Essays on Sustainability & Transformation

Understanding PROUT

VOLUME 1

THE BIOPSYCHOLOGY OF COOPERATION

EDUCATION FOR LIBERATION

THE THREE-TIER ENTERPRISE SYSTEM

WATER AND LAND MANAGEMENT

Edited by Jake Karlyle and Michael Towsey

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To Shrii Prabhat Ranjan Sarkar

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Preface

This first volume of *Understanding Prout – Essays on Sustainability and Transformation* was published electronically in 2009 to mark the 50th anniversary of the founding of the Progressive Utilization Theory by the eminent Indian philosopher Shrii Prabhat Ranjan Sarkar (1921-1990). The editors are happy to present this paperback edition in 2010.

Prout (an acronym for Progressive Utilization Theory) is arguably the only socio-economic theory to emerge out of the Third World that has direct applicability to the developed world. It offers a new vision of society based on cooperation rather than competition and domination.

Why describe these essays as about *sustainability and transformation*? Because, in society as in individual life, there is a constant struggle to maintain equilibrium (sustainability) while at the same time to adapt to and to learn from the new experiences that life throws at us (transformation). Transformation also has a deeper, inner sense, as the contributors to this volume make clear. Surely the greatest challenge facing humans at the start of the 21st century is to learn the lessons embodied in climate change and globalization.

One of Prout's contributions to this challenge is to propose a cooperative economic system. Consequently all the essays in the first volume explore the theme of cooperation from various viewpoints. A cooperative economic system, however, is not possible without a commitment to a cooperative ethic and culture. Thus in the first essay of this volume, "The Biopsychology of Cooperation", Michael Towsey explores cooperation from an ethical, social and cultural perspective.

In the second essay, "Education for Liberation", Marcus Bussey begins with the paradox of a modern education. Why does it appear to impart so much and yet fail to prepare us for a future that now asks different questions of humanity. Bussey introduces Sarkar's philosophy of Neohumanism as the essential ingredient of an education for cooperation and liberation.

The third essay, "The Three-Tier Enterprise System", by Michael Towsey, introduces cooperatives from the traditional economic perspective and compares them with the more usual private and public enterprises. However he moves on to expand our understanding of the cooperative sector and to explore the governance and regulatory issues that are likely to arise in a cooperative economy.

Finally the fourth essay, "Water and Land Management", brings the focus to the local level. A cooperative global society cannot be achieved without due attention to the local economy and the local economy depends first and foremost on water and land management. Whereas 20th century water policy

focused on hydraulic engineering, so the 21st century approach will be about ecosystem management and biotechnology. It will work with ecological and biological processes rather than usurp them. We cannot live outside ecosystem dynamics.

P. R. Sarkar developed Prout over a period of 35 years, from the beginning of 1955 until his death in October 1990. Apart from some notable exceptions, the majority of his published works consist of extemporaneous discourses delivered to groups of people who had typically gathered from many parts of the world. The exceptions are books which the author dictated. All the author's discourses and books on Prout are contained in the series *Prout in a Nutshell*, which was created by the author in 1987. The First Edition of the series contains 21 parts, published between October 1987 and October 1991.

In 1959 Sarkar first described his socio-economic ideas as the Progressive Utilization Theory for which he coined the acronym Prout. From 1955 to 1959, he spoke on a broad range of topics, but it was on 5th June 1959 that he first solidified his socio-economic ideas into a comprehensive theory, defining Prout as the "progressive utilization of all factors". He continued to develop Prout throughout his life and consequently *Prout in a Nutshell* contains some 180 discourses and book chapters.

P. R. Sarkar once noted that the study of Prout can be done on three levels: introductory, intermediate and advanced. These levels may be equated with senior high school, undergraduate and post-graduate or research levels respectively. The essays in this series of volumes are designed to be on the intermediate level, making them accessible to a wide audience.

A number of contemporary thinkers have studied Prout and been impressed by the scope of Sarkar's vision. For example, Leonardo Boff, the co-founder of Liberation Theology, says, "Prout is very important to all who yearn for a liberation that starts from economics and opens to the totality of human existence." Hazel Henderson, economist and author of *Beyond Globalization*, has described Prout as, "an important contribution to re-thinking the disastrous course of the current economic globalization". Noam Chomsky, Professor of Linguistics (MIT), renowned academic and activist, says of Prout: "Alternative visions are crucial at this moment in history. Prout's cooperative model of economic democracy, based on cardinal human values and sharing the resources of the planet for the welfare of everyone, deserves our serious consideration."

The editors hope that the reader will enjoy the essays in this book – they are a refreshing contribution to the challenges that lie ahead in the 21st century.

Jake Karlyle and Michael Towsey, Editors

The Biopsychology of Cooperation

Michael Towsey

Introduction

The cooperative system is fundamental to the organization, structure and culture of a Proutist[1] economy. It is an expression of economic democracy in action – cooperative enterprises give workers the right of capital ownership, collective management and all the associated benefits, such as profit sharing.[2] Sarkar, the propounder of Prout, goes further and argues that an egalitarian society is actually not possible without a commitment to the cooperative system.[3] The commitment is not just to an economic order but also to a cooperative ethic and a cooperative culture. This essay explores cooperation from the ethical, social and cultural perspective. The business enterprise perspective is the subject of another essay in this volume.[4]

Background

Cooperation as a cultural, social and economic movement arose early in the 19th century, and with particular success in Britain. The term *movement* is used here to indicate that what caught the popular imagination of the day was much more than the consumer/worker cooperative, which at the time was a novel form of business enterprise. The cooperative movement was primarily a social and cultural movement because it advocated better conditions for the working class and better education for their self-improvement. It was also an economic movement in that it "sought to transform the balance of economic power from capital ownership to democratic control by members of an economic enterprise".[5] The cooperative business model enjoyed early success in the capable hands of one of the movement's founders, Robert Owen. The philosophy of the movement was promoted by a group of thinkers who were later characterized by Marx and Engels as *utopian socialists*.[6] Indeed the word *socialist* was first used in 1827 to describe Owen and his followers.[7]

During the second half of the 19th century, both the theory and the practice of cooperation were ultimately rejected by all the other major strands of social and economic thought of the day. In particular, Engels made a stinging critique of utopian socialism in 1880 which caused those seeking radical social change to turn their attention to Marx and the emerging socialist Left. It could be argued that Marx and Engels effectively killed, for more than a century, any capacity the cooperative movement had to effect radical social change. In addition, the British government made no attempt to encourage cooperatives as a business model. This left the way open for the other currents of 19th century

political thought to mature into the three great *isms* of the 20th century: communism, fascism and liberal capitalism. However, out of the turmoil of the 20th century it has become clear that none of the three contenders was able to produce a stable social order, that is, one which is environmentally, socially and economically sustainable. These three characteristics are considered today, quite reasonably, to be the minimum requirements for a successful social order.

After more than a century of neglect, the cooperative movement is beginning to enjoy a renaissance. In fact, it comes as something of a surprise to learn that today worldwide the cooperative movement has a membership of over 800 million people and provides over 100 million jobs. That is 20 percent more than provided by all multinational corporations combined[8] and has been achieved despite vigorous efforts by privately owned corporations to demutualize profitable cooperatives.[9] But it has to be admitted that cooperation as a social and economic ideal is not part of today's popular consciousness. In an era mesmerized by the sparkle of globalization and consumer goods, cooperatives appear somehow old fashioned, like the *friendly societies* to which one's grandparents or great-grandparents once belonged.[10]

Four factors have helped to breathe new life into the cooperative movement. First, the collapse of communism[11] has discredited the Marxist brand of 'scientific' socialism and those looking for serious social change are once again evaluating the cooperative movement. Second, the economic woes besetting Western capitalist democracies have starkly exposed the defects of the dominant social order to emerge out of the titanic struggles of the 20th century. Third, the British Labour government from 1997 gave much support to what they heralded as *the third sector* and *social enterprise*. In many respects it was cooperation rebadged[12] but it did help to broaden our appreciation of cooperation by encompassing not-for-profits and self-help organizations and it also made alternative economic models more visible in the English speaking world.[13] Fourth, much economic and scientific evidence is emerging, some of it from surprising quarters, to suggest that cooperation is not a utopian concept but entirely achievable given any reasonable effort to put it into practice.

The rejection of the cooperative business model by 19th century British capitalists was motivated by a desire to preserve class privilege. And of course the British government was obliged to maintain an increasingly expensive and restless empire – cooperatives are not a good business model for empire builders. The essential criticism made by Marx and Engels, that utopian socialists failed to understand the importance of class struggle and did not have a theoretical analysis to underpin it, was correct. But the argument is no longer compelling because the 20th century has taught us that accepting one (class struggle) does not require rejecting the other (cooperative economics). Prout, for example, embraces both the cooperative economy and a theory of class and class struggle. New evidence is emerging to suggest that not only is

cooperation, as a social and economic ideal, possible in the 21st century, but that it is necessary. One of the objectives of this essay is to present some of that evidence.

The evidence is better appreciated by making comparisons with the other social orders that dominated the 20th century, in particular communism and neoliberal capitalism. The failings of both these systems highlight the importance of cooperation, both as a social ideal and as a business model.

Structure of the Essay

This essay is in four parts. Part one, *The Cooperative Movement in the 19th Century*, briefly reviews the early history of the cooperative movement up to the point of Engels' famous 1880 pamphlet and the emergence of the Fabian socialists. The second part, *Matter-centred Philosophy,* reviews the communist attempt to build a social order on the foundation of Marxist theory. The ideal, classless, worker-ruled society was sought by the imposition of material equality. Part three, *Self-centred Philosophy*, examines *neoliberalism* as the most recent development of capitalism. Neoliberalism rejects cooperation in favour of individualism, competition and survival of the fittest. Finally part four, *The Renaissance of Cooperation*, as the title suggests, turns to the renewed interest in cooperation evident in the first years of the 21st century. We review the theory, the science and the ethics of cooperation. The scientific evidence, most of it obtained in the last few years, suggests that cooperation is an extremely important component of human social and economic behaviour.

On the way we find that a number of themes keep recurring. Five of them will be flagged here to help the reader maintain continuity as our story weaves through the 19th and 20th centuries into the 21st. The first concerns human nature. To what extent do humans have a propensity for altruistic as opposed to selfish behaviour? A cooperative economy would certainly draw on the human capacity for altruism and empathy.

A second theme is the frequently controversial *nature-nurture* debate. What is the relative importance of genetic inheritance versus environment in determining the trajectory of a person's life? Or are both of these subservient to the expression of free will? These themes are intertwined. Selfish behaviour is observed in all humans at various times and could thus be considered 'natural'. Is altruistic behaviour likewise natural or must it be learned, even imposed? Some philosophers have claimed that humans are essentially brutish and rise to cooperative behaviour only in response to reward and punishment.[14] Others, such as the utopian socialists, have leaned to the view that humans are essentially good but spoiled by a brutish environment, and still others claim that one's life depends entirely on the choices one makes.

A third theme is egalitarianism. Many societies like to claim the virtue of equality, but what does it mean in practice? In particular, must a society be equal in some sense to be cooperative?

A fourth theme is ethics. What kind of ethical principles are required to sustain a cooperative society? And a fifth theme is social progress. How do we know whether our circumstances are getting better or worse as the years pass by? These last two themes are also intertwined since progress is frequently defined in terms of an increasing quantum of the *good* compared to the *bad*.

The Cooperative Movement in the 19th Century

The 19th century was the first in which, at least in Europe, the pace of scientific discovery and technological change threatened the stability of society at large. Today we accept rapid technological change as a fact of life, despite its often disruptive social and cultural impacts, and we attempt to gain the initiative by anticipating future possibilities. However, with respect to technological change, we might say that the 19th century was caught by surprise. Social dislocation created many new opportunities for exploitation and the unscrupulous were not slow to take advantage of them. By contrast, the intellectual world was full of optimistic expectation that science and technology would lift humanity above its age-old struggle with nature.

The concept of progress formed an important backdrop to 19th century debates. New discoveries in the physical and natural sciences and the ever increasing productivity of machines suggested that material progress could continue indefinitely. Furthermore the publication of Darwin's theory of evolution in 1859 encouraged a view that progress was somehow a universal truth, applicable to both the natural and the human worlds. The concept of progress is not made explicit in our following review of the 19th century debates but it was certainly part of the intellectual background to those debates.

This part reviews the initial successes of the cooperative movement in the 19th century and its subsequent decline. We review only the key strands of ideological and political thought to emerge in Europe and particularly in Britain. A more detailed account can be found in the books of historian George Cole.[15] The various ideological splits that took place in the 19th century set the stage for the major political struggles of the 20th century.

Early Success

The cooperative movement arose as a response to the appalling conditions of the working class during the industrial revolution.[16] Although the first consumer cooperatives were formed in the 18th century,[17] it was not until the early 19th century that a school of thought emerged to promote cooperation as a social and economic ideal. The movement was represented on the European

continent by the philosophers Henri de Saint-Simon (France, 1760-1825), François Fourier (France, 1772-1837) and Wilhelm Weitling (Germany, 1808-1871), but the greatest practical success was achieved in Britain due to the efforts of Robert Owen (1771-1858).

Owen was born in a small market town in Wales. At the age of 17, he moved to Manchester where he subsequently enjoyed much success managing a cotton mill. In 1799, he moved to New Lanark, on the Clyde upriver of Glasgow, and finally realized his ambition to manage a cotton mill that achieved commercial success yet also satisfied his cooperative and ethical ideals. The New Lanark project generated considerable interest both in Britain and in Europe. Inspired by what they saw, others set up worker and consumer cooperatives, so that by 1830 there were several hundred cooperatives in Britain. Many of these eventually failed but some continue even today.[18] In 1844 the *Rochdale Society of Equitable Pioneers* established the Rochdale cooperative principles which became the basis for the development of the modern cooperative movement and is considered by Cole[19] to be its formal beginning. For more on the birth of the cooperative movement, see also Bihari.[20]

For his philanthropy, Robert Owen enjoyed much fame and the support of a wide circle of social reformers, including the influential Benthamites.[21] New Lanark itself became a much frequented place of pilgrimage for social reformers, statesmen and royal personages, including Nicholas, later to become emperor of Russia.

But Owen was not satisfied. He recognized that the well-being of his workers in New Lanark was entirely dependent on his personal approach to business. There was a need to embed new principles of worker and social welfare in legislation. In 1817 he lobbied strongly for the Poor Laws and was a zealous supporter of the Factory Act of 1819, although the final result greatly disappointed him. Engels is lavish in his praise of Owen's pioneering work for the working class:

> As long as he was simply a philanthropist, he was rewarded with nothing but wealth, applause, honor and glory. He was the most popular man in Europe. Not only men of his own class, but statesmen and princes listened to him approvingly. But when he came out with his Communist[22] theories that was quite another thing. Three great obstacles seemed to him especially to block the path to social reform: private property, religion, the present form of marriage.
>
> He knew what confronted him if he attacked these – outlawry, excommunication from official society, the loss of his whole social position. But nothing of this prevented him from attacking them without fear of consequences, and what he had foreseen happened. Banished from official society, with a conspiracy of silence against him in the press, ruined by his unsuccessful Communist experiments in America, in which he sacrificed all his fortune, he turned directly to the working class and

> continued working in their midst for 30 years. Every social movement, every real advance in England on behalf of the workers, links itself on to the name of Robert Owen. He forced through in 1819, after five years fighting, the first law limiting the hours of labour of women and children in factories. He was president of the first Congress at which all the Trade Unions of England united in a single great trade association.[23]

As Engels acknowledges in this passage, the birth of the cooperative movement was also the birth of socialism, the word itself being coined by Henri de Saint-Simon[24] in 1827. By the mid 19th century, many of the basic tenets of socialism had been articulated, in particular those concerned with egalitarianism. We may distinguish four egalitarian principles:[25]

1. All human beings regardless of birth or class have a *right* to self-improvement. This right is granted either by God or by virtue of being human.
2. There are no relevant differences between humans that justify one to claim a greater *inherent right* to self-improvement.
3. All human beings regardless of birth or class have the *ability* to improve themselves, *if placed in beneficial circumstances*.
4. Creating those beneficial circumstances is always within political control, and so is always, by design or neglect, the result of political activity.

Egalitarianism is the foundation of Owen's philosophy. For example, in *Revolution in the Mind and Practice of the Human Race*, he asserts that character is formed by a combination of Nature or God and the circumstances of one's experience. But given Nature cannot easily be changed, social circumstances become all important in shaping the human character. Cruel living conditions and the lack of educational opportunities will inevitably warp the development of moral sensibilities:

> …any character from the best to the worst, from the most ignorant to the most enlightened, may be given to any community, even to the world at large, by applying certain means; which are to a great extent at the command and under the control, or easily made so, of those who possess the government of nations.[26]

In effect, Owen is asserting the third and fourth principles of egalitarianism, today widely accepted but in his day dangerously radical ideas. Human beings are malleable – by manipulating social conditions it is possible to create the best or the worst of persons. Consequently the poor and impoverished are not to be blamed for vice and defects of character. Rather the fault is with those who govern and who permit the most treacherous of circumstances to "*inevitably* form… such characters".[27]

Opposition to the Cooperative Movement

The British cooperative movement in the early years of the 19th century drew its inspiration from the Benthamites, a highly influential group whose primary philosophical concern was to place free market capitalism on a rational and ethical footing. Bentham himself was initially a supporter of Owen's endeavours to reform working-class conditions. However, whereas the cooperative movement was primarily concerned with the *ethical defects* of capitalism and promoted socialist solutions, the Benthamites became increasingly preoccupied with its *rational defects*. When the consequences of the socialist program became apparent, James Mill,[28] a prominent Benthamite, was horrified. He wrote:

> Their notions of property look ugly… they seem to think that it should not exist, and that the existence of it is an evil to them. Rascals, I have no doubt, are at work among them.[29]

Bertrand Russell cites these words (written in 1831) as "the beginning of the long war between Capitalism and Socialism".[30]

The economic debates at this time are interesting, if for no other reason than that they appear not to have changed much in a century and a half. Bentham believed that free labour markets would enable workers to move from one place of employment to another and so choose their employers, thereby curbing the excess power of capitalists. Owen, on the other hand, recognized that in an age of machines, those few who owned machines could control the labour market and thereby bend the workers to their will. He understood what so few understand even today, that in free markets the question of who has market power is all important. Owen's solution was the cooperative one, that machines should be owned collectively so that the benefits of machine automation might be shared by those who worked them. Note that a cooperative economy does not imply the abolition of private property but rather introduces another mode of ownership in addition to public and private.

In pursuit of his vision, Owen and many of his followers set up intentional communities as experiments in cooperative living. The reasoning was simple – if the human character is moulded by life experience, in particular early childhood experience, then the way to a better world cannot be purely concerned with the factory floor. The entire social order itself must be changed to ensure that good life experience can shape people of good character. These experiments in community living were a failure and it is important to understand why. At least three factors suggest themselves.

First, many of the persons involved in the early cooperative communities appeared to have had little aptitude for what they were attempting. New Harmony, Owen's own attempt to set up a model cooperative community in Indiana, USA, 1826, collapsed when one of his business partners ran off with the money.[31] Another attempt in Glasgow also failed. In the words of Owen's

son, the persons who joined these experimental communities were "a heterogeneous collection of radicals... honest latitudinarians, and lazy theorists, with a sprinkling of unprincipled sharpers thrown in".[32]

Second, the community lifestyle required participants to accept a uniformity of purpose and circumstances. It was too much to ask. Contemplating the failure of New Harmony, Josiah Warren wrote:

> We had a world in miniature – we had enacted the French revolution over again with despairing hearts instead of corpses as a result... It appeared that it was nature's own inherent law of diversity that had conquered us... our "united interests" were directly at war with the individualities of persons and circumstances and the instinct of self-preservation...[33]

Warren went on to become an advocate for *individualist anarchism* – this in itself says something about the diversity of minds with which Owen had to contend. But there is no doubt that the requirement for a uniformity of mind and purpose contributed to the failure of the early utopian communities.

Third, the British government of the day rejected the cooperative agenda, both the business model to improve working conditions and the social model to address deficiencies in public education, health and welfare. Instead they chose the *laissez-faire* doctrine of minimum government intervention.[34] The Australian economist and academic Hugh Stretton believes that *laissez-faire* cost Britain dearly. The French, Germans and Americans were subsequently to become greater industrial powers because their governments became economically involved by promoting public education, public science, public investment and "abler public services".[35]

Owen devoted much of his life to lobbying politicians. He fought the commonly held view of his day that the poor were sub-human, the "savages at home",[36] for whom education would add cunning to vice. Articles appeared in *The Economist* magazine (which was then, as now, a proponent of *laissez-faire*) providing the theoretical justification for such views.[37] Owen's failure to overturn prejudice by moral argument disillusioned him with politics and he sought, instead, to create the ideal society by establishing working examples of it. But in a society which rejects cooperation, it is not easy to create a shining example of it. Owen's success at New Lanark is, therefore, all the more remarkable.

In conclusion, we must be careful to assess the cooperative movement of the first half of the 19th century with a view to its achievements as well as its failures. On the positive side, the movement changed forever the conditions considered acceptable for working-class people. It promoted child care, public education, public health and equal rights for women, all of which today are considered the norm in a democratic society. The other part of the cooperative legacy was the elaboration of a new business model, the consumer and worker cooperative. The Rochedale pioneers established the principles of cooperation

which survive to this day. On the negative side, the early experiments in intentional communities appear naive in hindsight. The failure of some of the early consumer and worker cooperatives are best judged as experiments in a new business model.[38]

While the cooperative movement was struggling with its failures, Marx and Engels appeared on the stage with a new ingredient to add to the socialist mix, class struggle. Owen of course recognized class antagonisms, but he attempted to establish his ideal *within* the established social order. In the *Communist Manifesto*, Marx and Engels disparaged this approach and drew a distinction between themselves as *scientific socialists* and the cooperative movement as *utopian socialists*. The term utopian socialists has stuck. Utopian socialists, declared Marx and Engels:

> consider themselves far superior to all class antagonisms. They want to improve the condition of every member of society, even that of the most favoured. Hence, they habitually appeal to society at large, without distinction of class; nay, by preference, to the ruling class. For how can people, when once they understand their system, fail to see in it the best possible plan of the best possible state of society? Hence, they reject all political, and especially all revolutionary, action; they wish to attain their ends by peaceful means, and endeavour, by small experiments, necessarily doomed to failure, and by the force of example, to pave the way for the new social Gospel.[39]

In 1880, Engels published a simpler and shorter account of the new scientific socialism, under the title *Socialism – Utopian and Scientific*.[40] Its grand visions captured the imagination of a younger generation. Historical materialism could explain the past and the future. The liberation of the working class was an historical inevitability.

By comparison, the utopian socialists offered only an ethical ideal with no apparent means to realize it. Socialism, said Engels, was not just a new idea discovered by Owen and his followers, but rather the necessary outcome of a historical struggle between two classes, the proletariat and the bourgeoisie. The requirement of the day was not to build model communities but to strike at the source of class enmity, the economic relations between the two classes.

Trade union membership increased rapidly from 1880 to the end of the century and the cooperative movement also enjoyed a resurgence, partly due to rising living standards of workers and partly because, as Cole puts it, every "trade unionist was always a potential cooperator..."[41] But over the same period the two movements took different paths. Cole again: "In the eighties trade unionism and consumers' cooperation went on their several ways, each shedding much of its earlier idealism, and each settling down to consolidate its position within somewhat narrowly delimited fields."[42] The cooperative movement expanded more easily into consumer cooperatives which engaged labour "in the ordinary labour market…" and were not therefore seen as

offering the same benefits to workers as producer cooperatives. Towards the end of the 19th century, the cooperative movement equipped itself with all the formal apparatus of a large national organization, holding annual congresses with delegates from regional and local levels. It also began publishing a newspaper, *The Cooperative News*. And, despite the difficulties, there was also a gradual expansion of producer cooperatives during this period.[43]

The Cooperative Movement into the 20th Century

Marxism split the socialist movement in two, those supporting the revolutionary approach through the vehicle of Communist parties, and those supporting a gradual approach through moderate Labor parties. In Britain, 1884, the gradualists formed the Fabian Society, which continues to this day to be the social conscience of the British Labour Party. It promotes the welfare state but does not challenge the power of the private enterprise sector on which the welfare state depends.

By the late 19th century, the cooperative movement had lost its initial momentum and fervour. Revolutionary socialists had rejected cooperatives in favour of state-owned enterprises[44] and liberal capitalism had made only those grudging compromises with the welfare state it deemed politically necessary. The cooperative ideal continued to get political support from Fabian socialists,[45] but the focus of the socialist struggle had moved elsewhere.

However, it should not be forgotten that the cooperative movement continued to spread around the world in the late 19th century and first half of the 20th century in the form of agricultural cooperatives and credit unions. They especially found a role in the newly emerging frontiers of the USA and Australia where government administration and infrastructure had not yet penetrated. Farmers had to fend for themselves and found it advantageous to form cooperatives through which they could process and market their produce.

Two impressive examples of cooperative economies in the 20th century deserve special mention, that of Yugoslavia (on a national scale) and that of Mondragon, Spain (on a regional scale). Yugoslavia during the 1960s and 70s provides a unique example of a predominantly worker cooperative national economy. In *Yugoslav Socialism: Theory and Practice*, Harold Lydall[46] makes some interesting comparisons between the Yugoslav and Mondragon approaches to worker cooperatives. A critical difference between them concerns income reinvested for capital formation – in Mondragon cooperatives it is owned by the worker/members whilst in the Yugoslav case it was collectively owned by the state. In Lydall's view, worker management in Yugoslav cooperatives was more a public relations exercise than real. As he puts it, a "one-party Marxist regime… is fundamentally incompatible with self-management, since it does not really trust the workers to make their own

decisions".[47] He prefers instead the Mondragon model to which we shall return at various points in this essay.

To sum up the 20th century experience, we may say that although cooperative economics was not highly visible compared to private enterprise capitalism and state enterprise communism, it nevertheless survived in pockets in an otherwise hostile world. This says much about the inherent resiliance of cooperation.

Fascism

Not much will be said of Fascism in this essay, because it is not a sustainable social system. Like a pathogen, it only draws sustenance from societies that are already sick. However it is of interest philosophically because it is the polar opposite of cooperation. 20th century Fascism grew out of 19th century European Romanticism.[48] As represented by the German philosopher Nietzsche (1844-1900), it celebrates the will of great men to do great deeds.[49] Great deeds require great resources which are gathered through imperial conquest. The suffering of the masses is of no account if it is in the service of great men. Nietzsche alludes habitually to ordinary human beings as the *bungled and the botched* and as having no independent right to happiness or well-being. He regards any sign of empathy or compassion as a weakness:

> The object is to attain that enormous *energy of greatness* which can model the man of the future by means of discipline and also by means of the annihilation of millions of the bungled and the botched, and which can yet avoid *going to ruin* at the sight of the suffering created thereby, the like of which has never been seen before.[50]

One glimpses in this passage a terrible premonition – Nazi Germany some 50 years later.

