell from 13,892 to 12,271, so that the average herd rose from 251 cows to 315 cows. The production of MS per cow, however, has fluctuated from 310 in 2000/01 to 322 in 2003/04 to decline to 308 in 2004/05. The pay-out per kg MS, adjusted for inflation (2004/05 as base), reached a peak of $5.72 in 2001/02 and has since fallen to $4.59 in 2004/05. Although world prices have been strong in recent years, the appreciation of the NZ Dollar has reduced the pay-out in NZ Dollars.

Over the period 1992/93-2004/05 the annual average increase in MS per cow has been 1.658 % p.a. However, the annual average change in the real pay-out per kg MS has been 1.008%. Combined with an increase in the average herd from 180 cows to 315 cows this suggests that the treadmill has remained in operation. Obviously, Fonterra is trying to improve its efficiency of production now that the industry is unified. It has recently made an investment of $153 million in the Chinese dairy industry, which is doubling in size every five years. Within New Zealand the industry will be constrained by a lack of

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[440] op. cit., pp. 37-40.

water, especially in Canterbury. Concern has arisen about the deteriorating quality of water in streams, lakes and rivers, caused, in part, by a much more pronounced use of nitrogen fertiliser by farmers in the face of a lack of clovers caused by the destruction of beehives by the Varroa mite and the advance of a clover-eating weevil. A few outside suppliers have arisen who seek to use milk for conversion into quality products for overseas niche markets. Overseas, former Eastern European countries such as Poland and the Czech Republic now have ultra-modern dairy factories that export to the rest of the world. Latin America will also become a major competitor.

15.10 The Future

The formation of Fonterra Co-operative Group, with ambitious goals for expansion abroad, might continue to shift the focus of decision-makers in the New Zealand dairy industry in the direction of larger economies of scale, more rural desertification and greater environmental degradation, especially as they have set themselves a goal of increasing productivity by +4% p.a. or +50% over ten years.

In May 2002 Dr Warren Parker has identified seven challenges that should be faced by the New Zealand dairy industry, namely:

1. Farmers need the capacity to respond rapidly to change (ageing of farm population and separation of management from farm operations).
2. The succession of farm leaders and farm owners (barrier of high fixed costs).
3. To intensify milk production in an environmentally-sustainable manner.
4. Improving returns per unit of milk.
5. A shortage of skilled labour and rising costs of labour.
6. Increasing energy usage.
7. The privatisation of intellectual property. [441]

Absent from these challenges is a challenge of world markets flooded by subsidised exports from the USA and the EU. The pending accession of a number of Eastern European countries to the EU raises doubts as to whether such exports from that region will soon disappear. Many of these countries are traditional dairy producers. They are currently modernising their industries, partly by importing technical expertise in the form of Western European farmers migrating to Eastern Europe and Western co-operatives investing in new plant in those areas. The CAP framework will be extended to them, albeit in modified form. Thus, whilst Western European countries will reduce their production, the East will take over.

Underlying this trend is the fact that the dairy industry world-wide is subject to the same technical/economic imperatives. This implies that there is a treadmill at work in most countries that have a modern dairy industry.

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[441] *The Dairyman*, June 2002, page 56.

Fonterra Co-Operative Group's strategy appears to be to build up major stakes in the Australian dairy industry, so that it can effectively control around 40%-50% of world trade. This, in combination with investments in other countries should provide a flow of income even if world dairy prices fall because of subsidised exports.

The goal of 4% p.a. growth in productivity set for the industry provides a clear break with the past if it can be achieved. By paying more attention to the health and nutrition of animals, part of this target can be achieved. However, it will also involve the introduction of automatic milking machines, cloning and genetic engineering. Such innovations are also likely to be made overseas. Since the costs of these innovations are high, the challenges posed by Dr. Parker might become even more urgent, especially if the rural areas continue to lose population and amenities.

As the current generation of dairy-farmers makes way for a new one, farms will become very large-scale and will be run, increasingly, as factories and operated under limited liability ownership. Cows are seen as machines that can be improved upon and replicate

d. As these farm factories are run for monetary profit, environmental regulations (*Resource Management Act 1991*) and Kyoto Protocol are appreciated as interference by Greens.

If Fonterra were to fail to maintain a rising real total pay-out for the industry, then, there will be pressure for it to be taken over by a larger overseas organisation.

The only way to stop the treadmill is to move towards localised dairy industries around the world. Jacques Berthelot has proposed that all countries should be able to protect their local agricultural industries on the basis of import levies, provided that there is a strict prohibition of export subsidies in place.[442]

15.11 Conclusion

Indications are that a consistent increase in productivity has been occurring in the New Zealand dairy industry, but that it has been insufficient to overcome a downward move in the real pay-out price received by dairy suppliers, with the exception of the late 1990s. The strong expansion during the 1990s must, however, also be seen in the light of even stronger declines in the profitability of sheep and beef farming. The treadmill hypothesis cannot be rejected, therefore.

There is no guarantee that Fonterra will be able to stop the treadmill in the long run. A failure of Fonterra in this regard will raise the possibility that the industry will be taken over by overseas interests.

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[442] Jacques Berthelot, op.cit.

CHAPTER SIXTEEN: CONCLUSIONS AND OUTLOOK

16.1 Brief Description of Rhizoid Theory

Social-economic rhizoids (Ch 11) are combinations of inter-individual or inter-communal relationships concerned with the stewardship of flows, stows and transformations. They are coherent, persistent and flexible in the sense that the feedbacks they contain ensure that the relationships of which they are composed form an identifiable structure, which endures through time, albeit not without changes. A rhizoid does not necessarily coincide with an industry as defined in official statistics. The NZ dairy rhizoid (Ch 15), involves research centres, vets, sheep and beef farmers who are weaning calves, banks and supermarkets, among others as well as flows of rain, sunshine, grass, effluent and money payments in and out. Stows include the pastures, herds, inventories of milk powder and bank balances. Transformations include the conversion of grass into milk, the processing of milk into butter, etc. This rhizoid has been evolving since its early beginnings in the second half of the 19th century. Over the years it has developed a tradition of co-operative ownership and joint exporting. Together flows, stows and transformations provide another way of describing and analysing economic phenomena than customary national income statistics such as GDP. The approach is developed on the basis of the well known monetary flow of funds accounts.

Since rhizoids allow a mapping of social inter-personal relationships they may be used to show the connection between changes in world- and life views and changes in the way people conduct their economic affairs. In this respect, the distinction between open rhizoids, which are changed as a result of technical innovations, new entrants, takeovers etc. and closed rhizoids which replicate themselves over time is important. Traditional subsistence agriculture is often conducted in closed rhizoids. In modern life, the category of clopeds, rhizoids that are protected to a degree but also open to change are very common.

This study has been concerned with agricultural rhizoids and in particular with the way in which modern technology has been shaping them as open rhizoids.

16.2 A future Technicistic Scenario

The issue examined in this study has been whether the problems of animal welfare and environmental degradation observed in modern agriculture and associated with a treadmill of supply rising more rapidly than demand for food leading to falling farm incomes, triggering, in turn, another push to raise productivity and production from the same plot of land, have been due to technicism and economism.

Historian Paul Kennedy's scenario of a biotech revolution in the 21st century may serve to put the problem in focus.

He envisages that such a revolution might be the answer to the problem of how the world might feed another three billion people between now and 2050.[443] Food would be manufactured synthetically 'in vitro' by large bio-chemical companies. Farmers, operating large-scale farms, would supply the biomass needed. Hormones, seeds, and fertilisers would all be supplied by the companies. The application of growth hormones would reduce the number of cows and pigs required. Thus, the problems of pending shortages of fertile cropland, growing salinity, major droughts arising from climate change and environmental degradation (felling of rainforests) would be solved. However, Kennedy is realistic enough to point to the major social problems that would arise since millions of Third World peasants would lose their livelihood, without necessarily finding alternative employment. There could be peasant risings in many countries, reminiscent of such risings in European history (Ch 1.3). There have already been such troubles in China. Problems arising from displaced people migrating into First world countries would be exacerbated. Many Third World countries would be angry since the technical know-how, the patents etc. would be largely in the hands of private TNCs located in First World countries, for which they would have to pay higher food prices. Thus, the age old transfer of income from peripheral countries to the centre within empires would continue. Clearly, the biotech revolution Kennedy has in mind presumes a continuation of international trade to provide the markets required by the TNCs.

The empirical study on the development of the New Zealand Dairy rhizoid (Ch 15), bears out the trend on which Kennedy bases his scenario. The number of farmers has been falling virtually year after year, whereas the size of herds and the production of milkfat per cow have been increasing relentlessly. Pollution problems have also become more acute, especially due to a higher application of chemical nitrogen and the need to dispose of growing volumes of effluent. The availability of water for irrigation is becoming a constraint. The eco-system is under threat, therefore.The now unified processing and exporting company has been building up stakes in advanced production of food (techno-food), pharmaceuticals and other high-value products. Should 'in-vitro' production of dairy products be feasible they would not hesitate to jump on the band-wagon.

The New Zealand dairy rhizoid would be prepared to build up markets in poor countries or to take over existing dairy companies in those countries. The joint venture it is presently undertaking in China is a case in point. As the problems alluded to by Kennedy mount, open rhizoids may become very aggressive.