The question arises in Nietzsche's philosophy – how to determine a great man and how to determine a great deed? Great men are those who rise to the top through struggle and war. And these men must be great by birth because if such accomplishments could be achieved by learning, this would suggest an equality that Nietzsche is nowhere prepared to acknowledge. Great deeds are determined by great men for "no morality is possible without good birth" and "every elevation of Man is due to aristocratic society".[51] It comes as no surprise that Nietzsche despised women ("we should think of women as property") and Christianity (because it cultivates slave morality). It should be noted that Robert Owen and many other 19th century socialists also argued against religion. But whereas socialists objected to religion because it checked the advancement of the common person, Nietzsche objected to it weakening the resolve of a great man. The common person was of no account.

Writing in 1943, while Nazi Germany was still a formidable power, Bertrand Russell remarks on a particular feature of Nietzsche's philosophy – the complete absence of empathy.[52] Indeed, Nietzsche explicitly preached against

it. Only three years later, a psychologist, Dr. Gustav Gilbert, was assigned by the U.S. Army to study the minds and motivations of the Nazi defendants at the Nuremberg tribunals. The following year, he published a diary containing transcripts of his conversations with the prisoners. The one characteristic he found all the defendants to have in common was a lack of empathy. In a 2000 TV dramatization of the Nuremberg trials, the Gilbert character says:

> I told you once that I was searching for the nature of evil. I think I've come close to defining it: a lack of empathy. It's the one characteristic that connects all the defendants: a genuine incapacity to feel with their fellow man. Evil, I think, is the absence of empathy.

In an essay motivated by the *Nuremburg* dramatization, journalist Ernest Partridge says:

> Empathy, the capacity to recognize and cherish in other persons, the experience, emotions and aspirations that one is aware of in oneself, is the moral cornerstone of progressive politics. It is a principle recognized and taught in all the great world religions, reiterated by numerous moral philosophers, and validated by the scientific study of human personality.[53]

In conclusion, it seems relevant to note that Nietzsche, the champion of the superman and the despiser of the bungled and botched, was for most of his life incapacitated by bad health. He retired from a university position, incapable of work, at the age of 35. He went insane aged 44 and remained so to his death twelve years later.

Matter-centred Philosophy

In *Socialism – Utopian and Scientific*, Engels introduced Marxism as a synthesis of French socialism, German philosophy and English economics. It is not the intention of this section to offer a comprehensive account of Marxist philosophy. Our interest is primarily with Marx's treatment of ethics and the human character. How did Marx hope to create a better society? How did he contend with the question of human nature? What was the practical outcome of his scientific socialism?

The Ethics of Scientific Socialism

Marx rejected a universal morality[54] just as he rejected a fixed human nature but it is inaccurate to claim, as many have, that there is no morality to be found in his philosophy. Morality for Marx was rooted in class. Good and bad for working-class people was a function of their class interest and quite different from the good and bad of the bourgeoisie. Moral systems that claimed to be for the universal good, yet ignored class conflict, must be a fraud because class

conflict necessarily undermined the possibility of a universal good. Yet some Marxists do make the claim for an absolute socialist morality.

> Marx does indeed possess an 'absolute' moral criterion: the unquestionable virtue of the rich, all-round expansion of capacities for each individual. It is from this standpoint that any social formation is to be assessed.[55]

And how is one to achieve this rich, all-round expansion of capacities? By participation in class struggle. Marx believed that a classless society was not just possible but an inevitable consequence of historical dialectical forces. The play of class dialectics would, stage by stage, propel capitalist society through socialism towards that classless society. The moral imperative was to work towards that end. Furthermore only by participation in class struggle was personal improvement possible.

> In the modern world this entails both engagement with, and fanning the flames of, those collective struggles against the dehumanizing and alienating effects of capitalism through which our need for solidarity both emerges and is realized.[56]

Socialist morality is rooted therefore in the particular interests of the working class, but the success of those interests is considered ultimately to be in *the universal interest*.[57] Socialist morality is not an individual code of conduct. Human beings are social beings and therefore socialist morality has meaning only in a social context and only within the discipline of a collective struggle.

> By forming and being active within trade unions and working class political parties, workers create institutions through which they change themselves. Working together in such institutions becomes a day to day practice that both presupposes the need for solidarity and engenders a spirit of solidarity within the working class. The virtues or character traits that are thus promoted stand in direct opposition to the competitive individualism of the capitalist marketplace.[58]

Solidarity is an important component of revolutionary socialist morality. It satisfies a personal need and contributes to the empathy in human relationships. We might say that it is the 'soul' of the great socialist enterprise.

The Classless Society

The promise of a classless society provided class struggle with a moral compass. Without the desirability and inevitability of a classless society, there would be no reason to choose between working-class morality and bourgeois morality. The classless society made moral choice possible. It also gave meaning to the concept of progress because industrialization would ensure enough material production to satisfy everyone's needs, thereby making equality within a classless society a practical possibility. Given the importance

of the classless society in the Marxist view of the world, we are obliged to explore it further.

Technically speaking, a classless society would lack distinctions of wealth, income, education, culture or social network.[59] In the Marxist conception, the abolition of such distinctions would occur quite naturally following the seizure of political power by the proletariat. Furthermore the state would also wither because its only function is to maintain the exploitation of one class by another.

> The proletariat seizes political power and turns the means of production into State property. But, in doing this, it abolishes itself as proletariat, abolishes all class distinction and class antagonisms, abolishes also the State as State. Society, thus far, based upon class antagonisms, had need of the State. That is, of an organization of the particular class which was, *pro tempore*, the exploiting class, an organization for the purpose of preventing any interference from without with the existing conditions of production, and, therefore, especially, for the purpose of forcibly keeping the exploited classes in the condition of oppression… The proletariat seizes the public power, and… By this act, the proletariat frees the means of production from the character of capital they have thus far borne, and gives their socialized character complete freedom to work itself out.[60]

Note that the withering of the state might not happen immediately. But it would happen *inevitably* because socialized production would have, as Engels puts it, "complete freedom to work itself out". He goes on to say:

> The development of [socialized] production makes the existence of different classes of society thenceforth an anachronism. In proportion as anarchy in social production vanishes, the political authority of the State dies out. Man, at last the master of his own form of social organization, becomes at the same time the lord over Nature, his own master – free.[61]

This last sentence is of much significance. As the state dies out, different forms of social organization become possible and thereby 'Man' becomes "lord over Nature, his own master". The phrase "lord over Nature" is not to be interpreted in the environmental sense, as mastery over the external world of plants and animals. Rather it suggests that the unnatural, alienated condition imposed by exploitation and state oppression will disappear because its only cause will have disappeared. In such circumstances the free human will be master of his/her own character and will have no inclination to maintain class distinctions. Whatever vices or weaknesses of character persist will be of the trifling kind.

Engel's faith in free humans to be lords over their own nature can only be understood in the context of dialectical materialism, according to which human character and well-being are determined first and foremost by material circumstances. By appropriately adjusting those material circumstances, human beings can in some sense be made equal. This is the justification for the famous slogan, "From each according to his ability, to each according to his needs".[62]

By satisfying material needs, that is, by providing everyone with an equivalence of the basic requirements of food, clothing, housing and so on, not only is the egalitarian objective of socialism achieved, but something more – the seeds of social conflict are eliminated. Is this a reasonable expectation?

The answer to this question depends on how one views the *nature-nurture* problem. Marxists were firmly on the side of *nurture*. If material circumstances determine everything, then differences endowed by *nature* can be 'ironed out' by appropriate material adjustments in the environment.[63] If everyone has the same material circumstances then there will be no differences to promote class conflict, because all conflict having a material cause must also have a material solution. Furthermore, diminishing class conflict would promote a more equal distribution of material resources, leading inevitably by positive feedback to the ideal classless society.

It may be reasonable to argue, as socialists do, that a more egalitarian distribution of material benefits contributes to a better society. However during the communist era faith in *nurture* became a dogma beyond all reason. The consequences were particularly disastrous for Soviet agriculture under the direction of the Russian agronomist, Lysenko.[64] Lysenko promoted a form of *Lamarckism*, the scientifically unsubstantiated belief that an organism's characteristics acquired as a result of a particular environment can be inherited by their offspring. He did not claim that this was also true for human biology, but there can be little doubt that Lysenko rose rapidly in the Soviet bureaucracy because his Lamarckian beliefs were consistent with Marxist ideology as embraced by Stalin.[65] No one should enjoy material benefits in excess of those appropriate to the service of the state.

Even in moderate hands, Marxist faith in *nurture* appears to have been naively utopian – that is, to have depended on a belief that base human desires would simply fall away in the absence of class exploitation. It was possibly an understandable naivety in 19th century Britain when most social strife stemmed from mass poverty. But even in the 1940s and despite recognizing the corrupting influence of power, George Orwell continued to believe, according to critic James Wood, in a "mystical revolution",[66] a revolution in which English society would somehow keep all its good features and divest itself of all bad features. For Orwell, social privilege was the source of all evil – get rid of privilege and the exploitation of the working class would somehow take care of itself. His reform agenda did not appear to have any means to deal with the deeper origins of class exploitation in human psychology.

At this point, there are two criticisms that we can direct against the socialism of Marx and Engels: first its claim to be scientific and second its naive trust in the consequences of material egalitarianism. Concerning the first, the hallmark of the scientific method is to ask questions, to conduct experiments in the pursuit of answers and then to refine these answers through further questions and

experiments. The supposedly scientific part of scientific socialism was that part which asserted the dialectical inevitability of class struggle leading through the stage of socialism to a classless society. This element of Marxism borrowed heavily from Hegel. Concerning this aspect of Marx, Bertrand Russell says, "Broadly speaking, all the elements in Marx's philosophy which are derived from Hegel are unscientific, in the sense that there is no reason whatever to suppose that they are true."[67] The neo-conservative Joshua Muravchik, in an unsympathetic history of socialism, nevertheless makes a valid point – that the utopian socialists, by establishing experimental communities, were in fact attempting to apply the scientific method to human social organization. "Owen and Fourier and their followers were the real 'scientific socialists'. They hit upon the idea of socialism, and they tested it by attempting to form socialist communities."[68] Marx and Engels, on the other hand, made untestable predictions about the future, especially when proclaiming the inevitability of a classless society. They were certainly in no position to criticize utopian socialism as unscientific.

The second criticism we can make of scientific socialism is its approach to egalitarianism.

Egalitarianism

Socialists of all persuasions promote egalitarianism. Almost by definition, it is supposed to make for a better society. Marxism promoted a strong form of material egalitarianism. Engels was correct to chastise the utopian socialists for being preoccupied with the vision of egalitarianism without being concerned with the 'how to get there'. It was certainly naive to ignore the significance of class conflict and believe that those responsible for a system of cruel exploitation would give way to moral appeal. But Marx and Engels then replaced one piece of naivety with another – that the imposition of material equality would somehow eradicate the seeds of vice and exploitation.

It is interesting that utopian visions often seem to depend on the imposition of material equality. The tendency was already apparent in Sir Thomas More's *Utopia* published in 1518. In Utopia, everyone wears the same clothes (which they make themselves preserving the natural colours) and everyone eschews fashion. All houses are of the same construction and all streets and villages are laid out according to the same design. No one desires to live in a bigger house or in a better neighbourhood. Everyone works the same number of hours per day. There is no privilege and therefore no resentment fuelled by inequality to disturb the tranquil rhythm of Utopian life.

Bertrand Russell acknowledges that More's *Utopia* was "in many ways astonishingly liberal" for its day but is nevertheless dismayed with the vision:

> It must be admitted, however, that life in More's Utopia, as in most others, would be intolerably dull. Diversity is essential to happiness, and in Utopia there is hardly any.[69]

Russell might well have been talking about the USSR or Communist East Germany. In fact the communist experience tells us that the dogmatic imposition of equality, far from bringing utopia, spawns dystopia.

In an apparent reference to utopian socialism, Sarkar criticizes social theories that sound "somewhat pleasing to the ear" and speak "glibly of human equality" but which on application turn out to be ineffective because "the fundamental principles of these philosophies were contrary to the basic realities of the world". "Diversity, not identity", says Sarkar "is the law of nature".

> The world is full of diversities – a panorama of variegated forms and rhythms. One must never forget it. Sometimes the superficial display of these theories [that speak glibly of equality] has dazzled the eyes of the onlooker, but actually they contained no dynamism. And yet, dynamism is indeed the first and last word of human existence. That which has lost its dynamism is just like a stagnant pool. In the absence of flow, a pond invariably becomes overgrown with weeds, and becomes a hazard to health. It is better to fill this sort of pond with earth. Many philosophies in the past have rendered this kind of disservice to humanity.[70]

In conclusion, the fundamental problem with both the theory of Marxism and its practice, as manifest in the USSR and Eastern Europe, was an inadequate understanding of individual and collective psychology. It is true that later Marxist intellectuals, such as Gramsci and Marcuse, attempted a fusion of Western psychology with Marxist materialism, but for the practical implementation of Marxism it was too little and too late.

Egalitarianism remains today the most contentious and polarizing political issue in democratic nations. How far should governments go in promoting equality? Should they target equality of opportunity or equality of outcomes? What is an acceptable level of wealth inequality? So polarizing are these questions in the body politic that all political identity is defined in terms of them – in terms of the so-called *left-right* spectrum. Policies are somewhere on the spectrum from extreme left to extreme right. The following passage from Stretton is helpful in clarifying definitions:

> Some people favour greater or less equality for its own sake. Others favour greater or less equality as a means to other ends, such as productive efficiency or the reduction of poverty. (There are hard choices for the Left if it is ever true that greater equality may reduce productivity and for the Right if greater equality may increase productivity.) Whatever their reasons, this text generally uses Right for those who want greater inequality than exists in their society, Left for those who want greater equality, and Centre or middle of the road for those who don't want much change in either direction.[71]

In debates about equality, the theme of *selfishness versus altruism* obviously plays an important role. But perhaps surprisingly, *nature versus nurture* is also invoked. Those on the Left, in keeping with the socialist tradition, give much more importance to *nurture* (the family and social environment) and they frame policy debates in terms of adjusting family and social circumstances using government intervention to create an equality of opportunity or outcomes. Those on the Right, usually identifying themselves as *conservatives*, are more inclined to favour policies that reward those already endowed with talent and advantage. To the extent that talent is endowed by nature, conservatives by implication give more importance to *nature*. (Fascists take this dogma to the extreme.) Conservatives also reason that it is wasteful giving resources to those without the talent to use them efficiently and note that inefficiency *is* a moral issue. When it is pointed out that such people are usually the poor, conservatives reply that rewarding the rich benefits the poor by a *trickle-down effect* – which elicits from those on the Left the accusation of hypocrisy and selfishness.[72]

Sarkar on Marx

Sarkar praised Marx as "a good man" with "strong feelings for suffering humanity". Marx's writings, he added, "reflected his concern for the downtrodden humanity".[73] He appreciated the dynamism of the communist movement and in an obvious reference to the gradualism of the Fabian socialists whose logo is a tortoise,[74] he asks, "what is the use of tortoise-like progress such as this?"[75]

Sarkar condoned Marx's rejection of religion because how is it possible to break the structure of the capitalist age without freeing people from "the intoxicating effect of the opium of religion".[76] He recognized that Marx's rejection of religion was not a rejection of morality.

> A group of exploiters loudly object to a remark that was made by the great Karl Marx concerning religion. It should be remembered that Karl Marx never opposed spirituality, morality and proper conduct. What he said was directed against the religion of his time, because he perceived, understood and realized that religion had psychologically paralysed the people and reduced them to impotence by persuading them to surrender to a group of sinners.[77]

However on the issue of materialistic philosophies, Sarkar is extremely critical and Marx does not escape mention:

> There are certain defective philosophies which think that the material world is everything. When matter becomes everything, then matter becomes the goal of life. And consequently, human existence, human consciousness, the subjective portion of the human mind, everything will become like earth and stone. That is why such a philosophy is detrimental to human development. Karl Marx preached that defective philosophy.

> You should keep your mind free from the bindings and fetters of such a defective philosophy because it is anti-human, morally anti-human. It is most detrimental to human existence and human development.[78]

The difficulty for those wishing to put Marxism into practice was that it had no adequate theory of human psychology and spirituality. Even before all the basic material requirements are satisfied, the human mind wants to express subtler sensibilities. It might be drawn to the realms of music, sculpture, architecture or indeed the entire universe of ideas. Or it might get the urge to undertake some noble task or to explore the world of spirituality. This is not comfortable territory for those caught in the dogma of materialism. Sarkar notes the frustration experienced by those who attempted to implement the Marxist doctrine.

> Leaders like Lenin and Mao took up the task of materializing his [Marx's] ideas in the society. They were not bad people, but as they tried to materialize the theory of Marx they encountered many practical difficulties. Realizing that the theory was defective, they became frustrated and started committing many atrocities. Stalin was a demon who killed millions of people. This all occurred because of the inherent defects of Marxism.[79]

For Sarkar, the apparently rapid demise of communism in the USSR and Eastern Europe came as no surprise – the Marxist view of the human being was fatally flawed and any attempt to establish a socio-economic system on that view was bound to fail. Sarkar subscribes to a theory of history in which the *clash of civilizations* plays an important role (although certainly not the only role). The ideologies which underpin civilizations compete with one another for the hearts and minds of people. The struggle for survival exposes the weaknesses of an ideology and stronger ideologies will defeat the weaker. In order to survive, an ideology must provide sustenance to subtler aspirations of human mind and soul. And so it was that capitalism defeated communism, because as Sarkar puts it:

> whenever there is clash between self-centred and matter-centred theories, the self-centred philosophy [capitalism] will win. The matter-centred theory [communism] will never win. It comes as it goes after creating enormous devastation, and it dies a black death.[80]

But the success of capitalism has brought its own defects into stark relief and it is to these that we now turn.

Self-centred Philosophy

The theory and the practice of capitalism have come under attack by socialists, feminists and environmentalists for well over a hundred years. Yet despite the battery of arguments brought against it, the system rolls on[81] – a society that promotes self-interest is not easily checked by intellectual argument.

Capitalism offers choice and exciting consumer goods in great abundance. No matter that few of us can afford this abundance without going into debt. It has taken the combination of an impending environmental catastrophe and a global financial crisis to force people to question the wisdom of capitalism. Even *Time* magazine, citing eight reasons for the Global Financial Crisis, criticized the "the myth of the rational market" and "under-regulated" financial institutions.[82]

This part begins with a brief introduction to the theoretical foundations of contemporary capitalism. We then focus on the assumptions that the theory makes about human economic behaviour and we find them to be highly unrealistic. We next consider the emphasis on finance in contemporary capitalism and conclude with a discussion of ethics in capitalism. Here we must make a distinction between theory and practice and note that an unsatisfactory theory of ethics leads to an objectionable practice.

A note on terminology. The terms *neoliberalism* and *economic rationalism* are used to describe the modern practice of capitalism. Neoliberalism refers to the policy agenda of deregulation, privatization and free trade. It is the 20th century manifestation of 19th century laissez-faire. Economic rationalism refers to the policy agenda that places economic efficiency (narrowly measured) above other policy outcomes, such as full employment or environmental protection. Neoclassical economic theory is used as the justification for both policy agendas. This essay preserves the distinction between neoclassical theory and neoliberal practice.

Neoclassical Economics

In an analysis of capitalism from the perspective of a scientist, mathematician and environmentalist, Geoff Davies targets three defects of contemporary capitalism: 1) its theoretical foundation known as *neoclassical economics*; 2) its accounting system, in which all value (economic, environmental, social, cultural and ethical) is reduced to dollar figures; and 3) its monetary system, in which privately owned banks create money (an essential public service) as an interest bearing debt to the themselves. Only the first of these concerns us here.

Neoclassical economics is essentially a mathematical edifice. It begins with a set of assumptions and builds on these a mathematical description of prices, investment, wages, interest rates and national economies. The following critique draws heavily on Geoff Davies and economist Susan Richardson. The final conclusion is simple – the assumptions of neoclassical theory are profoundly flawed and therefore the conclusions drawn from a mathematical elaboration of them, no matter how elegant, are also flawed. For the purposes of this essay we note four assumptions of neoclassical theory:

- That every agent is actuated only by self-interest.

- That numerous agents motivated by self-interest produce an outcome which affords the greatest utility for the greatest number.
- That free markets are the most efficient means to allocate resources.
- That free markets come to a stable equilibrium.

The term *agent* refers, in neoclassical theory, to an abstract human being, family or firm. An agent is devoid of any behaviour other than to make economic decisions and is devoid of any motivation other than to maximize its self-interest. We identify this agent as *Homo economicus* and his/her characteristics are explored below. We should note a corollary to the first assumption – that *Homo economicus* is a valid model of human behaviour for the purposes of studying and managing a real economic system.

The second assumption, often referred to as the *invisible hand*, was made famous by the 18th century father of economics, Adam Smith. We shall return to the concept later, but suffice to note here that, if the concept has any validity at all, then it has been badly abused.

The third assumption requires that prices in a free market adequately reflect productive efficiency for the given level of demand. This assumption is severely compromised, however, because many of the factors which impinge on efficiency (for example, environmental pollution) escape accounting by the free market mechanism. These are referred to as *external costs* because they are external to the market.

Concerning the last assumption, neoclassical theory is not able to account for real world events, such as the growth and collapse of speculative bubbles, despite these being the apparent cause of the current Global Financial Crisis. According to Davies, a neoclassical economy never strays too far from a stable equilibrium, because its mathematical architecture constrains it from doing so.[83] Consequently government treasuries around the world found their financial models quite unable to cope with the Global Financial Crisis of 2008-2009. Their models described an unreal world.

As a result of constant repetition to generations of students, the four assumptions of neoclassical economics have acquired the status of axioms – they have become self-evidently true and therefore beyond question. Again, it is not the purpose of this essay to offer a detailed critique of capitalism, which has been done by many others. Our primary purpose is quite modest – to illustrate the inadequateness of *Homo economicus* as a model of human economic behaviour so as to shine the spot light on a more appropriate model.

Homo economicus

Neoclassical economic theory makes three assumptions concerning the behaviour of *Homo economicus*:

- That economic agents are well informed about the markets in which they participate.
- That economic agents are rational, that is, they are able to reason accurately with the information available.
- That economic agents are self-optimizing – that is, their only goal is to optimize their gain or pleasure.

We should be clear about what is, and what is not, being claimed. Neoclassical theory does not claim that human beings are purely economic beings. Nor does it claim that their environment is purely economic. But it does claim that, for the purposes of simplification and in order to get a grasp on matters of particular interest to economists, *one is justified in separating human beings and their world into two parts* – that part which pertains to economics and that which does not. About the non-economic part, economists are agnostic – it is simply not relevant. Here we find that neoclassical economics is attempting to emulate the physical sciences, such as physics and chemistry, where the accepted methodology is to experiment with *isolated systems* and to simplify the description of those systems using mathematical models. For the physical sciences, this has been a successful methodology. Its adoption by economists has proved otherwise.

Feminists were the first to draw attention to the problem of applying 'hard science' methodology to economics. What started as a set of simplifying axioms or assumptions eventually became a set of dogmatic assertions about the way people actually are. Economist Susan Richardson puts it thus:

> The deductive character of masculine economics means that a whole elaborate edifice has been constructed on the foundation of a few assumptions about the way people behave in their economic life. Initially the assumptions and the deductions from them were adopted to see whether self-interested behaviour could, under certain conditions, lead to socially desirable results. It was, in effect, a formal logical test of [Adam] Smith's propositions about the efficacy of the invisible hand. But it became more than that. Masculine economics slipped from the insight that under certain tightly defined conditions, selfish, individual behaviour and egocentric behaviour *could* produce economically efficient outcomes, to the assumption that people, in their economic behaviour, are indeed, individual and egocentric. These foundation assumptions of economics have rarely been explicitly tested to see whether they have much intersection with the way in which people actually feel and act in their economic lives.[84]

Richardson finds the principle that every agent is actuated only by self-interest to be depressing because we know it not to be true and yet its acceptance hides other more noble possibilities.

> This proposition can be (and has been) made to be tautological – any action which is taken is preferred by the author to the alternatives which

> are available to her, so it is self-interested. I find this depressing. It robs humanity of the possibility of noble behaviour. It means that we cannot distinguish morally or in other ways between private and greedy person, the passionate believer in a cause, the person who devotes her life to the well-being of others. All are equally said to be acting in their own self-interest.
>
> The proposition that all economic action is selfish diminishes humanity in a second way. It has been applied by economists, to the effect that if the slightest whiff of self-interest can be detected in an action then that self-interest is assumed to be the whole of the motivation. In fact, motivations are multiple and complex. Altruism, duty, love, compassion and fellow feeling are among them.[85]

In the end, argues Richardson, the assumptions of neoclassical economics become self-fulfilling prophesies.

> The assumption that people are entirely selfish in their economic behaviour also rules out systematic inquiry into the extent to which selfish or other motivations are affected by context and the behaviour of others. If a person behaves altruistically and gets selfishness in return, then she will feel not moral but a mug. This issue is important to the crucial question – does a system which runs on and assumes selfishness increase the total quantum of selfish behaviour, because this is the norm and is rewarded, or does it diminish it because it economises on altruism, saving altruism for circumstances where selfishness is hostile to human well-being? Man-made economics does not explore these questions.[86]

Let Tim Hazeldine, Professor of economics at Auckland University, have the last word. "*Homo economicus* is a selfish shit. There is no place for honour, decency, empathy and altruism."[87]

Since Richardson wrote more than a decade ago, considerable scientific research has gone into understanding the way in which people make economic decisions and the factors which influence them. The research is important for two reasons. First, its insights inform the work of advertisers and marketing departments. Second, and more importantly for our purposes, the entire edifice of neoclassical theory depends on the validity of its assumptions about human behaviour. The results, described briefly in the following pages, turn out to be fascinating and often humorous, but damning for neoclassical theory. Now let us briefly review each of the assumptions concerning *Homo economicus*.

People are not always well informed

Advertisers do not always tell the truth. As just one example, in October 2008 Coca-Cola in Australia employed a well-known actress to feature in a series of ads which claimed that accusations the drink was full of caffeine, rotted people's teeth and made them fat were a "pack of lies". The Australian

regulatory body that deals with false advertising ordered Coca-Cola to run another series of ads saying that the originals were misleading.[88]

The participants in a market may not be equally well informed. Insider trading deals depend entirely on having information not available to the majority of others. Indeed successful trading in many markets depends on the participants gaining an information advantage. Equality of information does not exist in the real world.