Kennedy's surmise of a future biotech revolution entails the likelihood of two major dialectics, although he only foreshadows the one between the Third and the First World. He ignores the dialectic between industrial and biological farming.

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[443] Paul Kennedy, *Preparing for the 21st Century*, Harper Collins, London, 1993, pp. 65-81.

16.3 The Treadmill under Technicism and Economism

One implication of Kennedy's scenario is that farmers would become entirely subservient to the demands of the bio-technical companies, even more so than is already the case with GMOs. If a farm is considered as a set of enkapses (H. Dooyeweerd) or integrated relationships of differently qualified structures (soil, plants, microbes, animals and people equipped with technical objects), then, science and technology would serve the farming operation, but without impairing the integrity of the farm animals as animals or the fertility of the soil. This foundational enkapsis is reversed by technicism into enkapses in which animals, plants and soils are dependent on science and scientific technology (Ch 10.6). Moreover, Kennedy's assumption that the biotech companies would produce synthetic food may be true, but is far from realistic. Faced with a treadmill, large agribusiness TNCs will prefer to grow crops for industrial applications, which have a higher price and income elasticity. This also has the effect of limiting the production of basic food, resulting in higher prices. This trend can already be observed around the world. Again the implied changes in the use of land would be imposed from 'above', without taking into consideration the need to at least maintain if not to increase the production of food in a world of many hungry people. To put it another way, the treadmill is pushed by technicism and slowed to an extent by economism. Such slowing, however, would provide the means for investing in new technologies to increase productivity, so that after a period the treadmill could speed up again.

16.4 The Treadmill and the Dream of Progress

The extreme technicism of Kennedy's optimism is a clear example of the dream of progress through science and technology. Since Descartes pronounced rationally thinking and acting people as lords and masters of nature, this dream has been given hands and feet in Western societies. Both the Agricultural and the Industrial Revolution of the 18th century had their roots in this dream of controlling and subduing nature. Yet, the control of nature has remained elusive, witness the outbreak of epidemics, as documented in the study of the Dutch swine fever crisis of 1997 (Ch 14). Attempts to control tend to evoke resistance in the name of freedom or in the name of returning to a nature unblemished by modern technologies. The recent movement of post-modernism might also be mentioned. It opposes the grand narratives of progress and universal enlightenment by reason in favour of smaller local narratives while accepting greater differences. However, it does not necessarily oppose all the advances of science and technology as such. The slow food movement certainly has a post-modern flavour.

The philosophies of the 17th and 18th centuries marked by the spirits of rationalism and Enlightenment had a strong mechanistic emphasis, inspired in part by advances in mathematics, the mechanical crafts and the achievements of Isaac Newton (Ch 4.4.4). This inspiration has been clearly visible in Adam Smith's moral and economic theories (Ch 5). Neo-classical economic theory has continued this mechanistic approach, often captured in

the phrase the 'price mechanism' (Ch 7). Economic theory, therefore, bears a strong technicistic imprint. Its concept of equilibrium between demand and supply is distinctly mechanical.

Interest in control has also been a feature of the utilitarian theories of Bentham and his 19th century follower F. Edgeworth (Ch 4.5.1). One needs the arm of the State to achieve the greatest happiness for the largest number. The poor are people that cannot be trusted. They should be given incentives to work and be supervised to ensure they work properly, as human beings were seen only as factors of production.

As the 19th century unfolded the expansion of the British Empire and the opening of large land masses to mechanised agriculture in the Americas, Australasia and India made farmers dependent on world markets. They had to accept the prices set in those markets. The interconnection between markets was such that there was in fact one large open agricultural rhizoid. In the crisis of the Long Depression, when abundant supplies from the new grain producing areas flooded their markets many small-scale European farmers had to close down (sell out to larger neighbours) or enter into defensive co-operative rhizoids, often behind protective import barriers (Ch 2.6). The Treadmill problem arose within these large open rhizoids.

In contrast, prior to the Industrial Revolution agricultural rhizoids had been small-scale, located in close proximity to towns and villages and with trade confined to imports to cover shortages or exports to dispose of surpluses. Many of these closed rhizoids involved elaborate social relationships between farmers, manors and lords to organise work on the fields and manage the commons. The corporate thinking of Thomism may be discerned in these co-operative small scale closed rhizoids (Chs 1,3,9).

In England in particular the advent of industrial farming, to supply the wool industry for example, led to the socially disruptive enclosure movement which lasted until well into the 19th century and which contributed to the large-scale farming practices typical for England. As such it was influenced by the growing economism that had taken root since the 14th century in Europe, especially in relation to colonialism. A much more individualistic spirit contributed to this development (Chs 1,3,9).

With Britain being the centre of the world-wide open rhizoid in the 19th century, the thinking of the utilitarians, Bentham and Jevons in particular, became noticeable, especially during the El Ninõ droughts of the 1880s/1890s. Poor farmers were not supported. Supplies of grain had to be shipped to Britain rather than being distributed to the starving masses (Ch 2.6). As the rhizoid wanted to expand into China it encountered the problem that China had its own rhizoids and sold only some finished products such as pottery to the West. To encompass this country into the open world rhizoid, China had to endure the Opium Wars, whereby it was forced to import opium in exchange for money, a clear example of economism.

16.5 The Historic Roots of Technicism and Economism

Technicism and economism have emerged over a period of over 500 years in two distinct, albeit related ways. First, the spirit of competition between emerging nation-states so characteristic for mercantilism (Ch 1.3.2.4) led to a close involvement of governments in commerce and industry, in the conquest of overseas territories and in the associated technical innovations. In the 17th and 18th centuries a spirit of innovation started to affect agriculture and industry. The economic inter-dependence of states, commercial/industrial enterprises and their joint interest in international trade has continued right into the era of globalisation. In agriculture Governments have continued to provide and/or finance research and development. The ability to compete depends on technical prowess combined with business acumen and the availability of finance, which, in turn, requires a high rate of profitability. Human labour and the long-term sustainability of eco-systems are of secondary importance.

The second way in which technicism and economism is much more functional via the strong growth of the mathematical and physical sciences since the 17th century, inspired by a desire to decipher the secrets of nature in order to master and control it. This has made a technicistic imprint on philosophy as well as on economic theory. The development of technology usually assists in making scientific discoveries, which, in turn, assist the further development of science.

These two ways, one via entities and the other via the functions of science, and the 'making' of money have increasingly come together in the modern business corporation and its close association with universities. They mutually reinforce each other, such that our civilisation expects scientific technology and economic growth to solve all problems, present and future, problems often evoked by the blind pursuit of new technology, business and profits. The earth is seen as a technical/financial system rather than a garden.

16.6 Three Functions

The modality theory of reformational philosophy suggests that all things, everything that exists on earth, functions in all modalities. The objectivising culture of Western civilisation (Ch 3.2 and 3.3) has given priority to three functions in particular, the analytic/scientific, the technical and the economic (Ch 8.13). Since they are universal functions they appear to provide a way of controlling life and the world, once we see the whole world as a set of objects to be exploited by human subjects rather than as kingdoms of things, plants and animals, with their own life and their own way of multiplying. Under technicism and economism the analytical, technical and economic object functions of things, plants and animals are over-developed at the expense of other object functions. Rather than tending these three kingdoms as a garden, Western civilisation treats them as scientific, technical and commercial objects. As a result, the natural world begins to look like a rationally organised factory.

Science and scientifically designed technology have become instruments to control and exploit not only nature but also human society. Over the past two hundred years or so these two functions have been operating also in conjunction with the economic one, especially via the business corporation. Business relies on science and technology to provide new products and technical innovations to develop new markets and outwit competitors with a view to making money. Science, technology and economics have become the heart of culture. As a result other functions have become subservient to these three. Human inter-relationships, as well as relationships between people and nature, have become technical and economic relationships. Social life has become subject to traffic (tourism), large-scale entertainment, sport, mass media and advertising. It is very much commercialised and subject to competition. The leading role of economism in this complex is expressed in the obsession with economic growth, understood as a continuous rise in real GDP per head of the population. It is a search for a limitless abundance of material goods and services. As the abundance of goods and services increases, food becomes relatively less important. This is the key economic reason for the Treadmill of modern agriculture. Indeed, the treadmill results from both technicism and economism.

Perhaps we should compare the economic growth engineered by the power of technology and money with natural processes of uncontrolled growth (cancers, viruses, bacteria, etc.). In either case there are unknown adverse effects on the environment.

16.7 Abstractions

Schuurman has drawn attention to four abstractions to explain technicism (Ch 8.4 and 8.7). First, science abstracts from the web of functions to concentrate on only one function. Second, within the framework of a function one abstracts from the singular, the concrete and special to concentrate on what is general and universal. Third, one abstracts from the visual concrete world to concentrate on the laws that apply to that reality. Finally, scientists are supposed to be free from promoting private interests. Their work springs from curiosity and should serve the whole of humanity rather than any group in particular.

By designing technology scientifically, these abstractions are projected into technology. As technology shapes and changes the world it begins to show the abstract character of scientific technology. Thus, technicism leads to a technicisation of the world. This tendency is strengthened by the economic abstractions of factors of production (land, labour and capital), market relationships as such and competition, which together with the technical/economic object money guide production. Markets are introduced into non-economic spheres and are used to deal with the problems of pollution and other environmental degradation that result from technicism and production processes that are guided only by money and markets (Ch 6).