People do not reason by logic alone

We know that people do not purchase rationally because many still buy cigarettes, even when the packet displays images of diseased lungs. But scientifically controlled experiments illustrate the irrationality of human economic behaviour even where addiction appears not to be involved. Here are just a few of countless observations:

- It is well known that placebos are often as effective as a medicine, illustrating the so-called power of the mind. But it is also observed in controlled experiments where subjects are required to purchase their medicines, that the more expensive the placebo, the more effective it is.[89]
- In controlled experiments where men are asked to play a simulated financial investment game on a computer, those shown pornographic images before hand make high-risk investment decisions compared to those shown neutral photos.
- A study of 443 women, aged 18 to 50, found that the participants were more prone to impulse buying in the luteal phase of the menstrual cycle (10 days prior to menstruation).[90]
- Much research has been devoted to the best supermarket layout to maximize sales. The placement of every product is guided by research. Take just one example. Supermarkets around the world will typically guide you on a path that takes you first past the fruit and vegetable stands, leaving the sweets and dairy products till last. This is because market research has shown that people are more inclined to buy high fat, high calorie foods if they have first been given the opportunity to select healthy foods.[91]

The conclusion we may draw is that economic decision making is not guided by logic alone. A range of factors plays a role and in particular every ‘rational’ calculation is made in a complex physiological environment. Numerous hormones and neuro-active substances are playing a role, either consciously or unconsciously.

People do not necessarily seek to optimize their gain

Numerous experiments have revealed that human economic decision making is far more complex than accepted by the simple theory of maximizing gain. This turns out to be true even for animals. For example, if two monkeys perform the same task side by side, and one is rewarded a grape (big money) and the other a cucumber (small money), the latter will become angry or work more slowly. Yet if both receive a cucumber, both continue to work and eat happily.[92] Conclusion: monkeys show an aversion to inequality. The reward does not have to be physical – it can even be the affection of laboratory staff.

Humans also behave 'irrationally' in rejecting inequality, even if it means walking away from a deal worse off or empty-handed. This is demonstrated in experiments where two strangers (*A* and *B*) are asked to share a sum of money, all of which is first given to *A* as if it belongs to *A*. The rules stipulate that if *B* rejects what is offered by A, neither of them gets anything. Classical economic theory says that gain will be jointly maximized if *A* gives just a small portion of the money to *B* because *B* at least gets something rather than nothing and *A's* displeasure at giving up something is minimized. In practice, this seldom happens. *A* usually offers close to half the money and *B* usually rejects any offering much less than half.[93]

This behaviour cannot be explained by a theory which says that agents should accept whatever reward they are given to maximize gain. And here lies a problem because, as already observed, the entire theoretical edifice of modern free market economics is built on supply and demand curves whose validity requires humans to optimize personal gain. The theory breaks down because it turns out that factors other than personal advantage also influence mental cost-benefit calculations. We will return to these other factors below.

In conclusion, the assumptions made by neoclassical theory concerning human economic decision making have been shown to be flawed. It is hard to avoid the conclusion that the entire mathematical edifice built on those assumptions is also flawed.

The Culture of Neoliberalism

The reduction of the world of economics and commerce to a mathematical abstraction has far-reaching consequences. When the goods we make and sell – our clothing, books and clean water – are all reduced to dollar units to facilitate accounting, it is but a short step to believing that manipulating dollar figures is the be-all and end-all of business and that the reality behind those figures is of little consequence. Psychologically, the shift is from a preoccupation with *production* to a preoccupation with *finance*.

This shift in preoccupation has even been accompanied, Sarkar notes, by a change in the meaning of words. The original Sanskrit word for a *business*

person was *vaeshya* and it meant "one who earns a living through the production of goods". The word survives in modern Indic languages but it has come to mean "one who profits by trading and broking without being directly involved in production".[94]

The sophistication of financial instruments and services has increased steadily over the centuries. However, the 1980s witnessed a singular transition in the history of capitalism because, during this decade of deregulation, financial instruments became an end in themselves rather than a means to production. The transition from *finance as means* to *finance as end in itself* paralleled the transition from Keynesian welfare capitalism to neoliberalism. One of the first countries to make this transition (with much haste and social dislocation) was New Zealand.[95,96] Writing from his own experience as a politician and bureaucrat administering the transition, Bruce Jesson compares workplace culture before and after:

> The difference between a productive culture and a finance culture is that the world of the producer is tangible whereas the world of the financier is ethereal. The old-style manager dealt with workers, customers and actual productive processes. The modern manager deals with spreadsheets and figures on a screen. The difference is expressed quite graphically in the changed attitudes of managers to workers. The old-style manager knew the workers, dealt with many of them personally and had a feeling of some responsibility for them. Laying them off was a last resort. The new finance-oriented managers have no contact with the workers and assume that there are too many of them. Laying workers off is their first option.
>
> The contrast between the culture of a production-based and public service-based economy and that of a finance-based one is crucial. Each has an ethos of its own. Production-based industries develop ways of life that are unique to them. They evolve standards of excellence and pride in their craft... People learn to cooperate in their work and form bonds of mateship...
>
> Finance has an ethos of its own too, to do with financial efficiency and competitiveness. From a financial point of view, there is nothing unique about any particular industry. Finance is fluid, mobile, moving constantly around the world. Finance recognizes no boundaries between industries – or countries – and it treats each industry the same way...
>
> At the same time, there is a fundamental contradiction in the ethos of finance. On the one hand, there is all this obsession with efficiency; yet the personal goals of the finance elite are apparently to make and spend money as conspicuously as possible. There is none of the frugality of earlier generations of capitalists, nor much apparent thought for the future. The lavish lifestyle of the elite is matched, within their own companies, by the emphasis that is placed on advertising and marketing. Industry is increasingly dominated by the sales process, with its parasitic

> caste of PR people and ad people promoting a culture of hedonism and avarice.[97]

Of note in Jesson's comparison is the deteriorating relationship between managers and workers. When finance is everything, a business has no use for ethics and the culture of cooperation. Margaret Thatcher, the person who perhaps more than any other symbolizes the temporary triumph of neoliberalism, once famously remarked: "There is no such thing as society – there are only individual men and women."[98] It was a nonsense statement then, as it is now. But its significance is clear. Society *is* the relationships between people. If those relationships are made invisible, then the violence done to them by neoliberalism is also made invisible.

The Ethics of Capitalism

Debates about the ethics of capitalism usually revolve around the ethics of market outcomes because the market is supposedly the determinant of everything that matters in a capitalist society. Markets are populated by producers and consumers. In a free market, consumers are free to choose whatever affords them the greatest utility. In this way, capitalism side-steps the *nature-nurture* debate and instead asserts the supremacy of *choice*. Between producers, however, neoclassical economics promotes the virtue of competition, and here we find an echo of Darwin's theory of natural selection and survival of the fittest. Producers compete in order to satisfy consumer choices and only those with the best business acumen survive or become rich. However what commercial competition selects is not genes but behaviour – and not moral behaviour but any behaviour that turns a profit. So we find that as the culture of neoliberalism pervades a society, business, and social ethics more generally, begin to decline. In this section, therefore, we are concerned with the ethics of capitalism, both the theory and the reality.

The invisible hand

The ethics of liberal capitalism were articulated by Bentham and became known as *utilitarianism*. According to this philosophy, the morally good is that which makes people happy and that which gives them pain is bad. Bentham made no distinction between pleasure and happiness. Of course, happiness and pain are seldom unalloyed, so one state of affairs is better than another if it involves a greater proportion of pleasure over pain.

Bentham went further however and claimed that each individual pursues that which he/she believes will deliver them the greatest net happiness. We recognize here the self-optimizing goal of economic agents – which is not surprising because the utilitarians did the philosophical groundwork for neoclassical economic theory. The concept of utility underlying supply and demand curves arises from utilitarianism.

The utilitarian ethic says that individual desires and actions are good where the outcome promotes the general happiness. But, and it is a significant 'but', the outcome does not have to be the intention of the original action, only its consequence.[99] This takes us back to the previous century when Adam Smith first articulated the metaphor of the *invisible hand*.[100] His assertion was that, in a free market, pursuit of self-interest (that is, profit) leads participants to achieve the material advantage of society as a whole, as though "led by an invisible hand to promote an end which was no part of his intention". Utilitarians take this argument two steps further: first, they equate a materially optimal result (measured at the government level as *per capita Gross Domestic Product* or GDP) with the greatest happiness of the greatest number; second, they make an ethical jump and equate the greatest happiness of the greatest number with the public good. Conclusion: self-interested action in free markets leads to the public good. Also implicit in the above chain of reasoning is the neoclassical definition of progress – an ever increasing *per capita* GDP. By this definition, progress depends on free markets and the invisible hand.

Neoliberals ignore Adam Smith's own doubts about the efficacy of the invisible hand and his belief that "economics should be subordinate to and in the service of society and morals"[101] rather than define those morals. Noam Chomsky argues that the invisible hand has been stretched to the point of abuse. Adam Smith believed, he says, that the invisible hand would destroy the possibility of a decent human existence "'unless government takes pains to prevent' this outcome, as must be assured in 'every improved and civilized society'".[102]

The 2001 Nobel Prize winning economist, Joseph E. Stiglitz, has a different objection to the invisible hand – it is invisible because it is probably not there.

> Adam Smith, the father of modern economics, is often cited as arguing for the "invisible hand" and free markets: firms, in the pursuit of profits, are led, as if by an invisible hand, to do what is best for the world. But unlike his followers, Adam Smith was aware of some of the limitations of free markets, and research since then has further clarified why free markets, by themselves, often do not lead to what is best. As I put it in my new book, *Making Globalization Work*, the reason that the invisible hand often seems invisible is that it is often not there.
>
> Whenever there are "externalities" – where the actions of an individual have impacts on others for which they do not pay or for which they are not compensated – markets will not work well. Some of the important instances have been long understood – environmental externalities. Markets, by themselves, will produce too much pollution. Markets, by themselves, will also produce too little basic research. (Remember, the government was responsible for financing most of the important scientific breakthroughs, including the internet and the first telegraph line, and most of the advances in bio-tech.)

> But recent research has shown that these externalities are pervasive, whenever there is imperfect information or imperfect risk markets – that is, always.
>
> Government plays an important role in banking and securities regulation, and a host of other areas: some regulation is required to make markets work. Government is needed, almost all would agree, at a minimum to enforce contracts and property rights.
>
> The real debate today is about finding the right balance between the market and government (and the third "sector" – non-governmental non-profit organizations.) Both are needed. They can each complement each other. This balance will differ from time to time and place to place.[103]

Ethics in the era of MBAs

It is not unreasonable to trace the source of the current Global Financial Crisis to a failure of ethics, which in turn can be traced to deregulation and the inadequate schooling of business students in ethics.

In the early 1990's the then Professor of Business at Monash University, Murray Cree, became interested in the ethical attitudes of his students. He conducted a survey of some 380 students from three Australian universities in the departments of business, accounting and marketing.[104] Their average age was 21. Cree asked two questions:

> Q1: Would you be open to being involved in an insider trading scam if the payment to you was to be $500,000?
>
> Q2: Would you still be open to the proposition if you knew it would wipe out your parents' life savings?

The percent of respondents answering 'yes' to these questions is shown in the following table.

	Accounting students	**Marketing students**	**Business students**
Q1	72%	46%	63%
Q2	42%	30%	26%

Approximately two thirds of students surveyed were prepared to engage in illegal and unethical practices for their own personal gain and one third would have been prepared to destroy their parents' life savings in the process. This is a frightening result. As Cree points out, many of these same students would be today's executives in the banking and investment sectors and would be managing large sums of money. If one is seeking the origins of the Global Financial Crisis, Cree considers the results of his investigation to be "Enough said!"

Other studies published in accounting journals have concluded that the threat of prosecution significantly lowers the propensity for financial wrong doing, suggesting that an effective regulatory regime helps to keep business people honest. The obvious corollary is that deregulation would have the opposite effect. It is also of interest that men appear to be less perturbed by the threat of prosecution than women.

Much of the finger pointing during the current Global Financial Crisis has been at the MBA courses offered by universities around the world. And the Harvard Business School, as the world's premiere business education institution, has come in for particular attention. This is the institution where, as one commentator points out, "currently 1,800 students are beavering away, trying not to think too hard about the economic triumphs achieved by such notable alumni as George W. Bush and Rick Wagoner, the chairman of General Motors".[105] (General Motors went from being one of the largest car makers in the world to declaring bankruptcy in 2009.) Another commentator, analyzing the movements on Wall Street, discovered that the more Harvard graduates are employed in any one year the worse U.S. markets perform.[106]

But the times are changing. Conscious of their reputation, Harvard business students have taken matters into their own hands. Nearly 20% of the 2009 graduating class (one may ask why only 20%) have signed *The MBA Oath*, a voluntary student-led pledge stating that the goal of a business manager is to "serve the greater good". It promises that Harvard MBAs will act responsibly, ethically and refrain from advancing their "own narrow ambitions" at the expense of others.[107] All students at the Columbia Business School must pledge to an honour code: "As a lifelong member of the Columbia Business School community, I adhere to the principles of truth, integrity, and respect. I will not lie, cheat, steal, or tolerate those who do." The code has been in place for about three years and came about after discussions between students and faculty. Business school academics say that what we are seeing is "a generational shift away from viewing an MBA as simply an on-ramp to the road to riches".[108]

What is Economic Truth?

It is worth asking why a demonstrably flawed economic theory has become the only economic truth taught in universities around the world. Why have alternative economic perspectives, such as those provided by schools of political economy, for example, almost disappeared from universities?

In answering this question, we are obliged to recognize the contested nature of academic knowledge. That which is learned at universities is not universal truth but rather the outcome of a struggle to which many forces are brought to bear. The development of economics as an academic discipline has been subject to diverse and powerful influences, of which it is worth identifying three: the

struggle for power, the struggle for rationality and the struggle for distributive justice.

1. The struggle for power: The dominance of neoliberalism in universities has been due to the ability of its proponents to render the issue of power and class struggle invisible. As in politics, a basic question in economics must be power – who has economic power and how is it obtained? Who does not have economic power and how is it lost? Power is rendered invisible to economics students around the world in order to hide the reality that neoclassical economics serves the interests of a powerful social class. When class and class struggle are made invisible, it allows teachers of economics to advance their subject matter with the aura of a rationality beyond question.[109]
2. The struggle for rationality: Rationality in neoclassical theory is defined in terms of *efficiency*. Free markets are rational because they are claimed to be the most efficient at allocating scarce resources. The term *economic rationalism* has its origins in this claim. Efficiency is no doubt a worthy goal and certainly an inefficient system is open to attack on moral as well as rational grounds. However the extent to which free markets deliver efficiency is debatable, because of the problem of external costs noted above. It is also of interest that neoclassical economists have attempted to enhance their aura of rationality by claiming the methodology of the physical sciences. To question neoclassical theory requires an audacity comparable to questioning Newton's theory of gravity.[110] Davies explores this issue in some detail and finds neoliberalism guilty of scientific fraud.[111]
3. The struggle for distributive justice: Ethical outcomes are certainly of concern to many economists, notwithstanding the insistence of conservatives who argue that "real economics is not a morality tale".[112] At least two difficulties arise with neoliberal measures of well-being. First, measures of economic well-being, such as growth in per capita GDP, are averages which ignore inequalities in income distribution. Second, economic well-being tends to be conflated with efficiency – the assumption being that efficiency is a prerequisite for justice, so achieving the former somehow achieves the latter.

Unfortunately for those who cherish a belief that universities should be the creators, preservers and disseminators of enlightenment, university economics in recent decades has been motivated mostly by a desire to preserve class privilege and concerned little with distributive injustice.

To claim that neoclassical economics is objective in the same sense as physics and chemistry is both nonsense and dishonest. Physical and economic laws are not the same kind of laws. Economic laws describe the aggregate of human behaviour in markets. Markets are systems created and managed by humans and behaviour in them is mediated by money, another human artefact. Since

markets are essentially human creations, they come within the purview of human consciousness. Their performance can be modified *if humans desire it*. Physical laws describe the aggregate behaviour of inert atoms or bodies in space. These behaviours, as exemplified by the law of gravitation, for example, are not amenable to persuasion by human consciousness – at least not in the present age. Not to see the difference is nonsense.

The dishonest aspect of the assertion is that its true purpose is to undermine the fourth principle of egalitarianism – that economic circumstances are, by design or neglect, a product of political processes and not of immutable universal laws. To surrender to the supposed law of the market is to surrender to any market result, even those which produce poverty and pollution. And this brings us to a more compelling reason to recognize a distinction between the physical sciences and economics. A theory of physics which gets the number of fundamental particles wrong is unlikely to spawn poverty or threaten the survival of the human race. A theory of economics which ignores the reality of external costs, such as climate change, is a serious threat to the planet.[113]

The Renaissance of Cooperation

We turn now to a discussion of the cooperative principle. The argument is that a society based on the principle of cooperation is possible given some reasonable effort to put it into practice. Furthermore, the future development of human civilization depends on our ability to establish such a society.

In the simplest of terms, a society consists of a collection of individuals and the relationships between them. It is the relationships that make a society something more than the sum of its individuals. To be of any practical use, a social theory must offer an adequate account of both social relationships and the individuals expected to participate in them.

Experience tells us that multiple factors help to maintain the cohesion of a social group (some formal, some informal, some coercive, some heartfelt) and likewise multiple factors encourage its disintegration. Obviously social integrity depends on the balance of cohesive and fissiparous tendencies. It is generally recognized that a predominance of self-interest over collective interest is detrimental to social cohesion. Societies which embrace neoliberalism are faced with increasing problems due to this defect. It is also generally recognized that rewards and inner convictions are better ways to preserve social cohesion than punishment. Fascist societies are relatively short lived because they have little other than propaganda and punishment to preserve an otherwise highly unstable social stratification.[114] Sarkar cites “too much self-interest in the individual members, the formation of groups for economic or social advantages, and the lack of understanding of others” as the principle reasons for the downfall of a society. “Instances of so many groups

and empires disappearing altogether are not rare in the little-known history of this world."[115]

The essential problem to be solved by all societies, and the problem addressed in the remainder of this essay, is how to achieve a social cohesion which is sustainable because it is consistent with the spectrum of human needs and aspirations. The discussion is divided into seven sections, each of which approaches the challenge of building a cooperative society from a different perspective. Here is an overview of what is to come.

Section 1, *What is Scientific?*, argues that Western materialistic science, which now dominates world culture, is in its present form partly a help and partly a hindrance in building a cooperative society. This section makes the case for a broader definition of science based on a synthesis of Western materialistic science and Eastern spirituality.

Section 2, *The Concept of Progress*, links social progress to the pursuit of happiness, but links the pursuit of happiness to the development of human potential. Any kind of social or economic development, therefore, can only be considered progress if it enhances the more subtle and more expansive potentialities of human consciousness.

Section 3, *The Theory of Cooperation*, introduces the concept of s*ocial capital*, a term used to describe the network of relationships between people and especially the moral and empathic component of those relationships. We also introduce Neohumanism, that part of Sarkar's social philosophy which links cooperation to social progress.

Section 4, *The Science of Cooperation*, introduces the (Western) science and sociology of cooperation. Surprisingly we find that humans have a genetic predisposition for cooperation, which can be elicited given appropriate social encouragement.

Section 5, *The Ethics of Cooperation*, explores the ethical dimension of cooperation and affirms that a cooperative society is possible given the right kind of individual and collective effort. We must also address the problem of *power*, which has undone all attempts so far to establish a cooperative society.

Section 6, *Egalitarianism*, begins with the dilemma that egalitarian societies can be shown to be happier and yet the imposition of material equality has proved to be a disastrous failure. What is the appropriate degree of egalitarianism required to encourage cooperation?

Section 7, *The Future of Cooperation*, looks to the growing importance of an economy for the mind.

What is Scientific?

The reader may be wondering why a discussion of cooperation should begin with the philosophy of science. Recall that Marx and Engels stamped dialectical materialism with the authority of science and likewise neoliberalism attempted to claim the authority of science, although neither of these attempts stood up to close scrutiny. The label 'scientific' endows validity because the discipline of science is both powerful and rational. When the discipline is followed wisely, the knowledge so obtained reduces the element of surprise in our dealings with the world (that is its power) and it provides a view of the world that is both internally consistent and, more importantly, consistent with human well-being (that is its rationality).

Science is motivated by questions and the question that motivates us here is: what kind of social relationships serve to strengthen society and at the same time promote the general happiness without encouraging selfishness? Obviously the answer we are inviting is *cooperative* relationships. But cooperation, like finding peace and love in our lives, is much easier to talk about than to achieve. We need something more than a wish and a prayer in order to build a society based on cooperation. We need the confidence and the rationality that science provides.

In the previous two parts of this essay, we considered the Marxist and the neoclassical views of the human being and we found them both wanting. The fundamental defect of both is that they are *reductionist* – but for different reasons. In the case of Marxism, the human being is reduced to a material entity for ideological reasons, but the theory flounders when the intellectual, aesthetic and spiritual human being begins to assert itself. In the case of neoclassical economics, the human being is reduced to a behavioural parody, because it supposedly facilitates a mathematical description of the narrow world that interests economists. Clearly we require a theory of the human being which avoids these problems.

From the Proutist perspective, a healthy society (and therefore a healthy economic system) can only be built on a holistic understanding of the human being, one which accepts humans as multi-dimensional, that is, as physical, instinctual, sentimental, intellectual, social, aesthetic, moral, spiritual and so on. Human beings have needs and aspirations in all the above dimensions of life and each of them impinges one way or another on social cohesion and on economic activity, which is why they must all somehow be acknowledged in theory and in practice. This idea is fundamental to everything that follows.

However, we are faced with a difficulty. Western materialistic science is founded on the assumption that only matter exists and therefore only matter can be known. Due to this presumption (actually it is a dogma), Western science can only ever seek to understand the more subtle aspects of human beings, their sentimental, intellectual, social, moral and spiritual lives, as

epiphenomena of matter. The quandary is that we wish to embrace Western science for its ability to improve our quality of life and to defeat dogma with rationality. Yet constrained by its own dogma of materialism, Western science is inadequate to explore the inner mental and spiritual worlds. Even the neuro-philosopher Patricia Churchland admits that, "We do our research as if materialism is a proven fact, but of course it isn't."[116] The philosopher Ken Wilbur argues that the non-material worlds must be approached on their own terms, that is, each of the dimensions of human existence is deserving of its own science and methodology. In *Eye to Eye*, he gives an elegant account of the three kinds of science required to deal with the physical, mental and spiritual worlds, and he highlights the common features of the three methodologies that justify their deserving to be acknowledged as scientific.[117]

Sarkar also embraces the Western scientific method but, not surprisingly, rejects the dogma of materialism. As with much of his philosophy, Sarkar's approach is to find a synthesis of East and West.

> The Asian countries, in spite of their long heritage of morality and spirituality, have been subject to great humiliation during periods of foreign invasion. While the higher knowledge of philosophy propagated by the oriental sages and saints has been accepted as a unique contribution to the store house of human culture and civilization, the people of these lands could not resist the foreign invaders. The history of all the Asian countries, a region of so many religions, has been dominated by foreign powers for centuries together. This imbalance brought about their material deprivation and political subjugation.
>
> On the other hand, the West is completely obsessed with physical development. It has made spectacular progress in the fields of politics, economics, science, warfare, etc. In fact, it has made so much material progress that it seems to be the sovereign master of the water, land and air. But for all that, it is not socially content and miserably lacks spiritual wealth. Unlike the East, in the West plenty of wealth has created a crisis. Therefore, it is abundantly clear that no country can progress harmoniously with only one-sided development.
>
> Therefore, it behoves both the East and the West to accept a synthetic ideology that stands for a happy synthesis between the two. Here, the East can help the West spiritually, whereas the materialistic West can extend its material help to the East. Both will be mutually benefited if they accept this golden policy of give and take…
>
> In the educational system of the East, there is the predominant element of spirituality… So the people of the orient could not but be spiritual in their thoughts and actions. Whereas there is, in the Western system of education, a clear and unilateral emphasis on mundane knowledge. So to build up an ideal human society in the future, the balanced emphasis on the two is indispensable.[118]

There are many schools of Eastern philosophy of differing influence and importance and it is as difficult to generalize about them as it is about the many schools of Western philosophy. Some might be characterized as idealistic, some materialistic, some dualistic, and so on. Sarkar places himself in the highly influential tradition of Tantra,[119] which might best be described as the *science of spirituality*. Tantra earns the title of a science (as opposed to a philosophy) because its methodology requires the practice of physical and mental disciplines to gain access to the subtle experiences described by the theory. Furthermore, like any good science, its body of theory and practice has evolved over time. It is not bound by the semantics of ancient texts.

Our assertion is that, in order to build a society based on cooperation, we desperately need science – but not a single science bound by the dogma of materialism but multiple sciences each with a methodology appropriate to the dimension of human experience it investigates. It must be admitted that not all the sciences we require are equally developed. But this is not the point – we cannot know everything in advance. We can, however, start with an immature science and develop it into a mature science over time. It must also be re-emphasized that advocating the need for new methodologies to investigate the inner mental and spiritual worlds is *not* a rejection of Western materialistic science. Western science has already begun to investigate how and why people cooperate – a good starting point to which we shall return shortly.

The Concept of Progress

Happiness

The pursuit of happiness is a fundamental human motivation. All social theories must provide some account of it. In the case of Marxist theory, happiness is implicit. Individuals find it in the solidarity of social struggle and ultimately in the harmony of a classless society. In neoclassical theory, happiness is explicit. Individuals pursue their own desires and the mechanism of free choice in a free market delivers the greatest happiness to the greatest number. Happiness is also explicit in Sarkar's social theory. All humans pursue happiness because it is human nature to do so. Typically, this search involves the pursuit of fame, power and wealth. But these avenues lead to frustration because human desires appear to know no bound – when one is satisfied another appears in its place and the seeker finds only emptiness. In truth, human desires are limitless. Therefore, says Sarkar, they can only be satisfied by something that is itself limitless and herein lies the value of spiritual science because only spiritual experience has this particular quality.[120]

So with respect to the pursuit of happiness, the science of spirituality promotes two principles. The first concerns *balance*, the second *wisdom*. Given that humans are multidimensional beings, their well-being and therefore happiness depends upon maintaining a proper balance within and between all the

dimensions of their lives. Just as the physical body requires balanced nutrition (pabula), so too the mind requires the right kinds of intellectual, cultural and spiritual pabula. Sarkar makes a distinction between *carbonic pabula* which are required to sustain the physical body and *non-carbonic pabula* required to sustain the mind. (We need this unusual terminology because Sarkar uses it subsequently to define an ethical principle.[121])

The second principle stems from the observation that the many kinds of pabula which humans pursue are not equivalent in their ability to satisfy. Pabula can be arrayed on a spectrum from crude to subtle, defined by how easily accessible they are to consciousness – sensory stimuli are easily accessible, intellectual ideas range in difficulty and certain kinds of spiritual experience are very difficult to grasp with ordinary consciousness. According to the second principle, the different kinds of pabula sustain happiness in inverse degree to their ease of attainment. Tasty food is necessary for happiness but it fails to be enough once readily obtained. Conversely, spiritual experience can be elusive but is found to offer sustained contentment in the long term. We may understand wisdom as the ability to discriminate between the different kinds of pabula.

Development and progress

The above two principles have ramifications for both the individual and the collective pursuit of happiness. From the individual perspective, the pursuit of happiness is a *developmental journey*. Humans are at first frustrated in their search for happiness, because they search where it is easiest to do so. By stages, however, they turn their attention in more subtle directions. Psychologists identify a definite sequence of developmental stages in the unfolding of the various potentialities of the human mind. The natural sequence (and thus also the healthy sequence) is from the crude to the subtle and from narrow concerns to expansive concerns. From baby, through infant and child to adult, the intellect becomes by steps more subtle and more powerful. Eventually the mind can span great physical and even metaphysical distances. Likewise from baby to adult, a person gradually acquires the faculty of empathy – the selfish concerns of the child give way to concern for the welfare of others. And again, moral perceptivity begins with fearful obedience to rules and grows to the appreciation of virtue. A happy life depends entirely on making each of the many steps of this developmental journey, a journey which continues for as long as one lives.

However the developmental journey is not without its struggle, because there is a palpable tension between the developmental transitions in life and the requirement to maintain balance. At each developmental stage, a person gradually learns to achieve equilibrium but each inner impetus for further unfolding of mind threatens the equilibrium that has been painstakingly achieved. Indeed Sarkar defines life as a never-ending struggle “to restore an

unstable equilibrium".[122] Wilbur offers a comprehensive description of the *equilibrium-development* tension in *Eye to Eye*.[123]

With regard to the collective pursuit of happiness, the same dynamics apply, but on a longer time scale. There is the same tension between development and equilibrium requiring the same struggle to restore an unstable equilibrium. Societies and civilizations, by gradual degrees, move from the crude to the subtle and from the selfish to the collective welfare. This movement becomes the basis for Prout's *definition of progress*. Note that by this definition, all scientific and intellectual discoveries, all kinds of social and economic achievement can only be considered progress to the extent that they encourage the flow of life from crude to subtle – that they encourage the unfolding of the more subtle potentialities of individual and collective life.

We are now in a position to understand the particular challenge confronting the human race in the opening decades of the 21st century. We are taking another small but collective step away from a pre-occupation with self-interest towards a pre-occupation with the welfare of the planet as a whole. We cannot expect to take such a step without some disruption and some letting go of the past, but by making this step we are surely embracing a more dignified and more optimistic future.

The nature-nurture debate

Human development is from crude to subtle. Mind has an inner impulse to unfold which is not dependent on, nor imposed by, the external environment. In other words, mind has its own dynamic, its own nature. This understanding has an immediate impact on our interpretation of the *nature-nurture* debate. In essence we are saying that, in addition to their physical attributes, humans are also intellectual, social, moral and spiritual, *by nature*. But nature in this view is something more than the universe of atoms and molecules – it now includes the universe of minds and consciousness. How a human being develops still depends on choices made in the context of inborn and environmental factors but now the inborn is not confined to genes and likewise environment includes all the physical and metaphysical worlds into which human life penetrates. So concerning the old debates of *nature* versus *nurture* and *determinism* versus *free will*, Sarkar is clear that a useful social theory must accommodate both sides of both arguments. It is not at all helpful to be dogmatic in these debates.

The assertion that the subtle aspirations of human beings are in part innate is significant for a second reason. Socialists have traditionally preferred to argue that all morality, all aesthetics, all spiritual yearning is imposed, for better or for worse, by family and society. The utopian socialists relegated all expressions of vice and virtue to the arena of nurture in order to reject the conservative argument that working-class vice was innate. Marxists went further and insisted that all human subtlety was derivative of socially imposed

material circumstances. Both views are inadequate because they try to squeeze human reality into a very tiny mould. The reality is larger, more complex and more subtle. A better approach surely is to expand one's theory to embrace reality, not to squeeze reality into the strictures of an outdated theory.

Economic progress

In the healthy developmental sequence, the human mind unfolds from a predominance of crude to a predominance of subtle preoccupations. We have already noted that this developmental sequence becomes the basis for Prout's definition of progress. Sarkar takes a highly significant step by linking the trajectory of economic development to the unfolding of human mind. In the first instance, humans are preoccupied with their physical existence, that is, to provide themselves with the basic requirements of life, which Sarkar lists as food, clothing, housing, health care and education. He describes an economy which cannot meet the basic requirements as *undeveloped*. Once physical requirements are satisfied, we find that more subtle intellectual, social and artistic expressions quickly assert themselves. Serious social problems arise if an economy is not reorganized to satisfy those aspirations. And finally, when a widespread refinement of intellect and aesthetic expression awakens spiritual interest, economic priorities change yet again. Of course these are not three distinctly separate phases, but unless one recognizes human development as an unfolding of more and more subtle aspirations, economic development will stagnate and human aspirations will at some point become frustrated, with potentially disastrous results. It also goes without saying that the economic indicators used to measure collective welfare must periodically be adjusted to accommodate changing aspirations.

Most communist countries were able to provide the basic material requirements of life but stagnated because they were not able to take the next step. Capitalist economies are able to satisfy some of the subtler aspirations of the middle class by diverting relatively modest resources into education, the arts and the like. However, their disregard for ecosystem relationships, social relationships and ethics leads ultimately to the disintegration of the social fabric.

Ecosystem relationships in the context of a cooperative society are discussed in another essay in this volume.[124] In this essay, we are concerned only with social relationships and ethics.

The Theory of Cooperation

Our concern in this section is to develop a theory of cooperation and social cohesion. The key argument is that social cohesion depends on cooperation and cooperation depends upon social relationships characterized by trust and empathy. Social cohesion will therefore depend on the *aggregate quality* of social relationships, which in Western social science has come to be described

as *social capital*. The term is used by way of analogy to other kinds of economic capital, such as human capital and financial capital. Some resist the term because it represents the further intrusion of economic thinking into the social sciences, but it is widely accepted and therefore used here. Interest in social capital arises because the concept is believed to be measureable (albeit indirectly) and because research has shown that those measures correlate with other important social and economic indicators.

Although Sarkar does not use the term as such, much of his Neohumanist philosophy is concerned with the quality of social relationships.[125] We begin with the theory of social capital as understood by Western social science and then introduce the contribution of Neohumanism.

Social capital

In *Taking New Zealand Seriously – The Economics of Decency*, Hazeldine defines social capital as the "empathy and sympathy" in human relationships and the "shared attitudes and goals" of a community.[126] Putnam, a sociologist, defines it as the "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them".[127] Social capital is embodied in human relationships and in the social, educational and cultural institutions which mould those relationships. The evidence suggests that it is hugely important in explaining the differences in wealth and productivity between nations. Government investment in activities which build good social relationships and community, says Hazeldine, can be as productive as business investment in new machinery and factories. This understanding makes Margaret Thatcher's repudiation of society in favour of individualism look all the more ridiculous.

Many studies have attempted to measure social capital and thereby make inferences about its correlation with other apparently unrelated social and economic indices. Following the lead of Putnam, the social capital of a community is often measured as the levels of trust and civic involvement of its members. Trust is assessed by gathering information using carefully worded questionnaires and civic engagement by measuring the average number of church groups, unions, sports groups, schools groups, clubs and societies to which people belong. One study,[128] for example, has shown that the correlation of income inequality with higher mortality rates (observed among the States of the USA) can probably be explained by declining social capital. In other words, income inequality occurs at the expense of social capital and declining social capital has a deleterious effect on public health.

Hazeldine[129] argues that New Zealand's program of economic rationalism (synonymous with neoliberalism in this essay), which began in 1984, is gradually destroying the social trust and empathy upon which economic life depends. In other words, New Zealand is living off the social capital

accumulated by previous generations and, as any economist will tell you, drawing on an account without making deposits cannot last forever.

There are different kinds of social capital just as there are different kinds of physical and human capital. Putnam makes an important distinction between *inclusive* social connections and *exclusive* social connections. Ethnic organizations, sectarian church groups and fashionable country clubs tend to be exclusive even while their internal bonds are strong. Civil rights groups, youth service groups and charitable organizations tend to be inclusive. From this perspective, social capital can be both positive and problematic. However, in the end, Putnam sees social capital as an essential force in society. He draws on a vast array of data that reveals how Americans have become increasingly disconnected from one another and how participation in sports, religious, political and hobby groups is declining. He links the disintegration of social capital to declining indices of individual and public health. On the optimistic side, however, he demonstrates how regenerating broken social bonds can improve those same indices.

Neohumanism

Neohumanism is Sarkar's reinterpretation of Humanism. It is well described as a synthesis of the European humanist tradition with the Indian spiritual tradition. It includes: an analysis of social sentiments as the basis for social cohesion; the role of rationality in the struggle against dogmas; a commitment to egalitarianism; and a commitment to spirituality as the basis for building a healthy society.[130] Various aspects of Neohumanism will appear in each of the subsequent sections but we deal here with its analysis of social relationships.

Humanism was defined by the Greek philosopher Protagoras (5th Century BCE) as the principle that *humans are the measure of all things*. Human dignity takes precedence over the dictates of kings, queens, priests and tyrants. It remains an excellent definition and European history can be interpreted as the struggle to establish the humanist ideal in the face of determined opposition from successive kings, queens, priests and would be tyrants. However, today the humanist ideal appears to be inadequate in at least two respects. First, if humans are the measure of all things, then what about animals and plants? Do they only have value or meaning by reference to humans? Second, what can we say about the future of humanity if we only have the past as a reference? A vision of human potential is required if we are to approach the future with confidence and optimism.

Neohumanism is Humanism infused with spirituality and extended to encompass the plant and animal worlds. Elsewhere in this volume, Bussey introduces Neohumansim as follows:

> Neohumanism is a reinterpretation of Humanism proposed by P. R. Sarkar. It takes the universal aspiration of Humanism, to reach beyond

> the limitation of humanity and to strive for unity at the social level, and suggests a universalism that includes all animate and inanimate existence. Humanity is thus part of a great whole and our job is to increase the radius of our heart's love… Furthermore, the Cosmos, its matter and the organic forms that populate it, are all taken to be conscious, thus human isolation is broken down. We are never alone, as Sarkar insists. Rather we are bound together in an infinite network of relationships that span material, intellectual and spiritual realities.[131]

Lying at the core of Humanism is both an ethic and a sentiment. The ethic is egalitarian – it asserts the essential equality of humans. The sentiment is an experience of empathy or connectedness with those who come within the humanist embrace. Put another way, Humanism is about cooperation. Both the ethic and the sentiment of Humanism are required to sustain cooperation.

But a cursory examination of history obliges us to ask: who is included in the humanist embrace? For the ancient Greeks, it did not extend to slaves or to women. In 18th century England, it did not extend to slaves or to colonies. Put another way, the cooperative ideal can be found on the inside of the humanist embrace but it does not extend to the outside. The struggle of human history has not been so much to establish some fixed Humanism but rather to extend the radius of the circle of those included within the ideal. In Neohumanism, Sarkar extends that circle to include animals and plants. Furthermore, spirituality is required in order to ensure that the circle of Humanism is extended to include more and more of the currently marginalized.

Sarkar's analysis of social sentiments and their contribution to social cohesion has some parallels to Putnam's analysis of social capital. Like Putnam, he makes a basic distinction between exclusive sentiments (for example, nationalistic *geo-sentiments* or groupist *socio-sentiments* that bind a group but then pit group against group) and all-inclusive sentiments. The Neohumanist sentiment is the ideal because it excludes nothing – everything and everyone is inside its cooperative embrace. Here then we have another perspective on Sarkar's definition of social progress – it is the ever-expanding circle of Neohumanistic cooperation, made possible by the ever-increasing subtlety of the human mind.

Much of Neohumanism is concerned with the use of *rationality* to defeat social dogmas. Rationality is usually understood to mean the capacity for logical reasoning undistorted by sentiment. Neohumanism however acknowledges what neuro-biologists have learned from investigations of the brain – that reason cannot be divorced from sentiment because the two are intertwined in the brain. Rationality is not reason divorced from sentiment but reason empowered by an all-inclusive Neohumanist sentiment.[132] Logic alone can never defeat the combination of dogmas and cheap sentiments offered by communism and fascism. Even the great 20th century logician, Bertrand

Russell, came to the conclusion that the final argument against Nietzsche's fascist philosophy must be an appeal to human emotion.[133]

Grounding social capital in human sentiments and therefore in human neuro-physiology is an extremely important step because it opens up the apparently intangible world of social capital to the rigour of (Western) scientific investigation. We now turn to that science.

The Science of Cooperation

In this section we examine some of the scientific evidence that humans have a predisposition to cooperation and in particular to economic cooperation. Some of the evidence comes from a new and exciting field of research known as *neuro-economics*. We then turn to those insights provided by sociological studies.

Neuro-economics

Neuro-economics is the study of the neuro-physiological underpinnings of economic decision making. The field is new and is providing unexpected insights into human economic behaviour. Recall that classical economic theory requires individuals to make complex calculations to maximize their personal advantage or utility. Utility, however, is a strangely ambiguous concept. On the one hand it is given a numerical value which implies the counting of something, but on the other it is entirely abstract and not anchored to anything in the real world that can be counted. The advent of neuro-physiology led to the idea that utility was really a surrogate for some chemical currency inside the brain, with most interest focused on serotonin molecules because these are known to be responsible for the experience of pleasure.

It turns out that a wide range of *molecules of emotion*[134] impinge on the mental cost-benefit calculations that are supposed to take place inside the brain and they have unexpected effects. For example, let us return to the 'sharing experiment' described earlier, in which person A was asked to share a sum of money with person B. Remember that these experiments demonstrated behaviour inconsistent with neoclassical theory. People appear to put a high value on fairness. In a follow on experiment, persons *A* and *B* were placed in the same experimental scenario as before, but they were (unknowingly) given an intranasal administration of *oxytocin*. Oxytocin is a neuro-peptide that plays a key role in social attachment and affiliation in animals and causes a substantial increase in trust in humans. In these experiments the effect of oxytocin was to increase the amount of money that *A* gives *B*. The experimenters concluded that "oxytocin may be part of the human physiology that motivates cooperation".[135] It is of interest that oxytocin also appears to play an important role in mental health – some of the signs of autism can be alleviated by a nasal spray containing oxytocin.[136]

Oxytocin is not the only neuro-chemical to promote cooperation. Recent observations of *bonobo* monkeys in the jungles of the Congo reveal fascinating contrasts with chimpanzees.[137] Bonobos are matriarchal and show little aggression compared to the patriarchal chimps. Chimps respond to strangers with aggression, while bonobos demonstrate curiosity. When under stress chimp tribes degenerate into fighting, while bonobos respond to stress by engaging in collective sexual activity. Scientists have concluded that bonobos demonstrate higher levels of trust both with each other and with strangers. Of most interest, however, from a neuro-economics point of view, is the ability of the monkeys to perform a simple task requiring cooperation in retrieving some bananas that are out of reach. Although both species are intelligent enough to work out a solution (for example, by one climbing on the shoulders of the other or by one holding a ladder for the other), the chimps fail because they cannot trust one another. On the other hand, bonobos have no trouble cooperating to retrieve the bananas.[138]

It turns out that these differences can largely be correlated with a single gene – a so-called 'social gene' that acts via a neuro-peptide called *vasopressin*. Bonobo monkeys have the social gene, chimpanzees do not. And of particular interest – humans have the same vasopressin gene as bonobos. Recall that social capital was defined in terms of trust and empathy and that these behavioural traits oil the wheels of social and economic interaction by encouraging cooperation between strangers. We now know that oxytocin and vasopressin are the physiological underpinnings of trust and that they influence levels of cooperation.

Managing social capital

We must immediately dispel any notion that trust, empathy and cooperation are predominantly determined by genes. In Sarkar's terminology, genes represent *potentialities*. How those potentialities are expressed depends entirely on the choices people make in the context of their genetic endowment *and* their social environment. It is therefore extremely interesting to learn that measures of trust vary greatly from country to country. In one survey,[139] an aggregate measure of trustworthiness ranged from a low 3% in Brazil to 65% in Norway. In a ranking of some 42 countries, Australia came in eighth position just ahead of India, Switzerland and the USA (see Figure 1 in Zak[140]). It is possible to measure other social and economic indicators in the same countries and determine how these correlate with trust. The data suggest that low aggregate trust is correlated with low levels of investment and with poverty. Zak also claims that governments can increase aggregate trust by adopting policies which promote education, civil liberties and communication and which decrease income inequality.

This conclusion is supported by a just published, ground-breaking book which reviews 30 years of research into the adverse effect of income inequality on

almost all social indicators. The title says it all – *Spirit Level: Why More Equal Societies Almost Always Do Better*.[141] It does not matter if the average per capita GDP (the *de facto* measure of well-being in neoclassical economics) is very low or very high. It is the *gap* between rich and poor that is important.[142] The effect appears to cross cultures because countries as diverse as Indonesia, Vietnam, Finland and Japan all have better indicators than the UK and USA. The rich in more equal countries are happier than the more rich in less equal countries.[143] The evidence obliges us to turn the *trickle-down-effect* on its head – the rich enjoy a better life by increasing the income of the poor.[144]

The differences revealed, even between rich market democracies, are striking. Almost every modern social and environmental problem – poor physical health, mental illness, lack of community life, violence, drug abuse, obesity, long working hours, school dropout rates, imprisonment, violence and teenage pregnancies – is worse in a less equal society.[145] As with the Zak study, trust and cooperation are found to decline with increasing inequality and the authors suggest that low trust is a critical factor because low trust induces high stress and high stress leads to many of the other poor outcomes. Ultimately the *Spirit Level* is an optimistic book because there is good news – it is easily within the ability of governments to manage levels of inequality and therefore levels of trust. Many of the other social problems respond accordingly, without requiring the expensive remedial programs that attempt to correct the negative effects of high inequality. To this extent, the early socialists and George Orwell had an accurate intuition – reducing inequality helps to solve many apparently difficult social problems.

In the end much of this is common sense, but somehow it has been ignored by governments around the world bent on promoting the neoliberal agenda. In particular, it is worth noting the negative consequences of deregulating markets. Neoliberals claim that regulation warps the efficiency advantages of a truely free market. However the efficiency of a market is also dependent on trust among its participants. Deregulation combined with a lack of trader ethics eventually destroys a market because dishonest behaviour begins to dominate.

This is illustrated by an interesting experiment with a group of chimpanzees.[146] The object was to determine if chimpanzees could learn to trade using money. Chimps in the wild trade services with one another but not, as in this experiment, goods for goods with money as an intermediary. The results demonstrated that the animals could learn to trade using simple tokens as a currency convertible into snacks – but only as long as a human referee remained to keep the trading honest. In the absence of human supervision, trades started going sour because the chimps did not always return tokens proffered by their peers. “Lack of trust”, trouble communicating and difficulty with mental scorekeeping were three explanations suggested for the breakdown in chimp trade. A human parallel that one might draw from this experiment is that a market can be made to function adequately even if the participants have

poor ethics, as long as it is well regulated. It would be interesting to repeat the same experiment with bonobos.

Contemporary economic theory places much stress on free market competition to achieve efficiency. Justification for the role of competition comes from biological theories of evolution which stress survival of the fittest under competition. We now know much more about our closest primate cousins and have discovered that competition is only half the story. Some primates have a sense of fair play and an innate capacity for cooperative behaviour. The evidence points to humans also having a genetic and physiological predisposition to cooperation and, given the will, businesses and governments can foster that predisposition to promote a cooperative economy. Far from being weaknesses, trust and cooperation are economic strengths.

> The more we understand human cooperation and how to strengthen cooperation, honesty and trust, the more economically successful our society becomes.[147]

The Ethics of Cooperation

The essence of the utopian argument (and of its naivety) is that a better society can be created without sustained individual and collective effort. It contrasts starkly with the pessimistic argument currently pervading crisis-ridden capitalist societies which asserts that, no matter how humans struggle to create a better society, they will always be brought down by greed and selfishness. Both arguments are dangerous, the former because it does not accord with reality, the latter because it engenders hopelessness. Any vision of a cooperative society must avoid both these traps. Human beings have many potentialities from crude to subtle, from selfish to altruistic. Social progress depends on tipping the balance in favour of the subtle and the altruistic. It is therefore of paramount importance to understand the science behind all these potentialities and to encourage the subtle and restrain the crude.

We have seen that a cooperative society must be built on trust and empathy because these are required to sustain cooperative relationships. It is extremely difficult to establish trust and empathy in a culture which actively encourages self-interest and large inequalities of wealth. On the other hand, a cooperative society can be built where there is some rational effort both by individuals to deal with personal selfishness and by society as a whole to promote social equality. To the extent that traditional socialists turn their backs on individual morality and conservatives refuse to acknowledge egalitarian struggle, the more difficult it becomes to establish a cooperative society. In this section we deal with ethical struggle and in the next with the egalitarian struggle.

Sarkar promotes two complementary ethical systems, *cardinal human values* and *Neo-ethics*. They are discussed in turn.

Cardinal human principles

Sarkar places much importance on a high standard of morality in individual and collective life. Cooperative businesses require not just honest directors and managers but also a state administration that is run by honest public servants and politicians.[148] In other words, morality is the *sine qua non* of a cooperative society. A commonly accepted set of moral principles is required but here we come up against an obstacle. Conservatives are inclined to seek moral guidance from religious scripture and, in the worst case, impose dogmas which repel the rational mind. Traditional socialists, not wishing to submit to religious dogma, tend to reject all moral principles as relative. So what kind of moral code is required to sustain a cooperative society and how can one promote it? Sarkar argues for the concept of *cardinal human values*, values that go beyond any one culture or religion.

It is interesting to note the emergence of various international courts of law, driven by a gradual recognition that cardinal human values must take priority over local culture and custom. True, only the worst violations, such as crimes against humanity, reach the international courts today and admittedly often for political reasons, but nevertheless the gradual emergence of an internationally accepted set of moral values is of tremendous importance. Acts of violence, deception and theft perpetrated on innocent people cannot be justified in the national interest. By logical extension to individuals, acts of violence, deception and theft for personal gain are also morally reprehensible. Most cultures around the world accept these as moral principles – indeed it is hard to imagine a sustainable society without them.

Sarkar promotes a set of ten principles that encapsulate cardinal human values.[149] The first three are concerned with the avoidance of violence, deceitfulness and theft as described above. To act according to cardinal principles of morality, says Sarkar, is *virtue* and to act against them is *sin*. The central idea in virtue is "to serve the collective interest, to accelerate the speed of the collective body…" To retard the speed of the collective body is sin.[150] Note that the 'speed of the collective body' to which Sarkar refers is the collective movement from crude to subtle encapsulated in his definition of progress. We must flag this as a critical concept in Sarkar's philosophy – virtue and sin, good and bad, are defined by reference to collective social progress and not in terms of some prevailing religious idea.

The cardinal human principles have five important characteristics: 1) they are a natural system of morality in the sense that, without them, the natural developmental sequence of expansion and subtlification of mind cannot occur; 2) they are not ends in themselves but the means to individual and collective progress; 3) in particular they provide the necessary foundation for a healthy inner spiritual life; 4) their practice builds trust and therefore the quality of

cooperation in society; and 5) they are egalitarian because they are of benefit to all – their practice, by definition, excludes group or class interest.

Of the ten principles, one is of particular importance because it encapsulates the others: *non-objectification*.[151] Objectification is the use of people (or indeed anything animate and inanimate) as objects for one's own purposes without regard for their well-being. It is interesting to note that *economic exploitation* is defined in a similar way.[152] This principle appears in Neohumanism as the distinction between *utility value* and *existential value*. To recognize the existential value of a person is to recognize that their joys and sorrows are as important to them as my joys and sorrows are to me. We may therefore describe non-objectification as the *empathic principle*. It requires an ability to put oneself into the mind of another – to expand one's consciousness beyond its limited ego boundary.[153]

Environmentalism infused with the empathic principle becomes *deep ecology*,[154] whose significant feature is to acknowledge the existential value of the natural world in addition to its utility value for humans. Recall also that social capital is defined in terms of the trust and empathy inherent in social relationships. It is now clear that the building of social capital has a moral dimension.[155]

The practical translation of ethical principles into good social outcomes is performed by a society's legal system.[156] The law defines crime and the corresponding punishments. The larger the gap between crime and sin (the latter defined as that which impedes social progress), the more problems a society will face. Put another way, social progress depends on reducing the gap between morality and legality. Of course differences in climate and local circumstances will require minor differences in the application of the law from place to place, but the intention of the law should always be to give expression to cardinal human principles.

> If we try to expand the scope of the few fundamental cardinal human principles and draft the constitution, legal code, administrative and judicial systems in adjustment with the expanded scope of those cardinal principles, that will pave the way for the greater unity of human society. Humanity or Neohumanism will thereby acquire accelerated speed, which is one of the essential factors for the path of proper movement… This should not remain a utopian dream. It should be the first expression of the practical wisdom of humanity.[157]

Contemporary society offers many examples of a harmful gap between morality and legality. Consider CEO salaries, concerning which the word 'obscene' is used time and again. It was justifiably used to describe the £10.9m payouts received by Scottish Power's former chief executive and colleagues just three months after they warned customers about severe increases in power bills.[158] And in Scotland again, Sir Goodwin, former boss of the Royal Bank of

Scotland, had to have police protection after public anger over the announcement that he would receive a £650,000 annual pension entitlement on leaving the bank which had collapsed under his stewardship. CEOs defend their astronomical incomes as not breaking any law and as justified by 'market forces'.

A cardinal human principle relevant to CEO salaries would be *contentment*.[159] To maintain contentment, one must struggle against greed. It requires, says Sarkar, "being contented with the earnings of normal labour". How might we give this principle economic and legal expression? Sarkar's proposal is to provide a guaranteed minimum income (GMI) to all, sufficient to cover the basic requirements of life, and then to set the maximum remuneration at some fixed ratio to the GMI. This policy is already part of cooperative ethics and has been practised by cooperative businesses in Mondragon and Maleny for many years. However, due to the contributory role that excessive CEO salaries played in precipitating the Global Financial Crisis, the proposal to set a maximum salary at some ratio to the minimum is finding broader support.[160]

Another gap between morality and legality in contemporary capitalist society concerns the waste of material resources. The relevant cardinal principle is *non-acquisitiveness*,[161] or the avoidance of superfluous material consumption. Material goods should be acquired only to the extent required for a fruitful life. Note that this definition implies a legitimacy to consume something beyond basic needs, in contrast to Marx's 'needs slogan' that limits individual consumption to the basic requirements.

The justification for placing a moral constraint on material consumption is that material resources are finite. One person's inconsiderate use of finite resources disturbs the welfare of others and upsets environmental balance. From a social perspective, therefore, this principle offers the moral justification to pursue economic efficiency. As we have mentioned earlier, those who argue for productive efficiency do have a valid moral argument. But that same argument must also extend to efficiency of consumption, the issue which so worries environmentalists. Profligate consumption of fossil fuels (because capitalism considers Nature to be free for the taking) has brought planet Earth to a dire situation. The green slogan, *reduce, reuse and recycle* has a moral imperative.

Neo-ethics

The cardinal human principles define virtuous conduct for individuals. By contrast, Neo-ethics[162] is more concerned with the *ethics of groups*, that is, social groupings whose identity is defined by race, language, gender, economic class and so on. Neo-ethics is not an alternative to the cardinal human principles – the two are complementary. As the name implies, Neo-ethics is the ethics associated with Neohumanism.