Markets rarely correspond to the economic textbook model of perfect competition. The models abstract from real world 'imperfections' such as State regulation, differences in financial power of market participants, technical innovation, cultural differences, social networks, etc. Money has been called, correctly, one of the greatest abstractions ever invented by humankind. Those who have money or the power to create debts, are able to put production processes in operation or to speed them up, so that the rate of resource depletion exceeds the rate at which nature is able to replenish them, whilst the production of wastes, including greenhouse gases, exceeds the ability of the environment to clean itself. The application of (compound) interest is a factor that stimulates innovation inasmuch as sales should be increased to earn interest due (Ch 7.6).

The economic abstractions of factors of production and money are so prevalent that the inner contradiction between the drive for low wages and the need to make sales, at a profit, is hardly noticed. Who will buy the increasing output, especially since human capacity to consume is limited, especially in the area of necessities? Once sales stagnate, the burden of interest might not be serviceable any longer.

The WTO's Agricultural Agreement was found to exhibit the four abstractions of scientific activity, namely it accepts the claim of the neo-classical theory of international trade that free trade will enhance material economic welfare; it assumes that all participating countries are equal and that agriculture is the same activity everywhere; it prescribes the steps towards free trade and provides legal means of dispute resolution to avoid any bias due to the self-interest of larger members (Ch 13.6).

16.8 Farmers Pushed by Abstractions

Modern agricultural rhizoids consist of long chains of stows, transformations, and flows from sunshine to cheese in the supermarket. Being dependent on prices over which they have no control, except through political activities, a vast array of suppliers and advisors helps farmers to increase their production and productivity, often beyond what is needed by consumers. To survive farmers must carry out the tasks imposed upon them by their suppliers and service providers (Ch 15). The system has aptly been dubbed TATE (Technical Administrative Task Environment).

In these chains technicism begins with scientific advice and the design of farm implements, solutions to biological and veterinary problems, new seeds and breeds, fertilisers etc., mostly off-farm. Thus, the original foundational enkapsis with animals and plants being assisted by science and technology, is turned upside down, so that the farmer and their plants and animals become dependent on science and technology. The imperatives of the markets they must supply strengthen the power of the abstractions.

The reversal of the original foundational enkapsis (science dependent on agriculture) is a result of the abstractions of technicism and economism, as attempts to control nature for the sake of human pleasure and material

welfare (Ch 10.6). To put it concretely, a cow is able to transform grass into milk by means of a physical-chemical process that is enkaptically bound by her as a living animal. She can live without it if necessary. But, if agriculture turns the cow into a milk factory, her milking function begins to determine her looks (through selective breeding emphasising the size of the udder for example) and her way of life (inside a barn or paddock, close to an automatic milking machine). The cow becomes an extension of the milking machine. However, how cows so re-engineered will behave or for how long is a major uncertainty. The attempt to reverse an original foundational enkapsis results from a technicistic mindset for whom the creation should, in principle, not hold any mysteries.

Technicism and economism result in agriculture becoming more and more uniform (mono-cultures), large-scale and prone to disasters. The analysis of the Dutch pork rhizoid shows that the outbreak of swine fever could have been prevented by vaccination, which was ruled out because of the need to maintain export markets. The availability of cheap feed from the Third World caused an expansion in production far beyond the capacity of the region to cope with the flow of manure. Animal welfare suffered both on farm and during the crisis. The pigs were treated as technical objects.

Whether or not agriculture produces good quality food, features healthy farm animals and a flourishing bio-diversity is not considered essential, provided there are markets that take the produce. The case study of the NZ Dairy rhizoid, which is not protected by the State (Ch 15), shows that technicism and economism have the same effects as in agriculture that enjoys high levels of Government protection such as the pork industry within the EU (in 1998 European pork prices were higher than world market prices by a factor of 1.12).

Should import protection be universally removed, the treadmill would operate across the world, leading to large farm corporations. Traditional family farms would disappear. Large numbers of peasants would be pushed off the land. There is every chance that land degradation would accelerate, whilst the genetic pool of plants and animals would be impoverished. The abstraction of relative comparative advantage would have a very destructive effect.

The development of biotechnology has been driven by major chemical corporations (producers of chemical fertilisers) on the basis of scientific discoveries such as DNA. The possibility of changing the genetic structure of plants and animals appears to have opened up new avenues for increasing the productivity of farming and the production of food. In order to sell GMOs the corporations must convince farmers, or force them to buy, as well as Governments and customers. However, the sense that the new technology constitutes a qualitative break with practices of selective breeding and, therefore, presents major risks and uncertainties has inspired opposition to GMOs. Many countries have prohibited the import of GMOs. This has led to complaints to the WTO. A legal change such as the possibility of patenting life forms, including genes, has given rise to a hunt for genes, often in the tropical rain forests in Third World countries, suitable for manufacturing new products.

This also has led to conflicts between First and Third World countries in the context of the WTO.

Given that TNC's operate strategically and, therefore, secretly in a never-ending battle with other TNCs, then, small producers such as farmers must get by on the basis of limited, incomplete or even misleading information. How are they to manage their farm on the basis of the particularity of their land and climate? With whom would farmers negotiate? The prices they pay and they receive are given to them. This is true even in a strongly co-operative environment as the NZ Fonterra Co-Operative Dairy Group. The pay-out price for the next season is not known precisely until close to the end of the preceding one.

By means of the Internet and other modern communication devices, farmers may try to work out future trends in their field. Large TNCs would, however, play their cards close to their chest or spread deliberately misleading information. In such a case trends in future markets would tell very little.

16.9 The Neo-Classical Theory of International Trade

Economic theory approaches international trade in a number of ways. For Adam Smith it was a matter of extending the division of labour and thereby of extending the reach of markets. The ensuing specialisation would increase the wealth of nations. Hidden in this approach is Ricardo's view that if each country specialises on what it is able to do best relative to what other countries are good at, then, the best possible allocation of resources would take place, assuming other conditions such as perfect competition, static technology, lack of Government intervention and immobility of capital and labour across borders would obtain. Yet another approach is that of neo-classical welfare theory. If a series of optimal conditions apply, international trade will increase the world's total welfare.

What all three approaches have in common is that land, natural resources and capital are reduced to factors of production, whilst producers and consumers seek to serve their own interest, the latter by maximising their utility and the former by maximising their profits. Each would be guided by the price mechanism. The system as a whole is conceived as an automatically working negative feedback system. Neo-classical economists believe that it works best if left alone by Governments. Underlying this assumption is John Locke's labour theory of private property. Once we have put some work into a piece of nature we can call it ours. This idea has guided the conquest of the American colonies from indigenous peoples, often hunters and gatherers. Adam Smith called them savages in contrast to the civilised European nations of his days. This idea is still around inasmuch as the Third World countries, also known as the developing countries, are supposed to be on their way to become developed. Through organisations such as the IMF, World Bank and the WTO they are compelled to be suppliers of export crops, mining products and cheap labour to the developed world. In turn, they must accept subsidised agricultural exports and industrial products from the developed world to the

detriment of their traditional farming and industry. Their closed rhizoids must be broken up for the benefit of the open rhizoids of the First World.

Karl Polanyi has shown that during the 19th century a Great Transformation took place whereby the so-called factors of production were removed from their social context and regulation and became marketable commodities subject to the price mechanism (Ch 6.2). The crises of the 1920s-1940s were a totalitarian reaction to the imposition of market economies. They led to the introduction of farm protection and thus to the development of agricultural rhizoids in the USA and Europe protected by import controls.

The introduction of neo-liberalism after the crisis of the fordist industrial revolution and international regulation under the Dollar/gold standard in the early 1970s has been accompanied by globalisation aided by the information and computer technologies of the 1980s and beyond. This has revived Locke's concepts of private labour-based property and small state ideologies, marked by low taxation, light environmental regulation, flexible labour markets and free trade, albeit under the umbrella of the US defence forces. The Third World has become a supplier of cheap labour and raw materials (Ch 12.4).

The push for free international trade is motivated by the economic doctrine of relative comparative advantage. This involves a twofold abstraction inasmuch as the economic theory is developed in a very static setting, with immobility of both capital and labour and in the absence of technical change, but also in the sense that political, military and financial interests of nation states are disregarded. In practice, relative comparative advantage changes almost continually as a result of these factors. Technical innovation in transport technology has contributed to a highly refined and extensive network of transport links spanning the world, by sea, road, air and satellite. Goods are shipped across the globe, even when the rationale for doing it escapes from common sense considerations. Why would Dutch farmers raise pigs on Thai tapioca, when they cannot even get rid of the manure without severely polluting their land and water (Ch 14)? Arguing that Thailand has a relative comparative advantage in growing tapioca (at the expense of precious tropical forests) and the Dutch in growing pigs (they can be had just about anywhere around the world) is incredible (Chs 7,12).

Despite the emphasis on free trade, nation states remain in control of economic activities by means of fiscal and monetary policies and the promulgation of environmental regulations, social standards (labour market) and commercial legislation. This should provide an opportunity for a much wider and deeper assessment of free trade than by examining the effect on real GDP. The effects on the distributions of income and wealth, on the environment, on the structure of agriculture, on employment and unemployment patterns, should be investigated as well.

16.10 Rhizoids Moulded by Abstractions

The Dutch pork industry is a good example of a rhizoid (Ch 14). All pig farmers in the South East of the Netherlands are engaged in it as a group,

even though they may have no formal organisation as such, except through the semi-public body of the *Produktschap Vlees*. Those who discovered the possibility of making money by rearing pigs soon found followers. To make their trade possible, however, they needed supplies, transport facilities and processors. The latter would take care of marketing as well. They exported carcases to Italy for processing into Parma ham. The close proximity of the world port of Rotterdam, in combination with an excellent road transport system made it possible to get access to overseas supplies of feed (exempted from the CAP). The availability of veterinary services, farm advisors, trades people etc. helped as well. As the number of farmers expanded, various services could be provided economically through specialisation. However, the land available was too small to dispose of all the manure and the heavy metals it contained and ammonia, so that serious pollution of land, water and air resulted. Moreover, the EU had prohibited vaccination against swine fever. When an outbreak occurred, it affected the whole rhizoid very quickly. Government action to slaughter and dispose of animals was inevitable.

Similar intensive industrial farming rhizoids have been set up everywhere, with a heightened risk of epidemics such as bird-flu.

The NZ Dairy Industry (Ch 15) too shows the effects of technicism and economism. Since the 1920s science has become a key element in the growth of the rhizoid, along with scientific technology. Uniformity (a limited number of cattle breeds), maize as silage, effluent problems and ever larger herds and farms have become characteristics. Yet, farm incomes have tended to lag behind those earned elsewhere.

In each case the industry treats animals and plants as factors of production, machines in other words, able to transform inputs of feed and medicines into meat and milk to be transformed into a variety of consumer and industrial products, so that a return flow of money is generated to provide the means of paying wages, suppliers and, eventually farm incomes.

In general, large world-wide operating rhizoids that are intimately connected with flows of credit and capital and in which sometimes highly diversified TNCs are at the centre, make for a very fluid environment. TNCs aim at controlling their environment. By purchasing other business (Mergers and Amalgamations) they form monopolies. To take advantage of low labour costs, they outsource operations to cheaper countries. The flow of peasants from the land to the cities forms a useful stow in this respect. The increase in transport flows is largely intra-business. Just-in-time processes increase traffic flows on an inter-industry basis. The need to make 15% or more on capital invested provides a powerful incentive to take over profitable businesses. Political influence may be purchased (financing election campaigns) to get access to natural resources hitherto under Government protection.

16.11 The Industrial/Biological Dialectic

In modern rhizoids, there are strong links between scientific research, large TNCs, investors, services and farmers around the world. They represent a

modern way of dealing with nature, raising the question: what is nature and how do we use it? This question has deep roots in philosophic movements. It is also a controversial question. Various groups oppose the modern way and want to return to biological/ecological ways of agriculture. They are interested in smaller local rather than global rhizoids.

The introduction of GMOs in US farming, initiated by chemical companies such as Monsanto in the face of European opposition and questions about the risks of contaminating original wild plants, important to the long-term viability and renewal of hybrid plants, have raised interest in biological farming (Ch 2.12).[444] The movement has been gaining momentum also on the basis of recent crises such as the Dutch swine fever crisis (Ch 14), large scale outbreaks of Foot-and-Mouth disease, accompanied by a massive destruction of healthy animals, BSE and Bird Flu (H5N1 virus). In addition, there are longer standing concerns about the perceived excessive use of chemicals in agriculture and food preparation. Many prefer to return to farming practices that are closer to nature and which serve local neighbourhoods. Movements that plead for populations to feed themselves as much as possible, advocated especially by the French Confédération Paysanne (opponent also of GMOs), would also fit into this pattern.

In various countries the ecological movement protests against globalisation and the proliferation of modern technology by reverting to older methods of food production (natural rhythms of maturing, for instance) and species of plants discarded by industrial farming. In Italy a slow food movement originated out of a desire to preserve such older species of plants and the traditional regional recipes in which they are used. If successful, these movements would result in the widely cast networks of rhizoids operating world wide being replaced or complemented by local rhizoids of farmers, processors and consumers. The current European emphasis upon restoring nature also points in this direction. Similar movements could arise in Third World countries.

The ecological movement is inspired by sacral cultural perspectives as well as by the Western objectivising culture. In the latter case it involves a questioning of the scientific basis of industrial agriculture and the environmental and health problems it has been causing (Ch 2.18 and 3.2).

Industrial European agriculture was founded on the mixed farming model developed especially in Flanders. It has been refined and exported to many other parts of the world (Ch 1.3). Since the middle of the 19th century it has involved a marriage of science, technology and farming techniques, whilst agriculture became an open rhizoid with significant international trade, initially in the context of the British Empire (Ch 2.5; 12.3.3).

Would biological agriculture be able to displace industrial agriculture? Under complete liberalisation of international trade this seems rather unlikely. What might happen is that food processing TNCs impose biological methods on

[444] Thomas Fischermann, Kampf ums Korn, *Die Zeit*, Hamburg, 29 December 2005, p. 26.

their supplying farmers, either in whole or in part. Chemical fertiliser application might be reduced with animal manure being spread on land.

A similar process could take place with respect to animal welfare. Protests against battery hens, densely packed piggeries and cattle feedlots could lead to more specious accommodation, but without a return to free-ranging.

In areas not touched by industrialised agriculture, small rhizoids might be formed that are opposed to industrial methods. Local customers would buy direct from farmers or could even enter into co-operative arrangements with them.

As the incidence of epidemics and the awareness of environmental degradation associated with modern farming practices increases, the biological farming movement will intensify. Successes of such farming will result in others following. Faced with a static or even falling market share, industrial farming would have to adapt and incorporate biological farming methods. In some cases, large industrial farmers might buy out organic farmers or introduce biological methods by means of modern mechanised farm implements. Strife and suspicions would continue. The ecological movement might become more extreme in reaction. How long such struggles would continue might depend on the ability of biological farmers to capture the hearts and minds of the larger public. Closed networks involving biological farmers, shops/markets and consumers might arise.

On the whole we may be confident that biological farming will win out, simply because it applies biological methods to a practice that is biological in nature. As the present, often tentative, attempts to introduce biological farming improve, further steps become possible, so that eventually a truly sustainable agricultural practice emerges that preserves the capital of soils, water, microbes, plants and animals in all their diversity and natural ways of behaviour, with a wise use of organisms to control and prevent pests, in pleasant landscapes and with a good and regular harvest of healthy food.

16.12 The First World/Third World Dialectic

Although the importance of nation states is much diminished, some such as China, Japan and Brazil may by dint of their size try to forge links with other Third World nations to prevent bodies such as the WTO and the IMF to issue regulations they believe are contrary to their interests. Conflicts of this nature have already arisen as medicines badly needed in the Third World have become more expensive under TRIPS (protection intellectual property). Another bone of contention is the export of agricultural surpluses at subsidised prices, in particular by the European Union and the USA (Ch 13).

First World countries increasingly feel threatened by the growing power of some Third World countries. Guided by the USA they may seek to use their influence on capital markets (TNCs located in their jurisdictions) to counter such threats. As the state of the environment and public health deteriorates in the slums of the Third World the desire of people there to move out and to find

a better life in the First World will intensify. Major security measures notwithstanding, they manage to cross borders into Europe and the US, at the risk of their lives (many perish in the attempt). The more agriculture in their countries of origin industrialises, the larger such migration will become. However, in the host countries, such migrants tend to aggregate into ghettos and poor suburbs. On account of low levels of skills, language problems and different cultures they find it difficult to integrate with the local population. The second generation will feel particularly alienated. Clashes are virtually inevitable.

First World countries will respond either by tougher security measures or by deportations, which will worsen the problems, or by providing better education and training. This might cause resentment amongst the unemployed in their own countries. A meaningful response might be to train the youth concerned for work on small farms and horticultural projects around the cities in which they live, with a view to sending out some of them to their countries of origin to work on similar projects, obviously in close co-operation with those countries.

Should, for argument's sake all forms of import protection of agriculture be removed, as is the wish of many smaller countries, then, potentially all farmers would be faced with a world market that is practically infinite relative to their own production. As surpluses are produced, prices are put under downward pressure, leading to either another increase in productivity and production or to smaller farmers being bought out by larger ones. Whilst this might have the effect of lowering unit costs, final prices might decline at a faster pace (Ch 12.8). This, of course, is the treadmill problem (Ch 3.13).

Larger First World countries would react to the emergence of surpluses under this scenario by re-imposing import protection. Third World countries would protest or might do the same in retaliation.

There are signs that another scenario might obtain, involving an intertwinement of the industrial/organic and the First World/Third World dialectic. TNCs that are key drivers of industrial farming might develop biological products for sale in First World countries and continue their drive to sell GMOs to Third World countries. The precarious financial position of many of the latter might provide an opening for such a strategy.