Recall that the purpose of Neohumanism is to expand the circle of those who are included in the cooperative embrace. The existence of a circle, however, implies two groups, those on the inside and those on the outside. Within the circle there is cooperation and outside the circle is the *other*, those with whom there is not necessarily felt a need or even a willingness to cooperate. Groups are inevitable in society and they cannot simply be wished away. The problem to be addressed by Neo-ethics is the pathological tendency for some groups to coalesce around the desire to exercise power over the 'other'.

Sarkar labels this problem *imperialism*, a term he uses quite generally to refer to the endeavour of any group to wield power over another. The imperialist urge is a psychic ailment "rooted deep in the human psyche".

> Goaded by this psychic ailment, a superpower forces its own selfish national interests on other weaker states to establish its suzerainty politically, militarily, etc. An imperialist power wants to dominate and exploit other socio-politico-economic units as an expansion, perpetration and consolidation of its vested interests; a powerful linguistic group suppresses other minority linguistic groups; the so-called upper castes subjugate the so-called lower castes in society; and opportunistic males curtail the rights of women in various ways. In all these cases, the same inherent psychological malady of imperialism prevails.[163]

Whether expressed as capitalism, nationalism, caste-imperialism, male chauvinism or lingualism, imperialism is anti-human. "It runs counter to the spirit of Neohumanism and the ethics of human life… it thwarts human progress and creates global wars and all sorts of divisive and destructive forces in society." Imperialists "cultivate a psychology based on slavery, inferiority complex, pseudo-culture and psycho-economic exploitation".[164]

Concerning the problem of imperialism, socialists in the 19th century, both utopian and scientific, were quite naive. They appeared to believe that the imposition of material and social equality would somehow obliterate groups and therefore obliterate the group psychology giving rise to imperialism. But the imperialist impulse runs deep. George Orwell, in *Animal Farm*, identified it as the source of what went wrong with the socialist revolution but, as we have previously noted, he apparently still believed in the healing power of an imposed material and social egalitarianism.

An appropriate concentration of political power in society is required for stable governance – nowhere does Sarkar give the anarchist agenda any credence. Furthermore, individuals and groups will differ naturally in their social influence, quite apart from any power granted to them by a democratic process. We may view power as a neutral instrument which can be used for good purposes or bad. The question is whether power necessarily corrupts those on whom it is endowed and, if so, what can be done about it. Sarkar recognizes the seriousness of the problem and approaches it from two sides. On the external or objective side he advocates, among other things, the separation of powers and

the checks and balances that have gradually developed in Western democracies.[165] But external checks and balances are not enough – something is required on the internal or subjective side.

We have already noted that the natural sequence of human development gives rise to increasing intellectual subtlety, empathy and moral intuition. This constitutes the starting point for Prout's understanding of individual and collective progress. Unfortunately, for many different reasons, the developmental sequence is sometimes frustrated, in which case some intervention is required to remove the impediment and to encourage healthy development to resume. Sarkar views the imperialist tendency as a psychic ailment, that is, as a failure to develop to maturity. It arises when a person or group fails to maintain a healthy balance in life, that is, fails to maintain a balance between their outer (material) and inner (spiritual) lives, or to use Sarkar's unusual terminology, to maintain a balance between the carbonic and non-carbonic pabula required to sustain those lives.

> When people get detached from non-carbonic pabula and become increasingly engrossed in carbonic pabula, there are two ill-effects as a consequence. First, the arena of one's own carbonic pabula will increase and the mind will gradually and steadily drift towards crude matter. Secondly, one's mind will think in terms of devouring other's carbonic pabula. This is the psychological explanation of imperialism. That is, imperialism has its origin in the psyche and functions in the psychic arena.[166]

This passage addresses the internal or subjective side of the problem of power. To protect against the corrupting influence of power it is important to remain 'attached' to one's inner spiritual life. The lust for power grows in intensity when one fails to maintain a healthy spiritual life. This idea is pivotal in Sarkar's social philosophy but it is very difficult for Westerners to understand because Western culture is predominantly materialistic – we have little understanding of the tremendous social importance of a healthy spiritual life.

Social dynamism is the resultant of a myriad of social forces, some of them noble, some ignoble, some magnanimous, some selfish and so on. Just as in individual life, so too in society, there is a never ending struggle between progressive and degenerating influences. Sometimes the former are predominant, sometimes the latter. In the worst case, degenerating forces dominate to such an extent that they ultimately lead to the complete destruction of a society. The rise and fall of various fascist regimes in the 20th century are obvious examples.

Fortunately, many steps can be taken to tip the balance of social dynamism in favour of progress. One of them, says Sarkar, is to promote the conscious acceptance of the two principles of Neo-ethics. The first states that spirituality, being that which promotes all human virtue and subtle consciousness and therefore ultimately drives all social progress, "must be accepted as the

supreme desideratum in human life". The second principle concerns maintaining balance in life. "There should be happy adjustment and balanced blending between carbonic and non-carbonic pabula."

It must be emphasized that in Sarkar's view spirituality is not something imposed or unnatural. It is certainly not religiosity. Rather it is an attribute latent in all human beings and its expression is to be encouraged because it promotes all that is noble, charming and impressive about the human species. Hence the first principle – without the conscious acceptance of the importance of spirituality in individual and collective life, social progress becomes uncertain, hesitant and difficult to sustain. Leaders fall prey to their cruder ambitions and a blind populous follows to their ultimate destruction. In order to accommodate social progress, a second principle becomes necessary. Progress requires that the structure of society, including its economic structure, be continually adjusted. If we understand an economy as producing the many kinds of pabula required for human health and fulfilment, progress requires a gradual shift in emphasis from producing carbonic pabula to producing more and more subtle non-carbonic pabula. Sarkar describes that part of an economy producing non-carbonic pabula as the *psycho-economy*. Its role is to find new and creative solutions to economic problems so as to encourage the maximum utilization of psychic and spiritual potentialities.[167]

We live in an era where human intellect and aspirations have attained some degree of subtlety, but the most powerful of our political and economic institutions are still mired in the dysfunctional materialism of previous centuries. The choice is rather stark – imperialism or cooperation – but there is a choice nonetheless.

Given the human proclivity for abuse of power and the tremendous impact that this disturbing facet of the human character has had in history generally and in the history of the cooperative movement and of failed socialist endeavours, it deserves investigation from as many perspectives as possible, the political, but also including the psychological and the spiritual.[168]

The biopsychology of ethics

Since the acceptance of ethical principles is essential to sustain a cooperative society, it is clear that training in ethical decision making cannot be left to chance. It is encouraging to find that courses on business ethics are now multiplying in universities around the world, but something more than reading books on the subject is required. Soldiers cannot learn to fight from books alone and the same applies to those wishing to acquire ethical muscle. The learning of ethics requires exposure to real moral dilemmas because, as recent research has revealed, much more than the logical brain is involved.

Brain scans have opened a huge field of research into what parts of the brain are involved during different kinds of activity. In one recent study,[169] neuro-

scientists wanted to discover those parts of the brain associated with different states of mind such as empathy, compassion, altruism, emotional stability, self-understanding and pro-social attitudes. They found that pondering a situation calling for altruism or compassion activated a brain region known as the medial prefrontal cortex. However, moral decision making involved the joint activity of several distinct parts of the brain – the medial prefrontal cortex just mentioned (sometimes described as the social-empathic cortex), the rational cortex (dorso-lateral prefrontal) which plays a role in sustaining attention and working memory, the conflict detection cortex ("sixth sense" anterior cingulated) and the limbic system (a part of the brain usually associated with primitive emotions, such as sex, fear and anger). The authors concluded that the neuro-biology of wisdom may involve an optimal balance between the more primitive brain regions and the newest ones. For those teaching ethics in MBA courses, the conclusion is clear. If the goal is to help students acquire ethical muscle, they will need to be exposed to situations which exercise all these different parts of the brain at the same time.

It turns out that all decision making involves the emotional parts of our brain. Even decisions which are not apparently emotionally or morally charged still engage parts of the brain associated with emotion. Far from being opposites, emotion and rationality are interdependent. Neuro-physiologist Antonio Damasio[170] has shown that people who lose the ability to perceive or experience emotions as a result of a brain injury also find it hard, if not impossible, to make decisions.

Another important finding, this time by cognitive psychologists,[171] is that intuitive judgements of right and wrong operate quite independently of religious affiliation. Atheists are just as ethical and have just as strong a moral compass as persons with religious beliefs. Harvard psychologist Marc Hauser says that his investigations, designed to test the kinds of moral decisions made by people from different cultures and backgrounds, lead him to believe that there might be something like a universal moral grammar, a set of principles that every human is born with regardless of culture. It is a tool kit in some sense for building *possible* moral systems. The analogy here is to Noam Chomsky's idea of a universal grammar, a basic linguistic tool kit that underlies all the languages of the world, but which nevertheless permits much variation in lexicon and grammar. Likewise, Hauser says, there is a suite of universal (innate) principles that strongly influence how all humans think about the nature of harming and helping others, but each culture has some freedom, within constraints, to determine how those principles are expressed. Although in many cultures religious beliefs have become the standard way to conceptualize or articulate moral intuitions, religious conviction is *not the origin* of those intuitions.

Hauser takes an evolutionary point of view and views the selective advantage of a universal moral grammar within our brains as a mechanism that facilitates

making rapid decisions when confronted with ethical dilemmas. Part of the substrate for a universal grammar must surely be the proclivity for cooperation, altruism and empathy that also appears to have evolved with the human species and that is demonstrated even in infants as young as 15-24 months.[172] From this perspective cooperation and ethics cannot be disentangled; they are simply two different views on the same facet of the human character. They are both supported by the same biological mechanisms which, according to evolutionary anthropologist Michael Tomasello, have:

> …very likely supported humans' earliest forms of complex collaboration and, ultimately, our unique forms of cultural organization, from the evolution of tolerance and trust to the creation of such group-level structures as cultural norms and institutions.[173]

Egalitarianism

Recall the assertion (possibly the most important made in this essay) that a cooperative society can be built where there is some reasonable effort to do so. That effort involves two parts, the first of which was discussed in the previous section, the personal struggle with ethics. We now turn to the collective struggle to establish a cooperative society, where the focus is on egalitarianism.

We have noted the communist attempt to impose material equality and found it to be a disastrous failure. However, we have also reviewed some of the accumulating evidence that more equal societies perform better on virtually all social indicators than less equal societies. Even the rich are happier. People appear to be deeply sensitive, even subconsciously so, to differences in social status and relationships. The greater the differences, the more tension people experience. The increased trust, cooperation and well-being that accompany greater equality are associated with a reduction in social stress.

The balance of equality

So the question arises – if 100% equality is both impossible and undesirable, and yet equal societies are happier, what should be the balance of equality/inequality? Those on the left and right of politics take different positions on this question because they attach different values to the achievement of equality over other goals, such as productive efficiency. We have suggested that there is a legitimate policy debate here because both equality and efficiency have a moral dimension. The moral requirement for productive efficiency places a legitimate constraint on the virtue of income equality. If talent and hard work are not rewarded, both productivity and cooperation suffer.

The Proutist solution has two components: first, to divide the Gross Domestic Product into two parts, one part to guarantee the minimum requirements of life to all and the other to reward effort and talent; and second, to set the maximum

income as a fixed ratio to the minimum income. As a community accumulates more wealth, the quantity and quality of the minimum requirements can be increased.

The commitment to egalitarianism in this incomes policy is evident in three respects. First is the commitment to provide the minimum requirements to all (humans, animals and plants). This corresponds to Marx's dictum – *to each according to need*. Second is the commitment to increase purchasing capacity by increasing the quality and availability of the minimum requirements:

> …increasing the purchasing capacity of each individual is the controlling factor in a Proutist economy. The purchasing capacity of common people in many undeveloped, developing and developed countries has been neglected; hence the economic systems of these countries are breaking down and creating a worldwide crisis.
>
> The first thing that must be done to increase the purchasing capacity of the common people is to maximize the production of essential commodities, not the production of luxury goods. This will restore parity between production and consumption and ensure that the minimum requirements are supplied to all.[174]

Third is the commitment *to reduce income inequality* by gradually reducing the gap between the maximum and the minimum income.

After the needs of all have been met, Sarkar proposes to reward those who have demonstrated talent and effort. Fairness and the desirability to maintain productivity justify such an approach.

> The concept of equal distribution is a utopian idea. It is merely a clever slogan to deceive simple, unwary people. Prout rejects this concept and advocates the maximum utilization and rational distribution of resources. This will provide incentives to increase production.[175]

Rewarding talent and effort can be interpreted as the *meritocratic* component of Prout because, quite obviously, those so rewarded will rise in social position. Many socialists oppose the meritocratic concept because, as the word implies, it can lead to the entrenchment of a class that monopolizes access to merit, thereby perpetuating its own power and privilege. Sarkar is clear that the necessity to reward talent should not be at the expense of needs (however they are defined in any particular age) and he also advocates checks and balances on public power. But the positive outcomes are too obvious to ignore: work satisfaction, work place efficiency, the possibility for self-improvement and so on. The productivity increase so achieved creates more wealth which can be used to increase the standard of 'needs'. However the egalitarian versus meritocratic impulses are always likely to be in political conflict – to hope otherwise is to hope for the discredited socialist utopia. Rather than ignore or suppress the associated political tensions, it is sensible to recognize them and provide a forum in which they can be expressed constructively.

Ultimately the degree of egalitarianism in a particular community and the rate at which egalitarian indicators can be increased is a matter of culture and collective social consciousness. These do not change easily, which is why the sudden imposition of equality will always fail if culture cannot sustain it.

The egalitarian principle in Neohumanism is referred to as the *Principle of Social Equality*. It is a social mentality as much as an economic state. And significantly it is defined in terms of needs:

> It is the realization that all the creatures which have come to live in this world, do not want to leave it – they all want to survive. Thus we must grant them their right to remain in this world, their right to survive. We must continue to fulfil all their needs so that they will not have to leave this world prematurely. We must make arrangements for the food, clothes, education, shelter and medical treatment of each and every individual, so that all can live in this world as long as possible, and become assets to the earth.[176]

In the context of Neohumanism, *creatures* is a reference to humans, animals and plants. Those who wish to create a better society, says Sarkar, will have to "stage a fight against all crude forces, a pauseless struggle against inequality and cowardliness". He then adds curiously that "complete one hundred percent equality is an impossibility", so for those wishing to create a better society, "Where is the opportunity for them to have rest?"[177] This is the way of the world – we must struggle for social equality while recognizing that complete equality is impossible due to the relentless dynamism of nature.

Coordinated cooperation

Sarkar makes a distinction between ordinary cooperation, coordinated cooperation and subordinated cooperation. He opposes subordinated cooperation and wants to promote coordinated cooperation:

> …for the maintenance of any organism, there must be a close cooperation between each of its component parts. Humanity is not inert, and the relationships between human beings depend on more than mere cooperation. This cooperation instead of being based on a master-servant relationship, must be constructed in a warmly cordial atmosphere of free human beings. It should be a coordinated cooperation and not a subordinated one.[178]

The features of coordinated cooperation that distinguish it from ordinary or "mere" cooperation are: 1) coordinated cooperation "must be constructed", that is, it is intentional; 2) the affect is positive for all concerned because part of the process is to create "a warmly cordial atmosphere"; and 3) coordinated cooperation must be voluntary, which is one of the internationally accepted principles of cooperation.

Although the distinction between coordinated and subordinated cooperation is quite general, Sarkar uses it most often in relation to the position of women in society:

> In the annals of human history we do find women whose memory glorifies not only womanhood, but the entire human world. In philosophy and spirituality, social reform and educational pursuits, science and technology, they stand second to none. Women are found discussing the riddles of philosophy, solving problems of social and educational reform, and are inspiring men in times of struggle. They have their potentiality no less than men. The difference in natural and biological characteristics between men and women speaks only of coordinated cooperation, not of subordinated cooperation.[179]

The progress of society is impossible when women are in a subjugated or subordinated position. Sarkar cites his own country as an example.

> Take the case of India. We are not as developed as we should be. Why? One of the reasons is that we have kept women confined within the walls of their homes, resulting in the progress of only fifty percent of the population – the males. And as only the men are progressing, they will have to carry the load of fifty percent of the population. Thus the speed of progress is reduced. Ideally, women should also move with their own strength and with the same speed as their male counterparts. In the process of movement, if they feel pain in their legs, if they fall on their faces, they should be physically lifted up. But not only women may need assistance: the males may also fall down, and then it will be the duty of women to extend their helping hand to carry the load of their male counterparts. We cannot expect that, in relation to men, the position of women will remain one of subordinated cooperation: it may also be one of coordinated cooperation. The position of males may even be one of subordinated cooperation. Nothing can be said emphatically in this world. The fact is that we must move together in unison with all.[180]

There are two points to note from this passage. First is the clear hint that, while the preferred future is coordinated cooperation, men could well find themselves in the subordinated position. There are surely enough clues in the changing dynamics of contemporary society to suggest this possibility. According to the UK trend forecaster Future Laboratory, "the future of business is feminine". In the wake of the Global Financial Crisis, even in the high powered world of global finance, women are now more sought after because they are more inclined to be team players and less inclined to take testosterone-fuelled risks.[181]

A second observation is that Sarkar never advocates the obliteration of "natural and biological" differences between groups as the solution to antagonisms between them. In order to bring an end to patriarchy, one might propose three possibilities: matriarchy, coordinated cooperation or androgyny. The first of these is a distinct possibility; the second is to be preferred but what about the

third? Androgyny could be understood as the attempt to stop gender exploitation by diminishing the physical and psychological differences between men and women. Sarkar never appears to favour this strategy. His approach to class antagonisms, for example, is not to impose material equality (communist states tried this and failed) but to allow class dynamics to unfold progressively while remaining vigilant against the tendency for one class to exploit the others.[182] More generally, the dynamics that arise from the interaction of the many different groups in society should be allowed to play out naturally. Differences naturally endowed can be used to help one another. Service psychology underpins Sarkar's approach to coordinated cooperation.

Political leanings

Those who believe that the left-right polarization of traditional politics will find no place to draw energy in a cooperative society presumably believe that policy debates with egalitarian implications, for example, concerning income ratios and minimum requirements, will be resolved by rational argument. However, the evidence suggests that the psychological factors which incline a person to favour a more conservative versus a more egalitarian position on such issues are not going to disappear even in a more cooperative society.

Recent research has shown that where a person is positioned on the political spectrum has physiological and genetic correlates. According to a U.S. study published in *Science*,[183] political views are an integral part of ones physiology. Forty-six volunteers were asked about their views on a range of political issues before measuring their physiological responses (interpreted as levels of fear) to a range of non-political stimuli, for example, sudden loud noises and frightening images (including pictures of a man with a large spider on his face and an open wound with maggots). "Those individuals with measurably lower physical sensitivities to sudden noises and threatening visual images were more likely to support foreign aid, liberal immigration policies, pacifism and gun control, whereas individuals displaying measurably higher physiological reactions to those same stimuli were more likely to favour defence spending, capital punishment, patriotism and the Iraq War." The researchers concluded that "the degree to which individuals are physiologically responsive to threat appears to indicate the degree to which they advocate policies that protect the existing social structure from both external (outgroup) and internal (norm-violator) threats".

A number of studies[184] suggest that political orientation has a genetic component. A study of 30,000 twins from Virginia, USA, found that identical twins are more likely than non-identical twins to give the same answers to political questions. The explanation appears to lie in other independent studies which show that some personality traits are highly heritable and that political leaning depends on those traits. For example, conscientiousness, openness, extroversion, agreeableness and neuroticism are all accepted as basic

components of personality and they are all known to be highly heritable. The first three are correlated with political persuasion. Republican voters in the USA score more highly on conscientiousness but Democrat voters score more highly on openness and extroversion.

There is much irony here for socialists, for they strongly support policies that stress the importance of nurture and yet their policy preferences (so the evidence suggests) betray an influence of *nature*.

From a Darwinian perspective, the health of a species depends on the existence of 'hidden' genetic variability within its populations. A genetically determined trait may be advantageous in one environment but not in another. The success of any species depends on maintaining diverse genetic resources. We may assume that the diversity of human personalities (and the consequent diversity of political views) serves an important purpose for human society as a whole but it also means that debates about egalitarianism run deep and will be with us for a long time to come.

The Future of Cooperation – Psycho-economics

Contemporary economics is divided into two disciplines: microeconomics and macroeconomics. Sarkar proposes dividing economics into four disciplines: people's economics, general economics, commercial economics and psycho-economics. Contemporary economics is primarily devoted to commercial interests. People's economics, by contrast, is concerned with the provision of the minimum requirements of life using local resources, and psycho-economics is concerned with satisfying subtler human aspirations.

> People's economy will be the main concern of undeveloped and developing countries, but psycho-economy will gain increasing importance in the future once the problems of subsistence are gradually solved. Psycho-economy will be of major importance in a highly developed and mechanized economy where people may only work a few hours a week and have much spare time.[185]

Sarkar divides psycho-economy into two branches. The first investigates the psychology, behaviours and institutional arrangements which make people more susceptible to economic exploitation. "The first and foremost duty of psycho-economics is to wage a tireless fight against all degenerating and dehumanizing economic trends in society." The second branch of psycho-economy hints at the subsequent development of neuro-economics and beyond.

> This branch is virtually unknown today, but it will become an extremely important branch of economics in the future. It will ensure equilibrium and equipoise in all levels of the economy. It will find new and creative solutions to economic problems to nurture the maximum utilization of psychic and spiritual potentialities. Psycho-economics will add to the glaring glamour of economics.[186]

Psycho-economics will surely develop in directions that we cannot yet imagine, but it nevertheless has practical relevance in today's world. In developed economies (by definition, those which can provide the minimum requirements of life to all), its most obvious expression will be cultivation of the fine arts[187] – not just to provide entertainment but to engage the individual and collective minds with more subtle feelings and thoughts. If building a cooperative society requires a constant struggle against individual selfishness and narrow social dogmas, the fine arts provide us with the inspiration to make that struggle because they can take one beyond limited ego and personal concerns. The fine arts have the potential to engender feelings of love, awe and respect for all the different peoples and living things in this world. They overcome barriers and build bridges of affection.

> The entire aesthetics is the only charming entity in human life. Had there been no aesthetics, human life would have been just like a desert. A slight touch of aesthetics in this anxiety-ridden life of human beings is just like an oasis in a desert. Art, architecture, literature, music – everything had its origin, had its starting point – where? Just at the common point of aesthetics and mystics.[188]

Earlier it was noted that the struggle to create an egalitarian society can succeed only as fast as culture and collective social consciousness are prepared to accommodate it. We now go a step further and argue that education and the fine arts provide the keys to changing culture and in combination they are the most powerful force for social improvement. As an example we can turn to the success of *El Sistema*, Venezuela's 32-year-old program of social action through music. This program has been so successful that it is now being emulated around the world. It is estimated that a million Venezuelan children have participated in El Sistema and currently a quarter of a million Venezuelan teenagers and children, most from impoverished backgrounds, are being filled with an "affluence of the spirit"[189] through the intensive study of music and participation in orchestras, choirs and ensembles. The goal of the program is to help disadvantaged children become fully participating members of society. The rationale is that the many skills required to play in an orchestra or sing in a choir can be translated to the wider social setting.

> When you work in the kind of ensemble musical activity that El Sistema fosters, you are essentially developing into a social being, a cooperative being, a non-violent being, someone who has the empathy to want to reach out and help others…[190]

Jose Antonio Abreu, founder of El Sistema, was asked why he made the unlikely choice of music for disadvantaged children rather than the more obvious choice of sports, especially soccer. Abreu acknowledged that sport has the virtue of being invigorating, motivating and promoting physical health. But disadvantaged youths have had the message drummed into them throughout their lives, "You are a loser." The problem with competitive sports is that 50

percent or more of them will continue to get the message reinforced, "You are a loser."

> This is one problem that we do not encounter with playing in a symphony orchestra because a symphony orchestra is a rare and unique organization, whose only purpose and only reason for being is to be in agreement with itself. We are a community and we all win simply by participating in it.[191]

A note of caution is probably in order here. The fine arts are essential for human well-being but they do not promise utopia. Hitler and Stalin attempted to co-opt artists and musicians in the service of their tyranny. Those who did not succumb were killed or sent to prison camps. The American music critic Alex Ross has described "the awful warping effect that happened, in classical music in particular" as a result of the engagement of Nazi Germany with the fine arts. "You can see the danger of artists becoming too involved with politics and being too impressed with politicians who take an interest in art."[192]

The message is clear. Politicians must not be allowed to use the arts for their own ends and yet it is their duty to create a social and economic environment in which the arts can flourish. The vindication of this approach can be seen in the El Sistema project.

> I would love to be able to say that the problems of gang violence and poverty [in Venezuela] have gone away completely but what I can say [about Abreu's system] is that over the years, with a million children having gone through this system, those who have experienced it are among the most brilliant, poised, self-assured, curious, engaged young leaders of the future that I have ever met. I think that is about as good a sign of a system that works and frees people from the shackles that they were… born into and might have been fettered with for the rest of their lives, as any could possibly be.[193]

Conclusion

A healthy human society can only be founded on a social theory that recognizes humans as multidimensional beings, that is, as having metaphysical and spiritual aspirations in addition to their physical aspirations. Given the history of utopian visions gone wrong, it is important to guard against naivety – a cooperative society will not be established without struggle and without a commitment to cardinal human values and Neo-ethics. Human beings are both selfish and cooperative – our struggle is to encourage the latter in as many ways as possible and to control the former in as many ways as possible.

Cooperation must not be allowed to become another dogma. Coordinated cooperation will require a good scientific understanding of the physiological, psychological and environmental factors which encourage cooperation and those which do not. The research to date offers good grounds for optimism. Human beings have a strong genetic and physiological foundation on which to

build a better society and there is every reason to suppose that a cooperative society can be built given any reasonable effort in that direction.

We conclude with Sarkar's definition of society because it encapsulates many of the ideas developed in this article.

> The concerted effort to bridge the gap between the first expression of morality and establishment in universal humanism is called "social progress". And the collective body of those who are engaged in the concerted effort to conquer this gap, I call "society".[194]

The phrase "first expression of morality" clearly implies the emergence of a natural system of morality, certainly not one that was imposed from the outside. We might speculate that this occurred sometime in the late Palaeolithic (Old Stone Age) or early Neolithic (New Stone Age) when there is clear evidence for aesthetic expression and burial of the dead with artefacts. Aesthetics and ethics are closely linked in the Eastern understanding of developmental psychology.[195]

The term *universal humanism* is clearly an anticipation of Neohumanism (the above definition dates back to 1957). A society established in Neohumanism would accept Neo-ethics as its moral compass and would enjoy a degree of egalitarianism such that remaining class and group differences would not provoke disruptive social antagonisms. We cannot reasonably expect such a society to be achieved anytime in the near future, but without the vision, it is not possible to take steps in that direction.