Would a long-lasting synthesis of industrial/First World and traditional/Third World agricultures be forthcoming? Conflicts certainly would arise, especially between rich and poor both in First World and Third World countries. As prices would rise sharply under the impact of resource depletion (oil, water, phosphate), the rich would seek to secure their own supplies by direct investment in farms both at home and abroad. The poor would be excluded and would become dependent on State protection and hand-outs. Epidemics and environmental disasters might kill proportionately more poor than rich people. Riots would be the order of the day.

As in the case of the previous dialectic, the conflictive relationship between First World and Third World countries will not necessarily have the last word. The capacity to resist in Third World countries should not be under-estimated. Various groups of women in Africa and India have taken action against TNCs or against the advancing deserts in their region.[445] With appropriate help such initiatives could snowball. We can imagine that groups of people in Third World countries would establish rhizoids to secure their own supplies of food, perhaps by taking over smaller farms or establishing trading networks across borders. They may be able to draw on the accumulated wisdom of previous generations as well as on insights from biological sciences to develop productive biological farming practices.

For the time being, however, the dialectic of rich and poor will become shriller in tone the more Kennedy's scenario becomes reality. Recent acrimonious debates within the WTO about patenting (intellectual property) and services certainly point in this direction.

16.13 Normative Principles

A key insight of reformational philosophy is that the whole of the creation is subject to God's law. In Vollenhoven's interpretation there is a structural law expressed in modalities, the law of love, fulfilled by Christ, and the positive law formulated by office bearers for their areas of responsibility.

Technicism and economism are attempts to direct the whole of life on the basis of the structural law, namely by believing that the three functions of analysis, technology and economising should direct life rather than the law that we should love God and our neighbour as ourselves. Hence, all inter-personal relationships become technical and economic relationships. Office bearers in the various institutions and communities start making positive laws for the life of their organisations that are technicistic (detailed procedures to be followed) and economistic (performance criteria). The law of love is interpreted technistically and economistically.

To put the functions of the structural law back into their proper place (in the kingdom of people), we need to know what the normative principles are that should inform technical and economic practice. The former may be rendered as 'use tools to shape nature in the service of human ends', and the latter as seeking abundance, whilst avoiding waste.[446] Why should there be two elements, one positive and one negative in the economic sphere? The reason is that in producing things there are always two elements. Farmers aim for a harvest, but if in the process of preparing it they use labour, fertilisers as well as seeds and capital equipment. They may also produce flows of effluent and methane gases. If they run down their soil or pollute streams with effluent, they may well have a great harvest now, but very little profit and perhaps no harvest tomorrow. By putting it this way we retain the truth of the standard

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[445] Syfa International, *Les bons "plants" des Africains*, Syfa International, Montpellier, n.d. (articles written between 2000-2003).

[446] Schuurman, *Faith and Hope*, op.cit., p. 65, in respect of technical practice.

profit and loss account, but at the same time widen the inquiry to the whole set of flows, stows and transformations that make up the farming practice. This should lead to a much more comprehensive accounting system, something that requires further research (Ch 9.10 and 10.9.2).

In the view of reformational philosophy 'putting the functions back into their proper place' means that they are motivated by the pre-functional heart. This amounts to a conversion. However, many of those who believe in the scientific world view may also appreciate the problems of technicism and economism and search for alternatives.

16.14 A Culture of Response

The Word of God called the creation into being. It was not a static thing, but something that was to be unfolded through a process in time according to that same Word spoken in the beginning and with human involvement. The garden in the beginning was to develop into a city (with garden characteristics). As humans became fallen creatures, their actions have become flawed responses. However, they cannot change the law or Word that determines the structure of the creation. Humans can work according to the structure given or try to move in a different direction. If the latter, then, sooner or later the structure will 'fight back', will re-assert itself. However, this would not always be a restoration of what once was. When goats proliferated in what is now the Sahara, the vegetation was destroyed and it became a desert until the present time. It would take a huge effort to restore vegetation there. On the other hand, evil dictatorships such as Nazi Germany were so repulsive that other countries united their forces to defeat them.

So it is with the dialectics summarised before. What appeared to be promising new directions in human affairs, turned out to be movements that became very damaging in various ways (human, environment). Out of concern, movements came into being that started to oppose. Over time it will become clear as to whether they will be strong enough to turn the tide. It may well be that some changes made may be irreversible. To give one example, China and other Asian countries have seen the construction of major poultry farms, with thousands of birds congregated in very confined spaces as battery hens or broilers. They serve, amongst others, the KFC restaurants that have been established there. Suppose that bird flu triggered by the H5N1 virus requires the destruction of most of the chicken populations and that the virus mutated into a human flue virus, triggering a pandemic. Would this in due course lead to a rejection of such intensive industrial farming? It is not impossible, especially when one also begins to realise the pollution of air and water caused by these factories.

What type of disturbances caused by the cultural direction implied in economism and technicism will come upon the world is difficult to guess. We may surmise them, as was done above, but to a large extent this represented an extrapolation from what is known today. The potential for evil may be greater than imagined. It is also possible that new wholesome possibilities are found that provide a new and better direction. There are indeed signs that in

various parts of the world women and others are tackling environmental and farming problems in very creative ways. All one can say is that a process of unlimited growth sooner or later will be forced to reverse and that such a reversal will be accompanied by major environmental, social, economic, political, ethical and religious disturbances.

Here and there in the midst of such disturbances developments may take place that are reflections of a properly directed agriculture, blending with the environment and serving people's genuine needs for years to come, without endangering nature's abundance. Indeed, we should strive, in faith, to replace the dialectics just discussed by the true dialectic of listening to the Word and shaping the world and life in obedience to it. This involves a growing in wisdom, a spirit of humility, a willingness to try again and resistance to the domination of technical/economic functions.

Guided by the commandment to love our neighbours, the structural law should help us find the most appropriate technology and processes given the need to maintain the integrity of the kingdoms of things, plants and kingdoms, whilst applying all normative principles of the modalities pertaining to the kingdom of people. Sustainability cannot be discovered by means of a definition or legal provision. It calls for a comprehensive framework in which the structural law can be brought to bear in the direction of the law of love.

16.15 The Garden-City Metaphor and a Cosmonomic Framework

The garden-city metaphor respects the kingdoms of things, plants and animals both as they are and as developing in time. Human culture should gratefully accept their services by developing all their object functions rather than a few. In contrast, modern agriculture tends to mine soils and treats plants and animals as machines. Genetic engineering is a clear example of a mechanistic approach to plants and animals so as to have them provide an abundance of goods and, in the last analysis, a flow of money.

The garden-city metaphor accepts that human cultivation is called for but within limits. Within agriculture the diversity of plants and animals should be preserved rather than sacrificed to the uniformity of mono-cultures. Animals are not machines and should not be turned into machines, so that a cow is bred over a long period of time to become a giant udder. The limits of their own nature should be respected. This implies awareness that as humans we can never fully penetrate into the mysteries of creation (Ch 8.10 and 10.9). Thus, the values of harvesting, nurturing and caring become prominent.

Similarly, we should avoid poisoning nature with our technical objects, chemicals, greenhouse gases and all manner of wastes. A garden is an aesthetic pleasure as well as a source of food. The tragedy of the objectivising technicistic and economistic Western culture is that we have turned this around, so that nature is seen only as a source of food, technical objects, including atomic bombs and landmines, and entertainment and tourism.

If the garden-city metaphor really gains the hearts and minds of people, then, it will lead to major cultural changes. For a start the pace of life will slow, this is the wisdom of the slow food movement. Science will be used to solve riddles and problems independent of the business corporations. A good example is the discovery of the combination of the Desdemonia plant and Napier grasses in Kenya as an alternative to genetically engineering corn to limit the damages of the corn borer (Ch 10.9). Land will be used to grow basic foodstuffs rather than luxury materials such as drugs, coffee and tobacco. Rhizoids will contract from world-wide to local/regional ones.

Public goods such as land and water will come under communal ownership and control rather than being seen as private property to be exploited for commercial gain. Thus, farmers become true husbandmen and –women, tilling the land in accordance with communally agreed principles. The community will establish a charter that sets out principles for the responsible management of soils, plants, animals, employees and families living on farms. New technologies will not be introduced until they have been thoroughly investigated and proved as complying with these principles.

Thus, sustainable farming becomes a process rather than a subject for legal definition. Accepting all normative principles (certitudinal, ethical, juridical, economic, social, lingual, technical, analytic, aesthetic) and informed by the love of neighbour, sustainable farming seeks to develop the object functions of soils, microbes, plants and animals without impairing their intrinsic nature. As the case study of the Dutch pork crisis shows disasters may push farmers into the right direction as they were compelled to improve the space the pigs have available, so that they can exercise and play according to their nature.

What would the new direction mean for countries with large areas of agricultural land, such as Australia, Canada, Russia, USA and Argentina? As producers of grains, they would seem to be indispensable to all other countries that rely on bread. Given the large areas of land, in relation to population, often in harsh climates, it stands to reason that most of these areas would remain grain-growing and hence involved in international trade. However, they would shift from present chemical-based to much more biological agriculture and from large scale to smaller scale more labour-intensive farming.

Countries like Australia and New Zealand would see their total agricultural exports decline from present high levels, but this would be balanced by reduced imports. Parts of their lands might be returned to reserves for the preservation and protection of rare animal and plant species or for plantation forests based upon their wide range of native trees.

As exports are reduced in size across the world, energy resources consumed in transport are saved. Importantly, international trade would be conducted in terms of rhizoids that give priority to social relationships, such as organisations that select producers that comply with, for example, high environmental standards and deal direct with consumers. However, it can be argued that the current large scale production systems represent false

economies inasmuch as they do not pay sufficient regard to the health of soils, animals and plants.

The proposal to allow all countries to protect their own agriculture by means of import levies and a prohibition of subsidised exports, whilst controls are put on total volumes of production, in principle makes it possible to strive for an agriculture that displays the values of a garden. However, these are only necessary conditions. Sufficient conditions would lie in true multi-functionality. This requires small-scale rhizoids that involve a close interaction between farmers, social communities, consumers and Government. They would seek to establish parameters for agriculture in their environment. In this way many countries will develop their own distinctive types of food and other agricultural produce, including various processing activities.

Production and trade in tropical products would also be organised through rhizoids in which local producers, consumers and processors would work closely together to avoid a senseless exploitation of rich tropical forests.

Since the properties flowing from the garden metaphor involve a different direction from the technicistic/economistic form of agriculture, those wanting to follow this direction will have to face competition from those who continue farming industrially, supported by massive cultural and financial power. Eventually, the quality of farm products should earn them the markets they need. Even so, they will have to walk along a way that will be fraught with dangers.

It is encouraging that around the world interest in new directions has been growing.[447] In this connection the 'conversion' of Mr. Edgard Pisani should be mentioned. He was, as France's Minister of Agriculture, one of the architects of the CAP in the 1960s. Now towards the end of his life he has come to the conclusion that the environmental costs are too heavy. He would prefer to restore the family farm within countries that protect their agriculture without causing surpluses to be disposed of at subsidised prices.[448] Nevertheless, there is still a long way to go before the current direction is displaced by one informed by the garden metaphor.

16.16 A New Commons

Although the practice of commons in Britain and elsewhere under feudal regimes had its downsides, it also had many desirable features, witness the often stringent opposition to enclosures. Of course, the commons that once were cannot be resurrected. However, the importance of land, water and other natural resources is such that regional communities should take over the key stewardship of land and water as essential public goods. In this way, larger units than farmers could work out the principles of responsible farming.

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[447] See for example, José Bové et Fracois Dufour, *Le Monde n'est pas une marchandise; des paysans contre la malbouffe*, Éditions la Découverte, Paris 2000.

[448] Edgard Pisani, *Un vieil Homme et la Terre; neuf milliards d'êtres à nourrir. La nature et les sociétiés rurales à sauvegarder*, Editions du Seuil, Paris, 2004.

Land would be let to farmers on a long-term basis, with a perpetual right of renewal, subject to conditions of use. The cosmonomic framework of regulative and constitutive principles could then be set up and used to determine the conditions of stewardship to be applied to land let to farmers. New technologies and crops would have to be assessed communally, with independent advice from experts (Ch 10.9).

The treadmill problem should be eliminated as much as possible by means of creating smaller locally based rhizoids. In such rhizoids farmers and consumer representatives would be able to discuss issues of common interest. By having guaranteed sales, the drive towards ever increasing productivity would be lessened. The overseeing bodies should set up accounts of all relevant physical flows and stows. Farmers would be charged for non-market flows into the environment that would otherwise not be factored into prices. Problems of pollution, animal health, soil structure, fertilisation and so on, should be considered at community level.

16.17 Further Research

Rhizoids should not be confused with F.A. Hayek's concept of a spontaneous order or *cosmos* in which numerous people, without an overall purpose, unknown to each other, and independent of any human will pursue their own gain according to some abstract agreed upon rules. In such a cosmos each participant acts according to his or her local knowledge. Rhizoids, however, may be deliberately set up and various actors may use superior power to control others or to eliminate them either inside or outside of the rhizoid. Nor are rhizoids what Hayek calls *taxis*, organisations set up by an exogenous agency to attain certain ends. Such organisations may well be part of rhizoids, but their actions would be circumscribed by the actions of others within or outside of the rhizoid. The role of technological change is such that few people will be able to do the type of local bargaining that Hayek had in mind.[449]

Smaller companies and smaller closed rhizoids are under constant threat from TNCs. How, in practice rhizoids form, become more or less coherent, split into smaller rhizoids or join others is a matter for further research.

We need to get a map of the rhizoid structures before we can find out how participants obtain and use information, whether they accept control by others or seek to dislodge them, either by entering and then taking control over a rhizoid or by forming alternative rhizoids. This should always be done in conjunction with the flows, stows and transformations managed by rhizoids. We also need to know how the principal actors think and how their thinking changes under what type of influences. Some rhizoids may be able to harness military or political power to protect their interests. Technical change may lead to the death or transformation of rhizoids. Borders between rhizoids are likely to shift under technical and financial changes.

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[449] F.A. Hayek, *The Confusion of Language in Political Thought*, The Institute of Economic Affairs, London, 1968.

Further research is called for to establish whether rhizoids can be set up that are shaped by a direction that fundamentally rejects technicism and economism, in a world in which these powers appear to be entrenched. The theory should be utilised in particular to aid the development of a comprehensive framework for sustainable agriculture.

WORKS CITED

Achterhuis, Hans. *Natuur tussen Mythe en Techniek.* Ambo, Baarn, 1995.

Amin, Samir. Économie "pure": une nouvelle sorcellerie. *Manière de Voir 72*, Le Monde Diplomatique, Paris, Décembre 2003-Janvier 2004.

Anderson, K. Are Resource-Abundant Economies Disadvantaged? *The Australian Journal of Agriculture and Resource Economics*, Vol. 42, Issue 1, March 1998, pp.1-24, Blackwell Publishing Asia.

Arendt, Hannah. *The Human Condition.* The University of Chicago Press, 2nd ed., Chicago, 1998.

Aristotle. *Politics and Athenian Constitution.* Ed. and trans. J. Warrington, J.M. Dent & Sons, London, 1959.

Ault, W.O. *Open-Field Farming in Medieval England; a study of village by-laws.* George Allen and Unwin, New York, 1972.

Bairoch, Paul. *Mythes et Paradoxes de l'histoire économique*. trans. Anne Saint-Girons, La Découverte, Paris, 1999 (original, 1993).

Beckett, Andy. Review of: John R. MacArthur, The Selling of 'Free Trade': Nafta, Washington, and the Subversion of American Democracy. *Guardian Weekly*, Manchester, December 6-12, 2001.

Belshaw, H. et al. *Agricultural Organization in New Zealand; a survey of land utilization, farm organization, finance and marketing.* Melbourne University Press, 1936.

Berg, J.H. van den. *Leven in Meervoud; een metabletisch onderzoek*, Callenbach, Nijkerk, 1965.

Berthelot, Jacques. Un Autre Modèle pour l'Agriculture. *Manière de Voir* 59, Le Monde Diplomatique, Paris, Sept/Octobre 2001, pp.39-42.

Berthelot, Jacques. *l'Agriculture: Talon d'Achille de la Mondialisation.* l'Harmattan, Paris, 2001.

Berry, Wendell. *The Gift of Good Land; further essays cultural and agricultural.* North Point Press, San Francisco, 1981.

Berry, Wendell. Renewing Husbandry, *Orion Magazine*, Sept/Oct. 2005.

Biéler, André. *La Pensée Économique et Sociale de Calvin*. Georg et Cie (Librairie de l'Universite), Geneve, 1959.

Biéler, André. Calvin, *Prophète de l'Ère Industrièlle.* Labor et Fides, Geneve, 1964.

Boerboom, W. *Genesis en Rol van de belangrijkste Postulaten in de gangbare Ekonomie; essay in: Krisis in de Ekonomiese Theorie.* VESVV Kongres, VU, Amsterdam, 1973.

Bornkamm, Heinrich. *Luther in Mid-Career 1521-1530.* ed. and with a foreword by Karin Bornkamm, trans. E.Th. Bachmann, Darton Longman &Todd, London, 1983.

Bos, A.P. *In de Greep van de Titanen; inleiding tot een hoofdstroming van de Griekse Filosofie.* Buijten en Schipperheijn, Amsterdam, 1991.

Bové José/Francois Dufour. *Le monde n'est pas une marchandise; des paysans contre la malbouffe; entretiens avec Gilles Luneau.* La Decouverte, Paris, 2000.

Brakman S. and Marrewijk, CH. Van. Trade Policy under imperfect Competition: the Economics of Russian Roulette, *De Economist,* vol. 144, no 2, Junie 1996, pp.223-258, Kluwer Academic Publishers, Dordrecht.

Brassé-Brossard, L. *Le Destin de l'Agriculture Francaise.* Presse Universitaire de France, Paris, 1949.

Braudel, Fernand. *Beschaving, Economie en Kapitalisme (15e-18e eeuw), vol. 1, 2 en 3.* Armand Collin, 1979, trans. R.Fagel et al., Contact, Amsterdam, 1988-1990.

Bril, K.A. *Westerse Denkstructuren.* VU Uitgeverij, Amsterdam, 1986.

Burnett, John. *A History of the Cost of Living.* Penguin Books, Harmondsworth, 1969.

Charvet, Jean-Paul. *La France Agricole en État de Choc.* Éditions Liris, Paris, 1994.