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Michael Towsey studied biology at Auckland University (New Zealand) in the late 1960s and later obtained his PhD in computer science from Queensland University. For most of his career Michael has been a research scientist. He started in the field of plant physiology, moved to crop physiology and after obtaining his PhD turned to biological applications of machine learning. Michael is a founding member and associate of Prout College. In relaxed mode, he plays in two recorder ensembles and potters around in a community garden.

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Note: In the following endnotes, a space may have been inserted into some URLs in order to facilitate formatting. If a URL does not work, check for the insertion of a gap.

Endnotes

[1] Prout (the Progressive Utilization Theory) is the socio-economic theory developed by the Indian philosopher, Prabhat Ranjan Sarkar (1921-1990).

[2] Sarkar, P. R. "Cooperatives" (PE), p 128. For a more general introduction to Prout read, *After Capitalism – Prout's Vision for a New World* by Ac. Maheshvarananda Avt., Proutist Universal Publications, ISBN: 1-877762-06-7, First Edition 2003.

[3] Sarkar, P. R. "Shudra Revolution and Sadvipra Society", (HS2).

[4] Towsey, Michael. "The Three-Tier Enterprise System", in *Understanding Prout – Essays on Sustainability and Transformation*, *Volume 1*, Proutist Universal Australia, 2009.

[5] Bihari, Pranav. *What factors led to the emergence and early growth of the British co-operative movement in the 19th century?* Unpublished master's thesis, 2009, London School of Economics and Political Science, UK. http://pranavbihari.wordpress.com/

[6] Engels, Fredrick. *Socialism: Utopian and Scientific*, Marx/Engels Selected Works, Volume 3, pp 95-151, Progress Publishers, 1970. First published 1880. Download Version: Marx/Engels Internet Archive, http://www.marxists.org/archive/marx/works/index.htm.

[7] Russell (HWP) p 747.

[8] The International Cooperative Alliance. *ICA Membership Statistics. 2007*, retrieved 5 August 2008 from http://www.ica.coop/members/member-stats.html. The ICA defines cooperatives as "collectively owned and democratically controlled economic enterprises".

[9] Many of Australia's most successful cooperatives in the agricultural sector have fallen prey to large corporations seeking to privatize capital that was accumulated cooperatively. The push to demutualize cooperatives has succeeded for at least two reasons: 1) large cooperatives were finding it difficult to obtain finance from private financial institutions to expand their operations, and 2) the shareholders/owners of cooperatives, many of them farmers, had forgotten why their cooperatives had been formed in the first place and the advantages of them.

[10] A friendly or mutual society is a mutual association for insurance, pensions, savings and loan-like purposes. Many still exist today. http://en.wikipedia.org/wiki/Friendly_societies

[11] The word *communism* can be used in two senses. As used by Marxist socialists, it refers to the ideal classless society expected to be formed after the overthrow of capitalism and an intermediate period of socialism. Its second more common use refers to those states, such as the USSR and China, which attempted to implement the Marxist social agenda. This essay uses the term in the second sense. We use the phrase *classless society* to refer to the more formal notion of a communist society.

[12] The difference between a social enterprise and a cooperative is partly one of definition. Yet the difference may be important. A cooperative has a distinct legal structure that defines the shared ownership of assets and a more democratic management structure. Social enterprises, on the other hand, according to the Wikipedia entry under that heading, are "social mission driven organizations which trade in goods or services for a social purpose… It could be that the profit (or surplus) from the business is used to support social aims (whether or not related to the activity of the business, as in a charity shop), or that the business itself accomplishes the social aim through its operation, for instance by employing disadvantaged people (social firms) or lending to businesses that have difficulty in securing investment from mainstream lenders." Missing from this definition are explicit statements concerning the ownership of capital, amount of surplus returned to workers and management style.

[13] Pearce, John. *Social Enterprise in Anytown*. Calouste Gulbenkian Foundation, 2003.

[14] The English philosopher Thomas Hobbes (1588-1679) argued in a famous treatise, *Leviathan*, that all 'men' are equal in nature, but by nature they desire their own liberty and to acquire dominion over others. From these impulses arises a war of all against all, which makes life "nasty, brutish and short". Unlike bees and ants, human beings cannot cooperate because their nature is to compete. Strong centralized government alone can prevent the brutishness of life from overwhelming society.

[15] Cole, George D. H. *A Century of Cooperation*, George Allen and Unwin Ltd. for The Cooperative Union Ltd. First Edition, 1944. Downloadable from: http://www.archive.org/stream/centuryofcoopera035522mbp/centuryofcoopera035522mbp_djvu.txt. Cole is a noted historian of the cooperative and socialist movements in Britain from the 18th century through to the early 20th century. See also Cole, *A History of Socialist Thought*, 7 Volumes. The Wikipedia entry http://en.wikipedia.org/wiki/G._D._H._Cole offers a complete list of Cole's works.

[16] The opening paragraph of *A Century of Cooperation* (Cole, ibid) offers a deeply-felt introduction to the times: "The decade in which the Pioneers of Rochdale founded their Cooperative Store is known to historians as 'The Hungry Forties'. It deserves the name, not only on account of the devastating famines which swept Ireland when the potato harvests failed, but hardly less for the sufferings experienced by the working classes in Great Britain. The great enlargement of the powers of production which followed upon the new inventions in the textile industries and on the application of steam-power to manufacture and transport ought, had it been rightly used, to have added largely to the wealth and prosperity of the entire people: in fact, it inflicted upon them monstrous hardships which still arouse bitter indignation when one looks back upon them from the vantage point of today. One sees a hard generation of employers grinding the faces of the poor, and even making a merit of so doing, with the support of the orthodox economics of the day and of an other-worldly religion which taught that the 'deserving poor' would be richly compensated for their sufferings in this world by their blessings in the next."

[17] The first consumer cooperative may have been founded on 14 March 1761, in a cottage in Fenwick, East Ayrshire, when local weavers manhandled a sack of oatmeal into John Walker's front room and began selling the contents at a discount, forming the Fenwick Weavers' Society. George Cole (ibid) claims that the originators of the cooperative business were "workmen employed by the government in the dockyards of Woolwich and Chatham, who, as early as 1760, had founded corn mills on a Cooperative basis as a move against the high prices charged by the corn-millers who held the local monopoly. These early Societies speedily found themselves in conflict with the private bakers as well as with the millers; and when, in 1760, the Woolwich Mill was burnt down, the local bakers were accused of arson, a charge which they rebutted in a statement sworn before the Mayor. To this burning we owe our knowledge of this early Cooperative mill, and also of the mill at Chatham…"

[18] For example, Lockhurst Lane Industrial Cooperative Society (founded in 1832 and now Heart of England Cooperative Society), and Galashiels and Hawick Cooperative Societies (1839 or earlier, now Lothian, Borders and Angus Cooperative Society).

[19] Cole, George. *The British Cooperative Movement in a Socialist Society*, Allen and Unwin, London, 1951.

[20] Bihari, Op. Cit.

[21] The Benthamites were an extremely influential group of British philosophers, jurists and social reformers in the first half of the 19th century. They were named after Jeremy Bentham (1748-1832) and also included James Mill, John Stuart Mill and (for a time)

Robert Owen. The Benthamites are best remembered for their advocacy of *utilitarianism* as a social ethic because they believed it to promote individual and economic freedom. To this end they also advocated free trade. Their social agenda included animal rights, the separation of church and state, equal rights for women, the abolition of slavery and the death penalty, the right to divorce and the decriminalization of homosexual acts.

[22] Owen never embraced Marxist communism. Rather it seems Engels is attempting to co-opt those parts of Owen's program that he finds amenable to his own.

[23] Engels, Fredrick. *Socialism: Utopian and Scientific*, Marx/Engels Selected Works, Volume 3, pp 95-151, Progress Publishers, 1970. Download Version: Marx/Engels Internet Archive, http://www.marxists.org/archive/marx/works/index.htm

[24] Henri de Saint-Simon (1760-1825): a French utopian philosopher and founder of French socialism. Like all the utopian socialists, he was opposed to class revolt and instead attempted to implement his ideals by moral appeal to those in power.

[25] The four principles presented here are modified from Roger Scruton, *A Dictionary of Political Thought*, Pan, 1982.

[26] Owen, Robert. *A New View of Society*, First Edition, 1813, p 9.

[27] Owen, ibid, p 12, emphasis in original.

[28] James was father of the more famous John Stuart Mill, who helped to develop the ethical and theoretical foundations of neoclassical economics.

[29] As quoted by Russell (HWP) p 747.

[30] Ibid.

[31] New Harmony survives today as a town in Indiana. See http://en.wikipedia.org/wiki/New_Harmony%2C_Indiana, link valid 12 December 2009.

[32] See the Wikipedia entry on Robert Owen under the heading *Community Experiment in America (1825)* http://en.wikipedia.org/wiki/Robert_Owen

[33] Warren, Josiah. *Periodical Letter II*, 1856, as quoted in the Wikipedia entry, ibid.

[34] Contemporary neoliberalism can be understood as the 20th century manifestation of laissez-faire capitalism.

[35] Stretton (ENI) p 101.

[36] Gunnell, Barbara. "A bend in the river", *Griffith Review* **25**, September 2009. Also an interview with B. Gunnell by Geraldine Doogue on ABC Radio National, Saturday Extra, 22 August 2009, http://www.abc.net.au/rn/saturdayextra/stories/2009/2662879.htm

[37] Just as today, most 19th century academic economists were out of touch with the realities of poverty. They published essays on the six kinds of poverty, four of which were culpable because they were the outcome of a failure of will. To help the poor was morally wrong. To give shoes to a poor person, for example, would weaken their will to purchase their own pair of shoes. See Gunnell, ibid.

[38] It is worth remembering that bankruptcies do not diminish the ardour of capitalists for private enterprise.

[39] Marx, Karl and Engels, *Communist Manifesto*, Source: Marx/Engels Selected Works, Volume One, Progress Publishers, Moscow, USSR, 1969, pp 98-137; first published 1848.

Translated: Samuel Moore in cooperation with Frederick Engels, 1888. Download Version: Marx/Engels Internet Archive, http://www.marxists.org/archive/marx/works/index.htm

[40] Engels, Op. Cit.

[41] Cole, *A Century of Cooperation*, chapter 10, Op. Cit.

[42] Ibid.

[43] Cole, *A Century of Cooperation*, chapter 11, Op. Cit.

[44] In *Critique of the Gotha Program*, (Section 3) Marx makes it clear that the cooperative mode of production had no worth in itself and was of interest only to the extent that it represented the struggle of workers "to revolutionize the present conditions of production". Here is the entire passage: "That the workers desire to establish the conditions for cooperative production on a social scale, and first of all on a national scale, in their own country, only means that they are working to revolutionize the present conditions of production, and it has nothing in common with the foundation of cooperative societies with state aid. But as far as the present cooperative societies are concerned, they are of value only insofar as they are the independent creations of the workers and not protégés either of the governments or of the bourgeois."

[45] George Cole, Op. Cit., possibly the best historian of 19th century cooperation and socialism, was himself a member of the Fabian society for a short period.

[46] Harold Lydall. *Yugoslav Socialism: Theory and Practice*, Oxford: Clarendon Press, 1984. See also a review of this book by André Sapir in *The Economic Journal*, September 1985, pp 820, http://www.jstor.org/stable/2233060?seq=2, link valid 23 December 2009.

[47] As quoted by Sapir, ibid.

[48] Russell (HWP) p 696.

[49] The following exposition on Nietzsche is due entirely to Bertrand Russell, (HWP), Chapter XXV.

[50] Nietzsche, *Beyond Good and Evil*, as quoted by Russell, (HWP) p 731. The italics are in Nietzsche's original text.

[51] Russell (HWP) p 736.

[52] Actually Russell refers to the "absence of *sympathy*" which he defines as "being made unhappy by the suffering of others". Empathy is a broader concept than sympathy (see for example, the distinction at http://www.toddlertime.com/mh/terms/empathy.htm). I have chosen to use the word *empathy* (the word Russell might have used if writing today) in order to be consistent with what is to come.

[53] Partridge, Ernest. *Evil as the Absence of Empathy*, Atlantic Free Press, 14 August 2008, http://www.atlanticfreepress.com/news/1/4519-evil-as-the-absence-of-empathy.html

[54] At this point it is helpful to clarify the differences in nuance between morality and ethics. Here are the Oxford American Dictionary definitions. *Morality*: "principles concerning the distinction between right and wrong or good and bad behaviour" and "a particular system of values and principles of conduct, esp. one held by a specified person or society" e.g., bourgeois morality. *Ethics*: "moral principles that govern a person's or group's behavior" and "the branch of knowledge that deals with moral principles". Clearly these definitions overlap. Over the 200 years which this essay spans, usage of these words has changed somewhat. Today, use depends on context. Morality is used in a normative context and ethics in a professional or philosophical context. In this essay, the words tend to be used

interchangeably, depending on context and the word used by the author under consideration.

[55] Blackledge, Paul. "Marxism and ethics", *International Socialism – A Quarterly Journal of Socialist Theory*, Issue: 120, International Socialism, London, 2008. Web: www.isj.org.uk. Blackledge is citing Terry Eagleton.

[56] Blackledge, ibid.

[57] Blackledge, ibid.

[58] Blackledge, ibid.

[59] For a brief description of the classless society, see the Wikipedia entry: http://en.wikipedia.org/wiki/Classless_society

[60] Engels, Op. Cit.

[61] Ibid.

[62] This famous slogan appears in Part I of *Critique of the Gotha Program* by Karl Marx (1875). However Marx did not invent it. It was common to the socialists of the 19th century and can be traced to the utopian socialist Henri de Saint Simon. See http://en.wikipedia.org/ under the heading "From_each_according_to_his_ability,_to_each_according_to_his_need".

[63] It should be remembered that the principles of genetic inheritance were only gradually elucidated in the second half of 19th century and first half of 20th century, and of course their basis in DNA was not understood until the 1950s.

[64] Lysenko came to prominence in the 1930's during the crisis brought about by forced collectivization of Soviet agriculture. He denounced the geneticists of his day as "fly-lovers and people haters" – fly-lovers because, at the time, the principles of genetics were being elucidated by breeding experiments with fruit flies, a research preoccupation which appeared to have little relevance to the plight of Soviet agriculture. In 1948, genetics was denounced as a bourgeois pseudoscience and prominent geneticists were executed or sent to labour camps. A ban on genetics research was not lifted until the mid 1960's by which time immense damage had been done. Lysenkoism also spread to other communist countries and was not eradicated from China until long after it was denounced in the Soviet Union.

[65] See, for example, the Wikipedia entry on Lysenko. But note also the caution expressed concerning the extent to which Lysenko's rise can be attributed to ideological as opposed to political reasons. http://en.wikipedia.org/wiki/Lysenkoism

[66] James Wood in an interview on the ABC, Radio National, The Book Show, 11 May 2009, 10am, http://www.abc.net.au/rn/bookshow/stories/2009/2566126.htm concerning his essay "A Fine Rage", *The New Yorker*, 13 April 2009, p 54, http://www.abc.net.au/rn/bookshow/stories/2009/2566126.htm

[67] Russell (HWP).

[68] Muravchik, Joshua. *Heaven on Earth: The Rise and Fall of Socialism*, Encounter Books, ISBN 1-893554-45-7, 2002.

[69] Russell (HWP) p 508.

[70] Sarkar, P.R. *The Liberation of Intellect*. AM Publications, 1982.

[71] Stretton (ENI) p 36.

[72] The author believes it was John Kenneth Galbraith who observed that conservatism represents the age old endeavour to find the moral high ground for selfishness!

[73] Sarkar, P. R. "Suppression, Repression and Oppression", in (PN17) and (ElEdit), 1989.

[74] See the Wikipedia entry on the Fabian Society, http://en.wikipedia.org/wiki/Fabian_Society, for a picture of its logo. The emblem is inspired by Aesop's fable, *The Tortoise and the Hare*.

[75] Sarkar, "Shúdra Revolution and Sadvipra Society", Last chapter in (HS2). In his socio-economic writings Sarkar often writes from the perspective of an historian. Indeed, in *To the Patriots* he notes, "Politics is neither my hobby nor my profession. I am a student of history." Sarkar often makes direct and indirect references to historical debates and understanding these references helps to understand Prout.

[76] Ibid.

[77] Ibid.

[78] Sarkar, P. R. "Art and Science". Published in *Ánanda Vacanámrtam, Part 14*, First Edition, originally published in *A Few Problems Solved, Part 4*, 1979.

[79] Sarkar, P. R. "Suppression, Repression and Oppression", in (PN17) and (ElEdit), 1989.

[80] Sarkar, P. R. "The Excellence of God-Centred Philosophy", in (PN18).

[81] At the time of writing this paragraph in July 2009, the Global Financial Crisis is still unfolding and its impact on the future of capitalism is not yet fully understood.

[82] Fox, Justin. "Blame Them: Who got the U.S. into this financial mess?" *Time* magazine, 12 January 2009, p 31.

[83] Ibid, pp 39.

[84] Richardson, Susan. "Why do Women make Hopeless Economists? (Or fail to succeed playing man-made economics by men's rules." *Economic Papers*, vol **17**, 1 March, 1998. As quoted in Stretton, H. (1999) p 236.

[85] Richardson, 1998, ibid.

[86] Richardson, 1998, ibid.

[87] Hazeldine, Tim. *Taking New Zealand Seriously – the economics of decency*. Auckland: Harper Collins Publishers, 1998. Chapter 8.

[88] As reported in the Brisbane evening paper, *mX*, 3 April 2009, under the heading "Coke must correct false health claims".

[89] See the Wikipedia entry on Placebo for further information (http://en.wikipedia.org/wiki/Placebo). According to another study, the response to a placebo increased from 44% to 62% when the doctor gave them with "warmth, attention, and confidence".

[90] Pine, Karen. http://www.timesoftheinternet.com/60522.html. A study done at Hertfordshire University, England, 2009.

[91] http://www.beerprofits.com/progressivegrocer/content_display/supermarket-industry-news/e3i41aefa9b7ae8b6123a75022f77788844

[92] Khamsi, Roxanne. "Envious monkeys can spot a fair deal." *New Scientist*, 13 November 2007. Original report in *Proceedings of the National Academy of Sciences* (DOI:

10.1073/pnas.0707182104). http://www.newscientist.com/article/dn12913-envious-monkeys-can-spot-a-fair-deal.html, valid link 27 January 2010. See also Frans B. M. de Waal, "How Animals Do Business – Humans and other animals share a heritage of economic tendencies – including cooperation, repayment of favours and resentment at being short-changed", *Scientific American*, April 2005. http://www.rijnlandmodel.nl/achtergrond/sociologie/samenwerking_dieren_waal.htm

[93] Powell, Kendall. *Economy of the Mind*, PLoS Biology, **v1**(3) p 312, 2003.

[94] Sarkar (I&I) p 133.

[95] Hazeldine, 1998, Op. Cit.

[96] Jesson, Bruce. *Only Their Purpose is Mad – The money men take over New Zealand*, The Dunmore Press, 1999. ISBN 0 86469 343 5.

[97] Jesson, 1999, ibid.

[98] The author has read various versions of this famous remark. Davies (EC) cites B. Toohey, *Tumbling Dice*, William Heinemann Australia, Melbourne, 1994, p52.

[99] Russell, (HWP) p 745. Ethical systems that determine the virtue of an action by its consequences are known as *consequentialist*. Utilitarianism is just one example of *consequentialism.* Consequentialism is to be contrasted with systems of ethics that find virtue in *duty*, or *intention* or the *law of God*.

[100] Smith, Adam. *An Inquiry into the Nature and Causes of the Wealth of Nations*. First Edition, 1776. Accessible through chapter headings at http://www.adamsmith.org/smith/won-index.htm

[101] Davies (EC) p 47.

[102] Chomsky, Noam. "The Masters of Man" in *Notes of NAFTA*, 1993. http://www.chomsky.info/articles/199303--.htm

[103] Altman, Daniel, "Managing Globalization". In: Q & A with Joseph E. Stiglitz, Columbia University and *The International Herald Tribune*, 11 October 2006. http://blogs.iht.com/tribtalk/business/globalization/?p=177. The quoted passage is part of an answer to the following question: Q. What I find difficult to imagine is why a "superior authority," such as the government or an international organization, would be able to regulate/decide what is the best trading strategy for any given country/region/community. Why shouldn't we let the free market forces determine what is the best for the world? What is your opinion on the issue of free worldwide market forces versus regulation?

[104] The author became aware of this research as a result of a letter from Murray Cree to Geraldine Doogue, the presenter of Saturday Extra, Australian Broadcasting Corporation, Saturday 4 April 2009, http://www.abc.net.au/rn/saturdayextra/default.htm. The figures cited are those supplied in Cree's letter. Cree states that the research was published in the Certified Practicing Accountants Journal 1993. It is also cited in Murray Cree and Geoffrey Baring, "Desperately Seeking Ethics", *Australian Accountant* (July):25-26, 1991.

[105] Billen, Andrew. "Goodbye to glib gurus and their gobbledygook**",** *The Times Online*, 9 March 2009

[106] Daniel Gross. *Why Harvard Is Bad for Wall Street – Obscure Economic Indicators: Harvard Business School graduates on Wall Street*. SLATE: Posted 19 November 2004

[107] Leslie Wayne. "A Promise to Be Ethical in an Era of Immorality", *The New York Times*, Times Reader 2.0, 2009, http://www.nytimes.com/2009/05/30/business/30oath.html

[108] Ibid.

[109] The invisibility of power in the contemporary teaching of university economics would appear to be an example of what the Portuguese philosopher and co-founder of the World Social Forum, Boaventura de Sousa Santos, calls *abyssal thinking*. Abyssal thinking creates systems of visible distinctions in order to render other more fundamental distinctions invisible. In the case of mainstream Western economics, the visible distinction is the tension between distributive rationality and distributive justice and the invisible distinction is between the economically powerful and those colonized. According to de Sousa Santos, "the struggle for global social justice must be a struggle for global cognitive justice as well. In order to succeed, this struggle requires a new kind of thinking, a post-abyssal thinking." See Boaventura de Sousa Santos (2007) *Beyond abyssal thinking: From global lines to ecologies of knowledges*. http://www.eurozine.com/articles/2007-06-29-santos-en.html

[110] This is a reference to a statement of Margaret Thatcher (cited by Davies, 2004, p 38) that *monetarism* (the monetary policy of neoliberalism) is not just a theory but is as "essential as the law of gravity".

[111] Davies (EC) *Is neoclassical theory scientific?* Part 6, p 62

[112] This is the title of an editorial in *The Australian*, 2 April 2009, p. 13. For the benefit of non-Australian readers, *The Australian* is an extremely conservative, yet very influential daily newspaper. The editorial was prompted by a well-publicized speech given by the Prime Minister, Kevin Rudd, in St. Paul's Cathedral, London, in which he castigated the "false god" of "unfettered free markets". According to the editorial, Mr Rudd overlooked the fact that world markets are "in the process of self-correcting". The editorial conveniently did not mention that the self-correction required many billions of tax-payers money, leaving a public debt that will require a decade or more to repay.

[113] Geoff Davies sums up capitalism thus: "The theory is bunk and the practice is ruining the world." Davies (EC) p 15.

[114] The characteristics of fascism are similar across cultural boundaries. Japanese society just prior to World War Two was not dissimilar to that of Italy and Germany – characterized by imperialism, militarism, racism and social stratification. Torture and propaganda were important instruments of the state, used to maintain order and ideological purity.

[115] Sarkar, P. R. "Social Psychology", in *Tattvika Praveshika*, First Edition, 1957, in (ElEdit).

[116] As quoted by Roger Lewin, *Complexity*: *Life at the Edge of Chaos*, ISBN:0020147953 / 9780020147954 / 0-02-014795-3. Simon and Schuster. Churchland goes on to acknowledge that although she does not believe in Cartesian dualism, "we cannot claim to have ruled it out".

[117] Wilbur, Ken. *Eye to Eye: The Quest for the New Paradigm*. First Edition, 1984. Third Revised Edition, 2001: ISBN 1-57062-741-X.

[118] Sarkar, P. R. "Talks on Education: Basic Differences in Attitude between the East and the West", in (ElEdit).

[119] Shrii Shrii Anandamurti. "Tantra and its Effect on Society", in *Discourses on Tantra*, *Volume 2*, AM Publications, 1994. Original discourse, 1959.

[120] Sarkar, P.R. *Ananda Marga: Elementary Philosophy.* 1963. First Bengali Edition, 1955. First English Edition, 1961. In (ElEdit).

[121] This terminology was introduced by Sarkar in the context of his theory of Microvita. The theory lies outside the scope of this essay but may be the subject of a future essay in this series.

[122] Sarkar, P. R. *The Supreme Question – 1*, 1957, in (ElEdit).

[123] Wilbur, Ken. *Eye to Eye*, Op. Cit.

[124] Towsey, Michael. "Water and Land Management – A Foundation for Economic Planning in Australia", *Understanding Prout*, *Volume 1*, 2010.

[125] The concept of social capital finds its place in Proutist economics as a *metaphysical potentiality* of the collective body. The third fundamental principle of Prout states: "There should be maximum utilization of the physical, metaphysical and spiritual potentialities of unit and collective bodies of human society", Sarkar (PE) p 7.

[126] Hazeldine, Op. Cit.

[127] Putnam, Robert D. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster, 2000.

[128] I Kawachi, B. P. Kennedy, K. Lochner and D. Prothrow-Stith. "Social capital, income inequality, and mortality". *American Journal of Public Health*, **Vol. 87**, Issue 9 pp 1491-1498, 1997. American Public Health Association.

[129] Hazeldine, Op. Cit.

[130] Sarkar, P. R. *The Liberation of Intellect – Neohumanism*. AM Publications, 1982.

[131] Bussey, Marcus. "Education for Liberation" in *Understanding Prout*, *Volume 1*, 2010.

[132] Implicit in Sarkar's synthesis of sentiment and rationality is a new approach to science – that science can only be of benefit to society if it is motivated by a Neohumanistic sentiment.

[133] Russell (HWP) pp 737. Russell asks, "Suppose we wish – as I certainly do – to find arguments against Nietzsche's ethics and politics, what arguments can we find?" After two pages of argument to and fro, he finally concludes, "But I think the ultimate argument against his philosophy… lies not in an appeal to facts, but in an appeal to the emotions. Nietzsche despises universal love; I feel it the motive power to all that I desire as regards the world."

[134] This is the catchy title of a book by Candace Pert, *Molecules of Emotion: The science behind mind-body medicine*, Scribner, 1997. ISBN 0-684-84634-9.

[135] Zak, Paul, R. Kurzban and W. Matzner. "The Neurobiology of Trust". *Annals of the New York Acadamy of Sciences*, **1032**: pp 224-227, 2004. See also URL2 http://abc.net.au/catalyst/stories/s1481749.htm.