Clairmont, Frederic F. Ces Deux Cents Sociétés qui contrôlent le Monde, *Manière de Voir 58,* Juillet-Août 2001, Le Monde Diplomatique, Paris 2001.

Coase, Ronald. The Problem of Social Cost, *Journal of Economic Literature*, 1960.

Copeland, Morris A. *A Study of Money-flows in the United States.* National Bureau of Economic Research, New York, 1952.

Cordonnier, Laurent. *Pas de Pitié pour les Gueux; sur les theories économiques du chômage.* Éditions Raisons d'Agir, Paris, 2000

Crowther, J.G. Francis *Bacon; the first statesman of science.* the Cresset Press, London, MCMLX.

Davis, Mike. *Late Victorian Holocausts; El Nino Famines and the making of the Third World.* Verso, London, 2001.

Dawkins, Richard. *The Blind Watchmaker.* Penguin Books, London, 1986/1991.

DeLeuze, Giles et Guattari, Félix, *Mille Plateaux*, Éditions de Minuit, Paris, 1980.

Descartes, René. *A Discourse on Method.* J.M. Dent & Sons, London, 1953 (1637).

Dickmann, Nicola. Viel Mehr als Bananen, *Die Zeit*, Hamburg, 15 April 1999, pp. 33/34.

Diepenhorst, P.A. *Het Mercantilisme, Voorlezingen over de Geschiedenis der Economie.* G.J.A. Ruys, Utrecht, 1910.

Dijk, G. van. *Sterft gij oude Vormen? Co-operatief Ondernemerschap op de Drempel van de 21ste Eeuw.* Nijenrode University Press, Nijenrode, 1997.

Dijk, G. van; Veer, J. de en Veerman, C.P. EG-Landbouwbeleid tussen Vrije Markt en vaste Kosten, *Economisch Statistische Berichten*, vol. 77, 1992, N. 3864, pp. 598-601, Economisch Instituut, Rotterdam.

Dijksterhuis, E.J. *De Mechanisering van het Wereldbeeld.* Meulenhoff, Amsterdam, 1975, reprint 1989 (1950).

Dinwiddy, John. *Bentham.* Oxford University Press, Oxford, 1989.

Dooyeweerd, Herman. *A New Critique of Theoretical Thought, vol. 1,2, 3.* H.J. Paris, Amsterdam (1935/36) and The Presbyterian and Reformed Publishing Company, Philadelphia, 1953/55.

Dooyeweerd, Herman. *Vernieuwing en Bezinning.* J.B. van den Brink, Zutphen, 1959.

Drayton, Richard. *Nature's Government; Science, Imperial Britain, and the "Improvement" of the World.* Yale University Press, New Haven and London, 2000.

Dufumier, Marc. *Agricultures et Paysanneries des Tiers Mondes.* Éditions Karthala, Paris, 2004.

Duchrow, Ulrich & Hinkelammert, Franz J. *Property for People, not for Profit; alternatives to the global tyranny of capital.* Trans. Elaine Griffiths et al., Zed Books, New York, 2004.

Engels, F. *Common Ownership, Wage Labour and Capital.* Common Ownership Journal, Wellington, 1997.

Fischerman, Thomas. Kampf ums Korn, *Die Zeit*, Hamburg, 29 December 2005.

Gash, Norman. *Peel.* Longman Group, London, 1976.

Geertsema, H.G. *Van Boven naar Voren; wijsgerige achtergronden en problemen van het theologische denken over geschiedenis bij Jurgen Moltmann.* J.H. Kok, Kampen, 1980.

Gies, Frances and Joseph. *Life in a Medieval Village.* Harper Perennial, 1990/91.

Giesberger, Daphne & Bouman, Mathijs. Een Silicon Valley Vol Varkens, *Economisch Statistische Berichten*, vol. 82, no. 4119, Rotterdam, 1997.

Gimpel, Jean. *The Medieval Machine*. 2nd ed., Pimlico, London, 1988.

Goethe, Johann Wolfgang von. *Faust 1 (1807), Faust 2 (1831),* trans.David Luke, Oxford University Press, Oxford, 1994.

Goldsmith, Eduard. Seconde Jeunesse pour les Comptoirs Coloniaux, *Manière de Voir 58*, Le Monde Diplomatique, Paris. Juillet-Aout, 2001.

Gombeaud, Jean-Louis and Decaillot, Maurice. *Le retour de la très grande Dépression*. Économica, Paris, 1997.

Goudriaan, J. *Economie in Zestien Bladzijden.* 2de druk, J.H. de Bussy, Amsterdam, 1953.

Goudzwaard, Bob. *Tussen de Klippen Door. Om het openhouden van perspectieven voor beleid en samenleving.* College afscheid VU. In *Bewogen realisme; economie, cultuur, oecumene,* eds H. Noordegraaf en S. Griffioen, Uitgeverij Kok, Kampen, 1999.

Goudzwaard, Bob; Lange, H.M. de. *Genoeg van te Veel/Genoeg van te Weinig; wissels omzetten in de economie.* derde druk, Ten Have, Baarn, 1991.

Graaff, F. de. *Als Goden Sterven; de Crisis van de Westerse Cultuur.* Lemniscaat, Rotterdam, 1969/1970.

Grandia, Bram. *Zeven Maal Zeven; over Sabbatjaar en Jubeljaar als God's bevrijdende Economie.* Ten Have, Baarn, 1998.

Gray, John. *False Dawn; the Delusions of Global Capitalism*. Granta Books, London, 1998.

Grefe, Christiane. Mais fur die Welt, *Die Zeit,* Hamburg, 19 August 2004.

Grefe, Christiane. Rettung von der Biofarm, *Die Zeit*, Hamburg, 6 June 2002.

Guillebaud, Jean-Claude. *La Principe d'Humanité.* Seuil, Paris, 2001.

Hale, John. *The Civilization of Europe in the Renaissance*. Fontana Press, London, 1993.

Harvey, Graham. *We want real food; why our food is deficient-and what we can do about it.* Constable, London, 2006.

Hathaway, Dale E. *Government and Agriculture; Economic policy in a democratic society.* The MacMIllan Comp., New York, 1963.

Hayek, F.A. *The Confusion of Language in Political Thought.* The Institute of Economic Affairs, London, 1968.

Hayes, Carlton J.H. *A Generation of Materialism 1871-1900.* Harper and Row, New York, 1941.

Heertje, A. *Geld..wat is het en wat doen we ermee? in: Geld wat is dat eigenlijk?* SMO Informatief 19, Stichting Maatschappij en Onderneming, Scheveningen, 1977.

Hennipman, P. *Economisch Motief en Economisch Principe.* Noord-Hollandsche Uitgeversmij, Amsterdam, 1945.

Hervieu, Bertrand. *Du Droit des Peuples à se Nourrir eux-mêmes.* Flammarion, Paris, 1996.

Heusinger, Robert von. Verdammt zum Wachsen, *Die Zeit*, Hamburg, 18 November 2004.

Hilton, Isabel. Made in China. Die Arbeiter von Guandong in der globalen Produktionsschlacht, *Lettre International*, vol. 69, Berlin, Sommer 2005.

Himmelfarb, Gertrude. *The Idea of Poverty; England in the early Industrial Age,* Faber and Faber. London/Boston, 1984.

Hobbes, Thomas. *Leviathan.* J.M. Dent & Sons, (1651), 1959 (1914).

Hobsbawm, Eric. *The Age of Capital; 1848-1875.* Abacus, London, 1975.

Hobsbawm, Eric. *The Age of Empire 1875-1914.* Abacus, London, 1997 (1987).

Hobsbawm, Eric. *The Age of Revolution, 1789-1848.* Abacus, London, 1962/1997.

Hoogh, J.de. & Silvis, H.J. *EU-Landbouwpolitiek van Binnen en van Buiten.* Wageningen Press, 1998.

Hooykaas, Reyer. *Religion and the Rise of Modern Science.* Scottish Academic Press, Edinburgh and London, 1972.

Howard-Brook, Wes & Gwynther, Anthony. *Unveiling Empire; reading Revelation then and now.* Orbis Books, New York, 1999.

Jensen, Bernard and Anderson, Mark. *Empty Harvest: understanding the link between our food, our immunity, and our planet.* Avery Publishing Grouping, New York, 1990.

Jochemsen, H. en Glas, G. *Verantwoord Medisch Handelen; proeve van een christelijke medische ethiek.* Buijten en Schipperheijn, Amsterdam, 1997.

Johnson, R.W.M. *Reforming Farm Policy; Lessons from New Zealand.* The Institute of Economic Affairs, London, 2000.

Kanning, Walter. Het Coase-theorema en de co-operatieve organisatie, *Economisch Statistische Berichten*, vol.78, 1993, No 3932, Economisch Instituut, Rotterdam, 13 Oktober 1993, pp. 940-942.

Kant, Immanuel. *Critique of Pure Reason* (*Kritik der reinen Vernunft*, trans. Norman Kemp Smith), The Macmillan Press, London, (1781), 1976 (1933).

Kant, Immanuel. *Samelewing en Vooruitgang: Drie Traktate, trans. J.J. Venter.* Potchefstroomse Universiteit vir Christelike Hoër Onderwys, Potchefstroom, 1992.