[136] "Nasal spray gives hope on autism". *The Sunday Times*, February 14, 2010. http://www.timesonline.co.uk/tol/life_and_style/health/article7026369.ece, link valid 16 February 2010.

[137] Newby, Jonica. *Making love not war*. Catalyst, ABC TV, 20 September 2007. http://abc.net.au/catalyst/stories/s2038245.htm

[138] The reader may ask if experiments with monkeys have any relevance to human social behaviour because our social conditioning can sublimate or repress physiological tendencies. But this is exactly the point. It is difficult in humans to know the extent to which subtle and altruistic behaviour is 'natural' because our social conditioning is so

pervasive. Monkey experiments point to the natural physiological foundations of human behaviour presumably without the same degree of social conditioning. But there is *an extremely important caveat*. The information so obtained must be extrapolated to humans with much caution. A large body of experimental work on the 'economic' behaviour of chimpanzees turns out not to be so relevant to humans because chimps lack the all important 'trust' gene (producing vasopressin). On the other hand, comparisons between chimps and bonobos appear to tell us a lot about the influence of the vasopressin gene.

[139] Zak, Paul. "Trust". *Capco Institute Journal of Financial Transformation*. **v7**: pp 13-21, 2003.

[140] Ibid.

[141] Wilkinson, Richard and Kate Pickett. *The Spirit Level: Why More Equal Societies Almost Always Do Better*, Allen Lane, 5 March 2009. ISBN: 9781846140396.

[142] Inequality was measured as the ratio of the average income of the richest 20% to that of the poorest 20%. Japan was the most equal nation in the study with a ratio of 3.5. Australia was well down the list along with Britain at 7.0. The USA had even higher inequality.

[143] See a review of *The Spirit Level* at the Penguin web site, http://www.penguin.co.uk/nf/Book/BookDisplay/0,,9781846140396,00.html.

[144] Experiments with brain scans throw further interesting light on this claim. In a study of 20 pairs of men who were asked to share money, it was discovered that the sharing promoted activity in those parts of the brain that process pleasureable rewards. Even when the richer of the two men said he wanted more of the money, in fact his brain scan indicated the opposite was true. Acording to the leader of the research team this apparent incongruity "highlights the idea that even the basic reward structures in the human brain are not purely self-oriented". The study was originally published in *Nature*, February 2010. For further information see a report by Marlowe Hood, "Subconsciously, humans want to share the wealth", http://uk.news.yahoo.com/18/20100224/tsc-subconsciously-humans-want-to-share-c2ff8aa.html. Link valid 26 February 2010.

[145] There is a curious exception to this statement – rates of suicide tend to be higher in countries with *more* equality. In an interview on ABC Radio, the authors Wilkinson and Pickett offered an interesting explanation – that in unequal societies people tend to blame others if their lives go wrong, whereas in more equal societies people are more likely to blame themselves. In unequal societies, violence is directed outwards; in equal societies it is directed inwards. ABC, Radio National, Saturday Extra, 6 June 2009, 7:30am. http://www.abc.net.au/rn/saturdayextra/stories/2009/2589596.htm

[146] Brosnan, Sarah F. & Beran, Michael J. "Bartering behaviour between conspecifics in chimpanzees, Pan troglodytes". *Journal of Comparative Psychology*. May, 2009. See also a report at http://www.world-science.net/exclusives/090522-trade.htm.

[147] Gunnthorsdottir, Anna. "Notes and Ideas – a behavioural economist nominates the five books that can explain the games people play". *The Australian Literary Review*. Issue 1, Volume 1, p 29, 5 September 2006.

[148] Sarkar, P.R. "Shúdra Revolution and Sadvipra Society" (HS2).

[149] The ten principles are known as *Yama and Niyama*. The terminology is Sanskrit because they have their origins in the ancient practice of yoga. See Sarkar, *A Guide to Human Conduct*, 1957 (ElEdit). See also Bussey, "Education for Liberation" in *Understanding Prout, Volume 1* for a further account of the *Yama* and *Niyama* and their importance in

Neohumanist education. Sarkar appears to use the terms *cardinal human values* and *cardinal human principles* interchangeably.

[150] Sarkar, P. R. "Talks on Prout", Section: Papa and Punya [Sin and Virtue], in (PN15). It should be noted that the English word *sin* is a translation of the Sanskrit *papa*. It does not have a religious connotation.

[151] In the original Sanskrit, this principle is known as *Brahmacarya*.

[152] See the Wikipedia entry on exploitation, http://en.wikipedia.org/wiki/Exploitation

[153] A moral person refrains from hurting another, not for fear of punishment but because he/she experiences disquiet about the pain inflicted on the victim. Empathy stops what anger, greed or passion might like to pursue. In other words, empathy, not punishment, guides the moral person in good conduct.

[154] Deep ecology was developed by Aerne Naess and shows the influence of Mahatma Ghandi's brand of Hindu philosophy.

[155] The role of empathy in traditional socialist philosophy is filled by *solidarity*, but it only appears to manifest when one follows the correct political line.

[156] Fitzgerald, Jennifer. "Rekindling the Wisdom Tradition" in *Transcending Boundaries*, Gurukula Press, Australia, 1999.

[157] Sarkar, P. R. "Sin, Crime and Law" in (PN12).

[158] The word obscene was used by Scottish National Party energy spokesman Richard Lochhead. http://www.spinprofiles.org/index.php/Scottish_Power

[159] In the original Sanskrit, this principle is known as *santosa*. Human desires know no limit and if some effort is not made to control them, much social harm results. Sarkar would consider the excessive salaries pursued by CEOs in contemporary times to be a moral malady. "Millionaires want to become multimillionaires, because they are not satisfied with their million. Ask the millionaires if they are happy with their money. They will say, 'Where is the money? I am somehow pulling on.' This answer indicates their ignorance of *aparigraha* [non-acquisitiveness]. But such feelings have another adverse effect on body and mind. Out of excessive fondness for physical or mental pleasures, people become mad to earn money and amass wealth. As money becomes the be-all and end-all of life, the mind gets crudified." To maintain contentment, says Sarkar, "one has to make a special type of mental effort to keep aloof from external allurements" and to avoid coming "under the sway of excessive greed".

[160] Simms, Andrew. "A salary cap for everyone", *The New Economics Foundation*, 7 August, 2009. http://neftriplecrunch.wordpress.com/2009/08/07/a-salary-cap-for-everyone/, link valid 27 January 2010. See also Simms, "Now for a maximum wage – A pay ceiling would be good for both business and social cohesion", *The Guardian*, Wednesday 6 August 2003, http://www.guardian.co.uk/politics/2003/aug/06/executivesalaries.economy, link valid 27 January 2010.

[161] In the original Sanskrit, this cardinal human principle is known as *aparigraha*. It concerns the avoidance of superfluous material consumption.

[162] Sarkar introduced Neo-ethics late in his life, in 1987.

[163] Sarkar, P. R. *The Neo-ethics of Multilateral Salvation*, First Edition, 1987. In (ElEdit).

[164] Ibid.

[165] Sarkar's principles of ethical governance will be the subject of a future essay in this series.

[166] Sarkar, P. R. *The Neo-ethics of Multilateral Salvation*, First Edition, 1987. In (ElEdit).

[167] Sarkar, P. R. "Quadri-dimensional Economy", in (PE), pp 40.

[168] We may conclude that any attempt to establish a socialist society with a materialistic philosophy such as Marxism is doomed to fail. The union of mind and matter that is supposed to usher in a classless society can, on the contrary, only lead to imperialism. The history of the USSR confirms such an outcome.

[169] Jeste, Dilip and Thomas W. Meeks. "A seat of wisdom in the brain?" *Archives of General Psychiatry*, 6 April 2009.

[170] Damasio, Antonio. *Descartes' Error: Emotion, Reason, and the Human Brain*, First Edition, 1994; Penguin paperback reprint 2005: ISBN 0-14-303622-X.

[171] "Is Morality Innate and Universal?" An interview with Harvard psychologist, Marx Hauser", *Discover* magazine 2007, http://discovermagazine.com/ 2007/may/the-discover-interview-marc-hauser, link valid 12th February 2010.

[172] Tomasello, Michael. *Why We Cooperate*, A Boston Review Book, 2009. ISBN-10:0-262-01359-2, ISBN-13:978-0-262-01359-8. For a review see http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=11864 See also Joan Silk, "Who are More Helpful, Humans or Chimpanzees?" *Science*, **v311**, 3 March 2006.

[173] Tomasello, ibid.

With Carol Dweck, Joan Silk, Brian Skyrms and Elizabeth Spelke

[174] Sarkar, P. R. "Some Specialities of Prout's Economic System", in (ElEdit).

[175] Ibid.

[176] Sarkar, P. R. *Liberation of Intellect*. Op. Cit. p 35.

[177] Sarkar, P. R. "Tantra and Its Effect on Society", Op Cit.

[178] Sarkar (HS1).

[179] Sarkar, P. R. "Women's Rights", (PN13), 20 April 1981.

[180] Sarkar, P. R. "The Importance of Society", (PN13), 8 December 1978.

[181] *Women's touch revives business*, http://www.news.com.au/business/story/0,27753,25908382-5012426,00.html

[182] Sarkar (HS2).

[183] Douglas R. Oxley, Kevin B. Smith, John Alford, Matthew Hibbing, Jennifer Miller, Mario Scalora, Peter Hatemi, John Hibbing. *Political Attitudes Vary with Physiological Traits*. Science **v321** (5896), pp 1667-1670, 2008. DOI: 10.1126/science.1157627.

[184] Giles, Jim. "Born that way: Your political leanings are imprinted in your genes". *New Scientist*, 2 February 2008, p 29.

[185] Sarkar, P. R. "Quadri-dimensional Economy", (PE) pp 40.

[186] Ibid.

[187] The author is indebted to Firdaus Ghista for the following train of thought.

[188] Sarkar, P. R. "Aesthetics and Mysticism", published in *Ánanda Vacanámrtam, Part 34*, AM Publications, 1980.

[189] http://forum.wgbh.org/lecture/el-sistema-venezuelan-music-education-miracle. Simon Rattle, conductor of the Berlin Philharmonic, has called El Sistema "the most important thing happening in classical music in the world today".

[190] Critendon, Stefen. *Who stopped the music?*, Background Briefing, ABC, Sunday 19 July 2009. The quote is from Brian Levine, managing director of the Toronto based Glen Gould foundation, which has just issued its prestigious award to Jose Antonio Abreu, founder of the *El Sistema* program. http://www.abc.net.au/rn/backgroundbriefing/> and http://mpegmedia.abc.net.au/rn/podcast/2009/07/bbg_20090719.mp3

[191] Ibid.

[192] These comments were made by Alex Ross when he was interviewed on the ABC, Radio National, The Book Show, 25 May 2009, 8-9pm. The reader is referred to Ross's highly acclaimed book, *The Rest is Noise: Listening to the 20th Century*. Fourth Estate, 2007. ISBN 9780374249397.

[193] Brian Levine in interview with Stefen Critendon, *Who stopped the music?*, Background Briefing, ABC, Op. Cit.

[194] Sarkar (HS1).

[195] Neolithic culture, characterized by the earliest use of wild crops and domesticated animals, appears to have arisen independently in several locations around the world, including Africa, South Asia, Southeast Asia and the Middle East. Its beginning in the Middle East is dated to around 9500 BCE, that is, around the end of the last ice age. However recent discoveries of so-called Bradshaw rock art in Northwest Australia indicate a widespread aesthetic expression going back into the previous ice age, around 30,000 years ago (Ian Wilson, *Lost World of the Kimberley – Extraordinary Glimpses of Australia's Ice Age Ancestors*, Allen and Unwin, December 2006). The Neanderthals (who survived in Europe until about 28,000 years ago) wore jewelry and probably buried their dead (Kate Wong, "Twilight of the Neanderthals" in *Scientific American*, August 2009, p 35). The earliest known human literature (which survived as an oral tradition) is the Rg Veda dating from West Asia and the Indian subcontinent about 15,000 years ago. Thus one might speculate that the dawn of human ethical and aesthetic sensibilities was between 30,000 to 15,000 years ago.

Education for Liberation

A Cornerstone of Prout

Marcus Bussey

> Prout is a socio-economic philosophy to help take humanity from imperfection to perfection… Prout is the path of socio-economic emancipation for humanity. Prout should go side by side with the psychic approach of Neohumanism. Neohumanistic ideas give human beings the impetus to move. They create a longing for subtler pabula, and that pabula is supplied by Prout. The spirit is to maintain a balance between the physical and psychic worlds and take human beings to the threshold of spirituality.
>
> P. R. Sarkar[1]

It is common in Neohumanist circles to talk about Neohumanist education without mentioning Prout. In fact the 1,000 plus Neohumanist preschools, schools and high schools around the world can be seen as a cornerstone in the Proutist goal of taking "humanity from imperfection to perfection". These schools represent a direct engagement with local peoples and local cultures with the clear intention of providing an education that is free from local dogmas and overtly universalist in intent. The activity of building schools is Proutist; the philosophical inspiration for them is Neohumanist.

Background

Education is a function of all cultures and societies. At all times it reflects the ideals and the world experiences of the culture it serves and maintains. In pre-modern contexts it was an informal and open-ended process involving much doing, emulating and story. At all times scholar-elders were recognized by their peers for a higher-than-ordinary capacity to manage complexity, link past, present and futures in meaningful ways and to communicate their wisdom with others. With the advent of institutional modernity (c1800) education shifted from these informal settings and became an instrument of the state.[2]

This modernist education is essentially Western in nature. It has been propagated worldwide as an important conduit for globalizing modernity.[3] The result has been increases in both literacy and numeracy and the attendant knowledge bases of the sciences and humanities. Statistically these increases have been accompanied by higher levels in health, well-being and living standards.[4] The current educational paradigm however also has resulted in a growing imbalance in the global economy, is replicating the thinking that has

depleted much of the world of its resources, has undermined local cultures and economies, and has failed to address the poverty in both imagination and moral vision that lies behind the current global financial and environmental crises.[5]

This paradox lies at the heart of modern education. It has achieved great things yet has also failed to prepare people for a future that now asks different questions of humanity. Essentially this is the result of an outdated image of the 'educated individual' still dominating the educational enterprise. When it was conceived in the first half of the 19th century, compulsory schooling was understood to be a form of social engineering that would bring a range of skills and literacies to the citizenry of industrializing states. The 'educated individual' was taken to be literate, disciplined, hard working and patriotic. In this endeavour education has been largely successful. However it adopted a one-size-fits-all approach and devalued creativity while seeing moral virtue in the discipline and patriotism it instilled in the educated.

Today a broader range of literacies needs to be fostered in order to meet the complex challenges that face humanity. Such literacies would include ethics, morality, creativity, spirituality, empathy, imagination, inner vision, courage, discrimination, universalism and so on.[6]

This essay will examine what Prout brings to our understanding of education. As a socio-economic theory it has clear educational priorities and these will be examined below. Prout also has a vision of the ideal 'educated individual' that vastly increases the range and focus of education. Prabhat Ranjan Sarkar calls such an individual a *sadvipra*.[7] To educate for the *sadvipra* greatly changes the goals and purpose of learning. For one thing, education lays the foundation to prepare a context from which the *sadvipra* might emerge – as in pre-modern societies, it is recognized that though we educate many, only a few will have the extra depth to become elders (*sadvipras*) and take on special responsibility for the shaping and guidance of the collective. Yet education must lead all to fulfil their maximum potential for in doing so they can best be utilized by the collective. It is in this validating experience that individual existence becomes meaningful and joyous.

Structure of the Essay

Much of this essay focuses on the relationship between Prout and Neohumanism. As noted in the opening, Neohumanist education has traditionally been associated with Neohumanism but Prout in fact can be said to have a prior claim both historically and also strategically to this philosophical position. The next section therefore offers a brief genealogical gloss to situate both Prout and Neohumanism historically. Neohumanism is then historically situated vis-à-vis Humanism and the possibility of a new Renaissance is posited.

Neohumanism is then introduced as a layered philosophy that can be seen as a form of pragmatism[8] with a distinctive epistemology[9] and an evolutionary ontology.[10] The attention then shifts to Prout and education. First, the social pedagogic dimension of Prout is outlined and then the educational implications of what Sarkar described as the Five Fundamental Principles of Prout is explored. Second, we return to the concept of *sadvipra*, the ideal for a Proutistic education. An educational system is only as strong as its vision of the ideal citizen. As Prout posits a universal citizen with revolutionary vision the context for this vision, drawn from Sarkar's model of the social cycle (*samája cakra*), is turned to as a way forward in developing a truly Proutistic educational experience.

Prout and Neohumanism

Twenty three years lie between Sarkar's initial statements on Prout[11] and his definitive statement on Neohumanism[12] yet he indicated early on that education was a major instrument in transforming society and that universal humanism[13] was to be the underlying philosophy to direct and shape this task. This is why in 1963 he founded the Education, Relief and Welfare Section (ERAWS).[14] At this time education was taken to be simply providing a basis in literacy, numeracy, the humanities and sciences within an ill-defined 'spiritual' or 'yogic' context. Yogic and dietary insights were introduced in schools and, once Ananda Marga globalized after leaving India in 1967, the ideas of alternative educational approaches from Montessori and Steiner through to the free flowing learning approaches characteristic of the open schooling and holistic educational movements were trialled in Ananda Marga schools in economically developed countries. This resulted in a lack of coherence and Sarkar formally introduced Neohumanism in 1982 to focus attention on the philosophical essentials necessary to fulfil the Proutistic intention of shifting human attention from the narrow and limited geo and socio educations of both the capitalist and socialist nation state towards expansive yet deliberately enabling universalist education. For him this moved attention from human self-interest to a new sense of purpose for the human story. Such a move was flagged in his initial statements on Prout where he discussed the need for a "common philosophy of life"[15] that fostered the physical, mental and spiritual development of individuals. In this way he foresaw the development of a integrated personality and a sense of not just belonging to one Cosmic family[16] but of being stewards by virtue of our position within the universal collective and thus responsible for the collective welfare of the universe. This vision he clarified over two decades later in his extended statement on Neohumanism in a series of discourses called *Liberation of Intellect: Neohumanism*:

> Neohumanism will give new inspiration and provide a new interpretation for the very concept of human existence. It will help people understand that human beings, as the most thoughtful and intelligent beings in this

> created universe, will have to accept the great responsibility of taking care of the entire universe – will have to accept that the responsibility for the entire universe rests on them.[17]

It would help at this point to explain the background to the term Neohumanism. The following section offers a short overview of it looking at its relationship with Humanism and the European Renaissance and the educational structure, based on the seven liberal arts, established to promote the Humanist agenda. An alternative Neohumanist approach, the seven liberating rationalities, is offered at the end of the section as an aesthetic counterpoint to the Renaissance model of learning.

From Humanism to Neohumanism

Humanism was a European intellectual movement that emerged in Italy in the middle of the 14th century. A number of cities became centres of great intellectual activity – these included Florence, Bologna, Milan, Rome, Ravenna, Pisa and Sienna. The thrust of this movement was a growing confidence in the human ability to understand the world. Many thought that this was achieved by going back to the ancient achievements of Rome and Greece but in fact it rested more on the ability to account for what we observed, that is, a scientific mind was emerging. This mind was bent on improving the lot of humanity. It did not differentiate between improvements in science, mechanics and engineering and improvements in art, music and poetry. What was key was a new aesthetic capacity and also a rationality that was bent on reason and logic. The Humanism of Italy rapidly spread throughout Europe and is now associated with the Renaissance. It made it hard to maintain church related dogmas and ultimately directly contributed to the Reformation.

The movement was initially Christian in tone, even though the Catholic Church viewed it with suspicion. At times the church even threatened Humanists with burning at the stake. Ultimately it was a force that soundly counteracted the dogmas of faith-without-reason. It did keep at its heart a desire to overcome socio- and geo-sentiment and saw humanity as one and as 'the measure of all things' – best captured in Leonardo da Vinci's *Vitruvian Man* (see Figure 1 below).

There are a number of ideal examples of Humanism from this time. Erasmus of Rotterdam (1466/9-1536) is one example as is Thomas More (1478-1535) who invented the idea of *utopia.* Miguel Cervantes (1547-1616) who wrote Don Quixote is another. One of my favourites is Sebastien Castellio (1515-1563) who took humanist thinking to a new level by arguing that though the human mind can reason well enough it does not have the capacity to determine absolute truth. For him truth was relative and there was always room for doubt; similarly he argued if we had a just and loving God it seemed illogical to

suppose that people who had never heard his message should be sent to hell by default – this is an astonishing insight for the 16th century!

The Reformation was in many ways the child of Humanism. It led to some terrible wars, lasting over the next 150 years. By the time this was over intellectuals saw the woes of humanity as premised on Christian intolerance. The way forward was a secular humanism framed in the universalistic aspirations of the Enlightenment which paved the way to both the French Revolution and the Industrial Revolution. The former was atheistic in tendency while the latter, though Christian, internalized the religious spirit in the private domain. Both in their own way led to a materialist understanding of reality.

Humanism and the Renaissance are intimately entwined in European history and laid the foundation for the kind of intellectual work that lead to the amazing energy of the last two centuries.[18]

Neohumanism is a reinterpretation of Humanism proposed by P. R. Sarkar. It takes the universal aspiration of Humanism, to reach beyond the limitation of humanity and strive for unity at the social level, and suggests a universalism that includes all animate and inanimate existence. Humanity is thus part of a great whole and our job is to increase the radius of our heart's love, to move from a single future, such as a *utopia* as in Thomas More's platonic ideal,[19] to multiple futures based on the good life or *eupsychia* in which many local variations of fulfilment and value are affirmed. Furthermore, the Cosmos, its matter and the organic forms that populate it, are all taken to be conscious, thus human isolation is broken down. We are never alone, as Sarkar insists. Rather we are bound together in an infinite network of relationships that span material, intellectual and spiritual realities. This is a much more creative but less stable reality. It stands in marked contrast to the order of the Humanist vision of the world.

Thus da Vinci's *Vitruvian Man* appears at ease and stable, what motion there is being centred on a solid axis. He lacks the dynamism of the Hindu god *Nataraj* who dances creation and embodies the Tantric worldview that underpins Neohumanism and understands existence as a tension between ignorance and understanding.[20] The worldviews of the West's Judeo-Graeco-Roman-Christianity and Asia's Tantric Hindu-Buddhism stand in clear contrast and evoke significantly different social and cultural futures and therefore educational responses (Figure 1).[21] As Gilles Deleuze and Felix Guattari argue the West has a totalizing and hegemonic approach to learning and knowledge production. This they call geophilosophy. It has a one-size-fits-all approach to reality and this size is distinctly Western.[22] Neohumanism, and consequently Prout, can be better understood via the dancing Nataraj. This figure is fluid and mobile and evokes cultural understandings that are fractal in nature and honour the local while affirming the universal: one foot is always near the ground while the other is free.

Similarly the Vitruvian Man represents order, stability and balance while the Nataraj points towards tension, paradox and dynamic transformation. The educational priorities of both, as a result, are qualitatively different. The Vitruvian Man stands for taxonomy and harmony in an ordered universe while the Nataraj represents a world of multiple meanings, contexts and forms. Thus order is always contingent and bounded by chaos. Each meaning, context and form is driven by its own logic and thus evokes a range of rationalities. This represents a significant shift in consciousness from the definitive mindset of Humanism to the process orientation of Neohumanism. Sarkar has argued that as a result of this emergent consciousness we will have/are having a new Renaissance which heralds a new dawn in the evolution in consciousness.[23]

This new Renaissance is found in the works of those pushing the boundaries of the knowable, trying to out-think thinking, and challenge the ability of any system to be comprehensive, save in its omission of comprehension.[24] As indigenous American pedagogue Sandy Grande argues, "no theory can, or should be, everything to all peoples – difference in the material domain necessitates difference in discursive fields".[25]

Both Renaissances evoke new modes of educating. The European Renaissance had the seven 'liberal arts' of grammar, rhetoric, logic, geometry, arithmetic, music and astronomy; Neohumanism has seven 'liberating rationalities' of service, empiricism, character development, ethics, aesthetic science, universalism and spiritual practice. The seven liberal arts are idealist in nature whereas the seven liberating rationalities are pragmatist in nature. This means that Humanism remained an intellectual movement that approached human social process theoretically and sought to rearrange the social order politically. Neohumanism on the other hand is a pragmatic movement that constructs reality through physical, intellectual and spiritual activity.

This constructive approach Sarkar called "cult" – the root of words such as *culture* and *cultivated*. Sarkar was clear that spirituality is not otherworldly but deeply grounded in daily practice: "Spirituality is not a utopian ideal but a practical philosophy which can be practised and realized in day-to-day life, however mundane it be".[26] Neohumanist education consequently turns away from idealist constructions of knowledge and grounds learning in local and practical contexts while holding aloft a sense of greater purpose which prevents it from being narrowed by local sentiment for place or group.

This rethinking of education pushes us away from a unified worldview, where there could only be one (European) Enlightenment, to a mode of thinking about existence and enlightenment as multiple, and layered (that is, dealing with the physical, the mental and the spiritual).[27] In this recognition of the layered nature of reality in which 'diverse movements of the infinite' generate hybrid formulations, new educational possibilities appear.[28] This new Renaissance thus reinvigorates the Humanism of the European Renaissance which

challenged humanity to see itself as one family rather than as tribal units. Sarkar developed Neohumanism to extend this task of Humanism to the entire universe.[29]

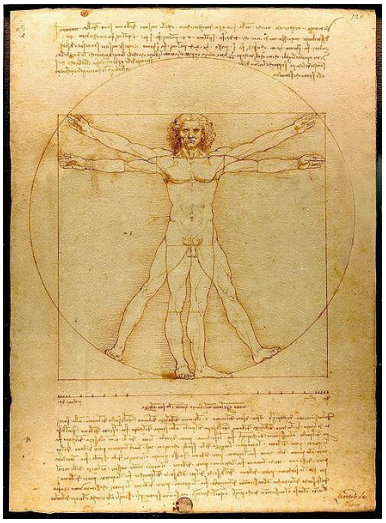
	Humanism and Modernity	Neohumanism and Prout
Image	 Vitruvian Man	 Nataraj
Cultural Referent	Christianity of Europe and pagan Classicism of Rome and Greece	Tantra of Hindu-Buddhist India-Asia
Core Mission	Totalizing and Hegemonic	Fractal, Local and Universalist
Expression	Order, Stability and Balance	Tension, Paradox and Dynamic Transformation
Educational Priorities	Taxonomy and Harmony; European Enlightenment	Layered reason; Multiple enlightenments
Educational Focus	Grammar, Rhetoric, Logic Geometry, Arithmetic Music, Astronomy	Service, Empiricism, Character development, Ethics, Aesthetic science, Universalism, Spiritual practice

Figure 1: The Vitruvian Man and Nataraj

Neohumanism is one of the voices of the emergent Renaissance of critical consciousness in which human identity expands from tribal allegiance to

species, that is, the humanist project, to a universalist recognition of self as participant and co-creator in the universe of forms.[30] The ideas in this section are summarized in Figure 1.