Kee, B. *Meer dan het Rationele.* VU Uitgeverij, Amsterdam, 1987.

Kennedy, Paul. *Preparing for the Twenty-First Century.* Harper Collins, New York, 1993.

Kerridge, Eric. *The Agricultural Revolution.* George Allen and Unwin, London, 1967.

Kerridge, Eric. *Agrarian Problems in the Sixteenth Century and After.* George Allen and Unwin, London, 1969.

Kets, W. & Tang, P. Free Trade and its Enemies, *De Economist*, vol. 152 no. 3, Kluwer, Dordrecht, Sept. 2004.

Keynes, J.M. *The General Theory of Employment, Interest and Money.* MacMillan St Martin's Press, for the Royal Economic Society, 1973 (or. 1936).

Keyzer, M. and Merbis, M. WTO and the Failure of Seattle; Notes and Communications, *De Economist*, vol.148, No. 2, 2000, Kluwer Academic Publishers, Dordrecht.

Klein, Naomi. *No Logo/no space/no choice/no jobs.* Flamingo, London, 2001.

Korten, David C. *When Business Corporations Rule the World.* Kumarian Press, Oakwood, 1995.

Kouwenhoven, A. *Vrijheid en Gelijkheid.* Stenfert Kroese/J.H. Kok, Leiden/Kampen, 1965.

Kraan, K.J. *Een Christelijke Confrontatie met Marx, Lenin en Stalin.* J.H. Kok, Kampen, 1953.

Krueger, Anne. "Anti-Trade Zealots are Off-track", *Australian Financial Review,* 11 October, 2000.

Kurz, Robert, *Schwarzbuch Kapitalismus; ein Abgesang auf die Marktwirtschaft.* Eichborn Verlag, Frankfurt am Main, 1999.

Lappe, Frances Moore & Collins, Joseph. *Food First; beyond the myth of scarcity.* Houghton Mifflin Company, Boston, 1977.

Lepper, John and Simons, Petrus. *Systems of Economic Relationships; three essays on rhizoids and their applications to social science*. Integrated Economic Services Ltd., Wellington, 1996.

Le Roy Ladurie, Emmanuel. *De Boeren van de Languedoc*. Trans. Herklots, B. & Versteeg, M., Ooievaar, Amsterdam, 1996.

Lindblad, J. Thomas. *Nederland en het Oostzeegebied 1600-1850,* in Remmelt Daalder et al., *Goud uit Graan*. Waanders, Zwolle, 1998.

Locke, John. *Two Treatises of Government, a new edition corrected.* London, MDCCCXX!.

Luther, Martin. *Ein Sermon von dem Wucher*. Martin Luther Ausgewählte Schriften, Band 4, Insel Verlag, Frankfurt am Main, (1519) 1983.

Luther, Martin. *Large Catechism, the Book of Concord; the Confessions of the Evangelical Lutheran Church.* trans. and ed. Theodore G. Tappert, Fortress Press, Philadelphia, (1529), 1978 (1959).

McAllister, Matthew P. *The Commercialization of American Culture; new advertising control and democracy.* Sage Publications, Thousand Oaks, 1996.

McLauchlan, G. *The Farming of New Zealand.* Australia and New Zealand Book Company, Auckland, 1981.

Maréchal, Jean-Paul. *Le Rationel et le Raisonnable; l'économie, l'emploi et l'environnement*. Presses Universitaires de Rennes, Rennes, 1997

Marshall, Alfred. *Principles of Economics*. Cambridge University Press, Cambridge, 1961 (original 1890).

Martinich, A.P. *Hobbes*. Routledge, New York/London, 2005.

Marx, Karl. *Capital, vol.1*. J.M. Dent & Sons, London, (1867), 1930.

Marx, Karl. *Economic and Philosophic Manuscripts of 1844*. Foreign Languages Publishing House, Moscow, n.d.

Marx, Karl. *On the Question of Free Trade*; speech to the Democratic Association of Brussels, 9 January 1848, in: *The Poverty of Philosophy*, Foreign Languages Publishing House, Moscow, n.d.

Marx, Karl and Engels, Friedrich. *German Ideology in: On Religion*. (1845/46), Foreign Languages Publishing House, Moscow, 1957.

Massiah, Gustave. Le G8 Club de Riches très contesté, *Manière de Voir 75*, Le Monde Diplomatique, Paris, Juin-Juillet 2004.

Mazoyer, Marcel & Roudart, Laurence. *Histoire des Agricultures du Monde; du néolithique à la crise contemporaine.* Éditions du Seuil, Paris, 1997.

Meade, J.E. *Trade and Welfare, vol. 2 of the Theory of International Economic Policy.* Oxford University Press, London, 1955.

Mekkes, J.P.A. *Ontwikkeling der Humanistische Rechtsstaatstheorieen.* Libertas, Utrecht/Rotterdam, 1940.

Mellor, John W. *The Economics of Agricultural Development.* Cornell University Press, Ithaca, New York, 1966.

Merlant, Philippe et al. *Sortir de l'économisme; une alternative au capitalisme néoliberal*, Les Éditions de l'Atelier, Paris, 2003.

Merton, Robert K. Science, *Technology and Society in Seventeenth Century England.* Howard Fertig, New York, (1938), 1970.

Milton, Giles. *Nathaniel's Nutmeg; how one man's courage changed the course of history.* Hodder and Stoughton, 1999.

Morgan, Jon. Time to Scrap the Plough, *The Dominion Post*, Wellington, 24 March 2005.

National Academy of Sciences. *Agricultural Production Efficiency.* National Academy of Sciences, Washington, DC, 1975.

Nichols, Dick. "World Social Forum Poses Alternative", *Green Left Weekly*, Sydney, Australia, 7 February 2001.

Norel, Philippe. Malgré les Sanglots de l'Homme Blanc, *Manière de Voir 58*, Le Monde Diplomatique, Paris, Juillet-Aout 2001.

O'Brien, D.P. *The Classical Economists.* Clarendon Press, Oxford University, Oxford, 1975.

OECD. *Sustainable Agriculture; concepts, issues and policies in OECD countries.* OECD, Paris, 1995.

OECD. *Technological Change and Structural Adjustment in OECD Agriculture.* OECD, Paris, 1995.

Olmstead, Alan L. Biological Innovation and American Agricultural Development, Alan Lloyd Fellowship Lecture, *Australian Agricultural and Resource Economics Society*, Christchurch, 1999.

Parekh, Bhikhu. *Bentham's Political Thought.* Croom Helm, London, 1973.

Passet, René. *L'Économique et le Vivant.* Economica, Paris, 1996.

Petrini, Carlo. *Slow Food; the case for taste.* Columbia University Press, New York, 2001.

Philpott, H.G. *A History of the NZ Dairy Industry 1840-1935.* Government Printer, Wellington, 1937.

Pisani, Edgard. *Un Vieil Homme et la Terre; Neuf milliards d'êtres à nourrir; La nature et les sociétés rurales à sauvegarder,* Seuil, Paris, 2004.

Ploeg, Jan Douwe van der. *De Virtuele Boer; set of essays.* cyclostyled, Wageningen, 1990.

Polanyi, Karl. *La Grande Transformation (the Great Transformation).* trans. Catharine Malamoud and Maurice Angenou, (1945), Gallimard, Paris, 1983.

Pollard, Sydney. *Peaceful Conquest; the industrialization of Europe 1760-1970.* Oxford University Press, 1981.

Rae, Allan N. "The Current Round of Agricultural Trade Negotiations: why bother about domestic support?" paper contributed to July 2001 conference of *New Zealand Agricultural and Resource Economics Society.*

Ricardo, David. *The Principles of Political Economy and Taxation.* J.M. Dent & Sons, London, (1817), 1962.

Riessen, H. van. Produktiviteit, in *Christelijke Encyclopedie,* vol. 5, J.H. Kok, Kampen, 1960.

Robinson, Joan. *De Troonsafstand van de Neo-klassieke Ekonomie, essay in: Krisis in de Ekonomiese Theorie.* VESVU, VU, Amsterdam, 1973.

Robinson, Joan. *Economic Philosophy.* Penguin Books, Harmondsworth, 1962.

Rompuy, V. van. *Sectorpolitiek*, in: Andriessen, J.E. en Meerhaeghe, M.A.G. van, eds *Theorie van de Economische Politiek.* H.E. Stenfert Kroese, Leiden, 1962.

Roper, Duncan. *Gems Afire; the reformational contribution to aesthetic theory.* Association for Christian Scholarship/ Australia and New Zealand, November 1992.

Rousseau, J.J. *The Social Contract and Discourses.* trans.G.D.H. Cole, J.M. Dent & Sons, Lodon, (1750), 1973.

Sachsse, Hans. *Anthropologie der Technik; ein Beitrag zur Stellung des Menschen in der Welt.* Friedrich Viehweg, Braunschweig, 1978.

Schiller, Herbert I. Vers un Nouveau Siècle d'Impérialisme Américan; dominer l'ère élèctronique, *Le Monde Diplomatique*, Paris, August, 1998.

Schlosser, E. *Fast Food Gesellschaft; die dunkle Seite von McFood & Co.* trans. H. Schlatterer, Riemann, München, 2002 (or. 2001).