Neohumanism

> Neohumanism offers an evolutionary map that contextualizes the concerns of Prout within a broadly philosophical engagement with three broad human concerns: pragmatism, epistemology and ontology. Sarkar divides Neohumanism into three stages which he calls "spirituality as a cult", "spirituality in essence" and "spirituality as a mission".[31]

Spirituality as a cult is the pragmatic work of constructing human existence through our engagement with the world. Cult, an often abused word, simply refers to the practice of anything in order to internalize its deeper lessons as core features of identity and meaning. It is the root of the word "culture" and the connection here is clear – culture is the set of those practices which generate meaning and identity in the human sphere of action. So, spirituality as a cult for Sarkar refers to the physico-psycho-spiritual processes used to "remove the defects of the psychic world and also the external world, and enable you to move towards the spiritual world without any delay".[32] This process takes on the physical world of need and the psychic world of sentiment in order to establish an effective base from which humanity can fulfil its spiritual potential. Spirituality as a cult engages with the physical and social contexts that people inhabit and works to relieve poverty and inequity in the commercial and political spheres and also ideological and paradigmatic limitations, which cast a narrow and disabling shadow across humanity. Here service and the re-imagining of human possibility link with a vigorous intellectual engagement with dogma and sentiment. This Neohumanist rationality is driven by universalism and a deep benevolence – it underwrites Prout and also the Neohumanist educational movement.

Spirituality in essence focuses on the psycho-spiritual as the epistemological context for Prout. It builds on the re-imagining of humanity as part of a universal story. This is an epistemological task as it works on how we know and understand the world around us. It engages with worldview and paradigm as the contexts which shape human understanding of self, other and the world around us. As this understanding is a collective story, there is nothing outside it.[33] There are many examples of this story in action today beyond the label of Neohumanism because many minds globally are responding to the need for such a renewal.[34] What makes Neohumanism significant is the fact that it integrates spiritual practice with Western empiricism and links it to a Tantric desire for liberation. Tantra tackles defects not by rejecting the world, as in traditional mysticism, but by embracing it and linking individual with collective in the struggle for liberation, social justice and environmental renewal.[35]

Spirituality as a mission is the ontological component of Neohumanism and Prout. This is the inner work of aligning existential self with what Sarkar termed "Cosmic Existential Nucleus".[36] His choice of such an abstract term is significant as he is seeking to define this Cosmic orientation beyond the cultural codes that have dominated metaphysical and religious discourse to date. In this alignment lies the fulfilment of human potential, yet Sarkar argues that individuals cannot make this journey on their own. This is a collective journey in which micro and macro both work ultimately towards the same goal. It is the mission that drives Prout, liberation of self and service to humanity, elevating its focus from the micro-conditions that frame direct experience, always reframing them with the macro-evolutionary journey of consciousness from 'imperfection to perfection'.

It is now time to consider how this plays out in Prout.

Prout as Social Pedagogy

Prout has a commitment to the progressive utilization of human potentiality.[37] This potentiality is moulded by context which always enhances some features while down playing others. Culture is the root of this context and is essentially the learning milieu that shapes human experience. Sarkar's contention is that human culture to date has been defective in one way or another.[38] At the broadest level this can be seen in the simple dichotomy between East and West. The East has tended to emphasize metaphysical sensibility and conformity in the form of stable hierarchic social structures; the West has, on the other hand, tended to emphasize material reality and individualistic, and thus less stable but highly creative, social structures. It is acknowledged that both are part of the human experience and both drive aspects of any educational agenda.

Consequently Sarkar argued that no country (or hemisphere) could progress effectively when offering only a limited approach to human experience. In this case both East and West have things to learn from one another. Thus Sarkar noted that: "We should remember that morality, spirituality and humanity and a happy blending of occidental extroversial science and oriental introversial philosophy is the very foundation of our education".[39]

Accordingly, Prout is linked to processes that free those in context from the limitations of their local culture. It is argued that there is one human culture, a mixture of values, physical, psychic and spiritual potentialities, aesthetic sensibilities, and responses to the fundamental human needs for food, shelter, medical care, education and security.[40] These needs are found in all local contexts but have been shaped by history, geography and localized sentiments. The pedagogic mission of Prout is to develop educational contexts that liberate people from the restrictive aspects of their culture without in anyway altering its core nature[41] or what Sarkar calls its *prana dharma*.[42] This is why Sarkar in discussing the Indian educational experience affirmed what was important in

the Western model brought to India by the British while arguing for a culturally appropriate Ashramic schooling system.

> Prout does not want to turn the hands of the clock back. Prout does not reject the Western educational system. But at the same time, the Western education system utterly failed to inculcate a sense of morality, reverence and a high standard of behaviour among the students of India during the time of the British Raj. That is why in Prout's system of education, we stress the need to start Ashramic schools in every village of India.[43]

Ashramic schooling is education aligned with Indian culture. It is local and built around a local scale that does not replicate the large factory schools of Western modernity. Yet it is not parochial either, as Sarkar insists that the best of Western education be included in the school curriculum and that also the school does not inculcate narrow sentiments that promote caste, gender inequity and either geo- or socio-sentiment. For education to liberate students and communities from the disabling restrictions of ignorance and narrowness, it must offer a holistic vision of human capacity. For Sarkar this needs to address human physical, intellectual and spiritual needs.

> The real meaning of education is trilateral development – simultaneous development in the physical, mental and spiritual realms of human existence. This development should enhance the integration of the human personality. By this, dormant human potentialities will be awakened and put to proper use. Educated are those who have learned much, remembered much and made use of their learning in practical life.[44]

Prout's Fundamental Principles and Education

There are Five Fundamental Principles that shape Prout's socio-economic goals.[45] The first puts a cap on wealth while the others focus in one way or another on the effective utilization of human potentials. This focus has clear educational implications. Take principle number two:

> There should be maximum utilization and rational distribution of all mundane, supramundane and spiritual potentialities of the universe.

This principle concerns both human and non-human potentiality. There is a relationship of course between the two. If humanity enlarges its capacity for fulfilment and love then the entire environment will benefit from benevolent and eco-centric human activity. Education is central to any such change. In both traditional and Western educational contexts education has acted as a useful tool in the maintenance of social relationships. This maintenance has not been committed to the fulfilment of individual or collective potentiality but rather to the ordering of society into hierarchic relationships that underwrite economic disparities and social/class structures.[46] For Sarkar education should challenge functional agenda and lead to the maximum utilization and distribution of human potential – as noted above this is physical, intellectual

and spiritual in nature. Thus he argues that education should be free and based on universalism.

Principle number three states:

> There should be maximum utilization of the physical, metaphysical and spiritual potentialities of the unit and collective bodies of the human society.

Sarkar elaborates this principle by noting that different people are endowed with physical, intellectual and spiritual potentialities. They should be encouraged to *serve* the society with their respective capacities. In the same way the collective body should also be encouraged to *serve* society.

Again the focus is on maximum utilization but in this case Sarkar directs attention to service. Both individual and collective abilities are not simply for the aggrandizement of the individual or the collective. These potentialities, the physical, intellectual and spiritual, are to be put to use for all, in the spirit of universalism. Neohumanist thought builds this insight into a form a benevolent rationality[47] and argues that reason needs to be understood in terms of our ability to understand physical, intellectual and spiritual contexts. In other words reason increases our ability to engage with the physical world, with the world of ideas and also with spiritual processes that have previously been considered to lie beyond the scope of rational discourse. In short education needs to inculcate the predisposition to serve and put one's abilities at the disposal of universal goals.

The fourth principle[48] unpacks the third principle by arguing that how propensities are used is determined by need. This is a form of discernment that must grow out of educational encounters with need in which again the benevolent intellect is developed that can best assess where need lies. Service spirit is fundamental here as the tendency is for individuals to put their own needs first when in fact collective need is greater. This relational quality the social scientist Ananta Kumar Giri has called *shudra bhakti*.[49] It is an expression of devotion to the whole via the sacrifice, *tapah*, of the individual. What is interesting, in the Neohumanist context, is that there needs to be an alignment between individual needs and the fulfilment of the whole – that is, liberation of self and service to humanity. The maximum utilization of the individual must affirm individual gifts and direct these towards collective needs. Thus Prout avoids the nihilistic dimension of authoritarian one-size-fits-all education.

The fifth principle further clarifies this process by pointing to the 'progressive nature' of such utilization. This means that where physical skill is needed then those with physical ability should be involved, but intellectual ability needs to be considered before the physical and if there is any scope for this to be utilized it should be. Similarly, spiritual ability needs to be cultivated in all but

given priority as when this is activated many intellectual and physical issues become less contentious. Thus a hierarchy is implicit in the principles but all are seen as mutually reinforcing. In this Sarkar shares the insight of Vivekananda who declared:

> The watchword of all well-being, of all moral good, is not 'I' but 'thou'. Who cares whether there is a heaven or a hell, who cares if there is an unchangeable or not? Here is the world and it is full of misery. Go out into it as Buddha did, and struggle to lessen it or die in the attempt.[50]

Both the spiritual and the intellectual are embodied processes and just as the hierarchy places spiritual work above the physical so the physical demands of the spiritual purposeful attention to the moment.[51] If the moment demands physical intervention then no amount of theory or meditation will avail. This is the magic of Prout – despite being spiritual in orientation it is utterly pragmatic and committed to addressing the physical suffering and inequity of the world. Thus *education becomes a direct tool in dealing with this inequity* and in lifting up those deprived of dignity and all-round development – physical, intellectual and spiritual. It is about fostering full capacity in each human being. It is therefore libratory in intent and opens each person, in context, to a better understanding of themselves, their world and their capacity to fully engage with it. As Sarkar noted:

> Education does not mean literacy alone. To my mind, education means proper and adequate knowledge and power of understanding. In other words, education is perfect knowledge of what I am and what I should do.[52]

Bridge Building

One way to think about this work is to see it as bridge building. Prout is Neohumanism in action and the core mission of Neohumanist educators is to build bridges. Bridges lead us from where we are to more expansive and inclusive futures. These futures hinge on the coordination of the social capital available to communities and schools.[53] As Proutistic service projects these schools often act as the locus for a great deal of other social infrastructure consolidation. The school is an important hub of community renewal. The present sets the context for this work and this is universal, as all human's share one reality, yet this universal is, paradoxically, intimately local. Neohumanism provides an aspirational agenda but does not concern itself with the detail that must always be worked out according to the context. Prout is the interface that does get involved with this local context. The common thread in terms of practical expression is service in all spheres of educational endeavour, that is, physical, intellectual and spiritual. Service also moves beyond the present and, via history, engages in what Mary Grey called "dangerous memory".[54] It also orients us towards future generations and leads us to serve the future via care

for the present in the form of environmental, social justice, peace and futures education.[55] Beyond this there is also service to the inanimate world.

> The range of our service should include the animate world, but it should not be restricted there. It should also extend to the outer fringes of the inanimate world. This is the demand of the day. From the point of view of Neohumanism the arena of our service should be ever-increasing, ever-expanding, and should include both the animate and inanimate worlds.[56]

Service grounds all learning in purposeful action and all teaching in context. Service to self and to the expressed world links the wonders of learning that expands the mind with the sweat of labour for the sick and needy, with the fields and forests, along with the subtlety of aesthetic and spiritual pursuits.

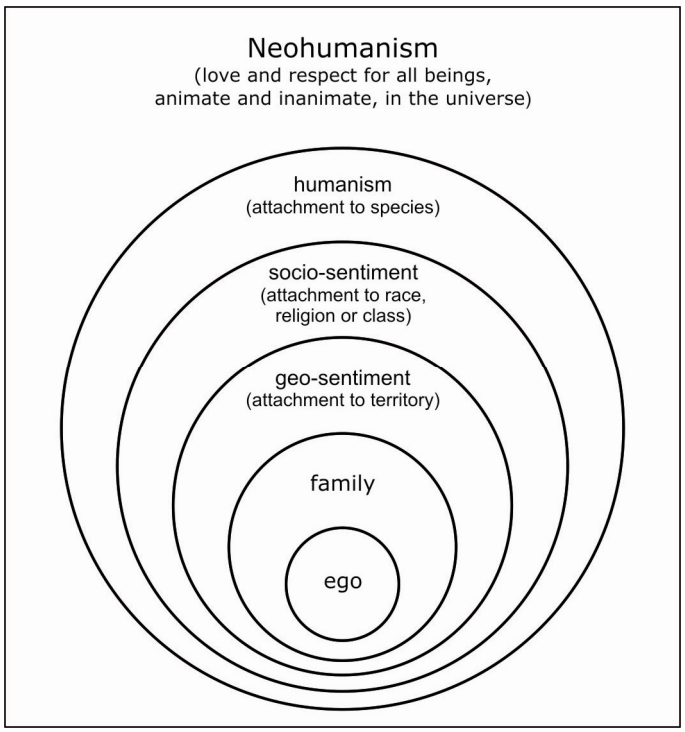


Figure 2: The Rings of Sentiment[57]

The rings of sentiment (Figure 2) outline how service can be employed to convert narrow sentiment to universal sentiment. This conversion is a central feature of all Neohumanist activity as Neohumanism always challenges us to transcend context; to overcome the limitations inherent to our personal, social and historical confines. Thus Figure 2 is generally employed to map the limitations inherent to context, yet it also flags those contextual realms that Proutists must engage with positively (that is, not reactively) in order to fulfil the core aspirational goal of Neohumanism which is to liberate self and society from contextual limitations. Service to context, while holding on to this aspirational goal, aligns us all with context without making us its prisoner.

Thus, as noted above, 'education is that which liberates' – *sa´vidya ya vimuktaeye* – which expresses this service as both a personal and social capacity with both an inner and outer orientation.

Unpacking Service

Service is the bridge between one person and another, one expression of the Cosmos and another. Proutists as Neohumanist educators need to embrace all their work as service, even if it seems to be otherwise, that is, how can service to the ego or a social group be expansive? Well it becomes so through one's intent. To become literate, to learn to excel in math or writing develops the ego but also develops a communal resource that can ultimately liberate both the individual and the group from narrow bonds of identity.[58] Intent frames the learning with greater import. When students understand that their skills have value beyond the market place of competitive capitalism and actually feed into the social capital of their communities, then they have learned the real lesson, and enlarged their frame of reference.

Prout expresses the Neohumanist drive to expand human potential, and lead humanity from crude to subtle, as service. This becomes a bridge between people, communities and cultures. It transforms one heart at a time by reaching out to the yearning within each of us and allowing dreams and hopes to become valid sources of inspiration for learning. It strengthens identity in peoples and communities by embracing the local as the forum for learning yet it maintains a universalist vision that empowers all to live beyond the narrow confines that context and habit so easily impose on learning.

Service takes many forms that can be seen to move along a continuum of contexts that move from the physical, the interpersonal, the visionary and into the spiritual. Thus we have:

- Service to the Present.
- Service to the Collective.
- Service to the Past.
- Service to the Future.
- Service to the Whole.
- Service to the Cosmic Principle.

Throughout this act of serving runs the individual's growing sense of self. It is cultivated through activity, built daily through engagement with the world. The individual grows and learns through this service. Giri emphasizes this point when he states, "It is a poetry and politics of [the] human heart which transgresses the familiar dichotomy between self-development and social commitment".[59] It is in this transgressing that all activities become means to

serving better. As people become empowered through this service they increase in the deeper resources this world so dearly needs: joy, devotion, patience, tenacity, centredness, discrimination and love.

Education for Sadvipraship

A Proutistic education is committed to leading humanity from the crude and partial cultures of the present, towards more unified visions of human possibility and more unified cultural forms. It is also committed to social and economic justice and in developing the values and skills needed to establish these in the world. Education plays a central role in this process. As noted, the journey is along a continuum of contextual moments. This continuum has been presented above when considering service as a central element in such an educational agenda. It was also suggested by the liberating rationalities of Neohumanism and the new Renaissance. It moves from the physicality of the present, to collective needs, to the hard memory work of the past, to the imaginative and hopeful work of exploring and activating alternative futures, to holistic and integrated processes that link all to levels of the universal and finally to the spiritual and inner work that brings us to the threshold of an entirely different level of consciousness and relationship to being.

Western education is founded on a static vision of humanity, as captured in the aesthetically perfect image of the Vitruvian Man. Prout's educational agenda, inspired by Neohumanism, suggests a more dynamic and transformative approach. The dancing Nataraj is suggestive of the energy inherent to transformative action. To bring this into clearer focus it is worth examining how society might educate for Sadvipraship. As noted, the *sadvipra* is an individual who brings, through their moral and intellectual courage, a transformative shift to society (see also Appendix 1).

According to Sarkar, *sadvipras* come forward at a time when society is dominated by a particular exploitative social group. He describes four social groups that are defined by their orientation to life and their chief mode of expression.[60] These are collective psychologies or *varnas* and drive social evolution. His reconfiguring of the Indic caste notion of *varna* is highly original, allowing for history to be rethought as eras dominated by a particular *varna,* either workers, warriors, intellectuals or accumulators of capital.[61] This dynamic interpretation breaks caste from its structural moorings and rereads it as discourse or psychology. Sarkar was clear in his rejection of caste as a form of social closure that maintains the oppression of the majority of Indians. For him the *varnas* offered a cyclic view of history, but this is not repetitive as in true cyclic history because he theorizes the *sadvipra*. Inayatullah explains:

> Through the intervention of the sadvipra, Sarkar's social cycle becomes a spiral: the cycle of the stages remains, but one era is transformed into its antithesis when exploitation increases. This leads to the new synthesis

> and the possibility of social progress within the structural confines of the four basic classes.[62]

Thus, for Sarkar, history is cyclic in that it follows a clear pattern but spirula in that it accounts for social progress. His vision of progress therefore also allows for history to be understood as linear in that social evolution is linked to the mythic dimension of consciousness evolution that supplies the ontological trajectory to his spiritual reading of existence. Education in this vision must cater for the needs of any era while sowing the seeds for potential ruptures that see new eras initiated.

To educate for Sadvipraship requires that elements of all the four *varnas* are developed within the educational system. Two reasons can be given for this. First, as asserted in four of the Five Fundamental Principles of Prout, the education system of Prout is designed to foster the all-round development of individuals. Therefore it must cater for the entire range of abilities and *varnas* in order to allow all to achieve their potential. Second, the *sadvipra* is a person who has internalized and transcended the qualities of all the *varnas* while being established in morality and spiritual practice. Consequently the education system must supply the necessary range of experiences to allow for this.

Continuum	Seven Libratory Rationalities	Service
Physical	Service & Empiricism	Present
Interpersonal Collective	Character development	Collective
Just Relationships	Ethics	Past
Build NH Futures	Aesthetic science	Future
Holistic systems	Universalism	Whole
Spiritual	Spiritual practice	Cosmic Principle

Figure 3: Correlating Context, Rationality and Service

These two points mutually reinforce one another. Again we can see bridges in action with each *varna* being offered the opportunity to best fulfil its potential within an educational context that is sensitive to the contextual nature of learning and the continuum of human experience that determines the libratory rationality at play. There are clear correlations here between the contextual continuum, the seven libratory rationalities of Neohumanism and the nature of service to be fostered in education. These correlations are mapped in Figure 3.

This figure provides a map for beginning to think about the nature of a curriculum for fostering Sadvipraship. Curriculum is a social and historical map of knowing – it tells us what is important and unimportant about knowing in any particular context.[63] Proutistic curriculum is potentially a map of something completely new. Yet it can also be a cosmetic touch up of what we already have. The world needs new ideas in order to imagine beyond business as usual and thus open social invention up to multiple lines of flight and break the trance of a single future – and thus make way for alternative futures. Curriculum aimed at the creation of *sadvipras* via the fostering of healthy collective psychology, that is, taking into account the needs of the four *varnas*, begins this transformative work. This exciting venture is sketched in Figure 4.

An attempt is made in Figure 4 to link the entire range of possible curricula interventions with the social psychologies of the *varnas*. Furthermore, they are presented along the contextual continuum that determines the forms of reason that best account for this mode of engaging with the world. Meditation and the ethical system of *Yama* and *Niyama*[64] are the backdrop for this work for all the *varnas.* Current educational practice can be seen to focus on a subset of these areas. The *sadvipra* is not introduced as a category simply because they function as a meta-category that incorporates all the *varnas*. As noted above, Sadvipraship rests on the synthesis of all qualities and is not a concrete goal. The *sadvipra* is recognized via their actions not via what they know. In this, Sadvipraship is similar to indigenous categories such as 'elder' and 'guru', and is a title bestowed by the collective not claimed by an individual. To educate for Sadvipraship is to educate all *varnas* in such a way that they reach their maximum potential. Only when this is done is the ground readied for the *sadvipra* to emerge when needed. Only when this is done are individuals in a position for their potentialities to be utilized to the fullest by the collective. Only when this is done is personal and collective aligned in such a way that the betterment of both is within reach.

Policy and Beyond

Now the pragmatic aspect of Prout links personal fulfilment with collective expression. It is not enough to facilitate individuality in a vacuum. Thus there is a strongly structural functional dimension to the social thinking of Prout. Yet this transcends the limited understanding that structural functionalism generally suggests.[65] Proutistic education, as stressed repeatedly above, acknowledges the role context plays in expression. The policy implications that emerge need to be responsive to this sensitivity yet there are also generic elements that can be developed globally. For instance the position of the teacher needs to be rethought. Teachers are not simply knowledge administrators in a Proutistic or Neohumanistic context – they carry a deep responsibility for their charges and should be socially recognized for this work in the form of higher status as reflected in increased salaries and also better working conditions. The

relational nature of teaching would also suggest the importance of lower teacher-student ratios than the one to twenty-five or so that is currently accepted in most countries.

Similarly, the role of the government in supporting public educational institutions would be reassessed and funding and staffing would be based on need and also linked to the wider set of goals suggested by the Five Fundamental Principles discussed above. To ensure consistent delivery also education should be quarantined from politics with recognized educators at the helm of educational practice and administration. In this setting many of the qualities of the *sadvipra* would be found in such educators and they would be chosen for leadership roles by their peers and the communities they serve and not by politicians or as the result of cronyism. Thus advancement would no longer hinge on length of service and the bureaucratic construction of seniority.

Essentially education would move from the periphery of governmental concerns to the centre. It has been common in the modern era for the human services of education, health and social welfare to be considered as less important than the economic, commercial and industrial portfolios of government. From the perspective of Prout this is the wrong way round. Investment should be in people first, and in this education should lead the way rather than being called upon to fix social problems and maintain the social sentiments and aporias of the vested interests that dominate an era.

Conclusion

An attempt has been made in this essay to outline the educational implications of Prout. Much time has been spent in elucidating the relationship between Prout and Neohumanism. It has been the latter that in recent decades has been the source of inspiration and identity in thinking about educational renewal and process. A good case can be made that this unilateral approach is in need of rethinking as Prout theory and practice are both essentially pedagogic in nature, though admittedly this often takes a social rather than an institutional focus. To demonstrate this proposition the Five Fundamental Principles of Prout have been examined and the utility of the central concept of the *sadvipra* in thinking about curriculum presented.

		Physical	Interpersonal Collective	Just Relationships	Build NH Futures	Holistic systems	Spiritual *	
	Service ➔	**Present**	**Collective**	**Past**	**Future**	**Whole**	**Cosmic Principle**	
Physical	**Worker**	Build, make, create	Assist those in need, team work	Stand in solidarity against injustice	Work at establishing projects	Identify with universe, awe, singing together	*Asanas*, diet, stillness – 'loving stamina'	**Meditation, Yama and Niyama**
	Warrior	Defend nature	Protect the weak	Fight injustice, bear witness	Challenge entrenched habits	Forge alliances, unity	Fight limitations, *breath control*	
Psychic	**Intellectual**	Measure, assess, describe, define	Create new knowledge and values	Define a new ethics, dangerous memory	Tell new stories; re-imagine the future	Find connections between stories, trans-disciplinarity, paradox	Mantra, listening, *sense withdrawal*	
	Merchant	Value nature	Share, establish cooperatives	Cooperative entrepreneurship	Negotiating	Networking, pattern	*Concentration*	

Figure 4: Mapping the *varnas* and service to begin rethinking curriculum and educational practice

* Words in this column in italics are taken from the Eightfold Limbs of Yoga from the *Yogasutra* attributed to the second century BCE commentator Patanjali. Meditation and the ethical system of Y*ama* and *Niyama* can be understood within the curriculum as synthetic or integrative and working across all *varnas*. The final limb of yoga is *Samadhi*, or union with Divinity-Cosmic Principle. This is theoretically available to all *varnas* yet in the Proutist system most likely realized by the *sadvipra*.

The pedagogic mission of Prout is timely and engages with the roots of concern that are fermenting broadly among an increasingly anxious globalizing intelligentsia. This group is less concerned with classrooms than with social justice and the immense inequity at the heart of the global social, environmental and economic system. A new story is called for. David Korten explains:

> It is impossible to exaggerate the creative challenge before us. Six and a half billion humans must make a choice to change course, to turn to life as our defining value and to partnership as the model for our relations with one another and the planet. Then we must reinvent our cultures, our institutions, and ourselves accordingly. It seems a hopelessly ambitious agenda, yet the key to success is elegantly simple: free ourselves from Empire's cultural trance by changing the stories by which we define our possibilities and responsibilities.[66]

Prout and Neohumanism together provide a cogent and coherent platform from which to engage a new story. This is not a single alternative to the monolithic story of Empire that Korten critiques. It is a multiple and nuanced retelling of human dreams and aspirations, grounded firmly in lived realities that are always paradoxically unique and universal.

Dedication

This essay is dedicated to the life and work of Neohumanist educator John Gurucharan Crowe (1 August 1952 to 14 July 2009). He was a good friend and mentor for over two decades, and an ideal teacher.

Acknowledgments

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Appendix

1. Sarkar's Extended Definition of a Sadvipra

"The world is a transitory phase or changing phenomenon within the scope of the Cosmic Mind. It is going in eternal motion, and such a motion is the law of

nature and the law of life. Stagnancy means death. Hence no power can check the social cycle of evolution. Any force, external or internal, can only retard or accelerate the speed of transition, but cannot prevent it from moving. Therefore progressive humanity should cast off all skeletons of the past. Human beings should go on accelerating the speed of progress for the good of humanity in general.

"Those spiritual revolutionaries who work to achieve such progressive changes for human elevation on a well-thought, pre-planned basis, whether in the physical, metaphysical or spiritual sphere, by adhering to the principles of *Yama* and *Niyama*, are *sadvipras*.

"The principles of *Yama* are *ahiḿsá*, *satya*, *asteya*, *aparigraha* and *Brahmacarya*. *Ahiḿsá* means not causing suffering to any harmless creature through thought, word or deed. *Satya* denotes action of mind or use of words with the object of helping others in the real sense. It has no relative application. *Asteya* means non-stealing, and this should not be confined to physical action but [extended] to the action of the mind as well. All actions have their origin in the mind, hence the correct sense of *asteya* is "to give up the desire of acquiring what is not rightly one's own". *Aparigraha* involves the non-acceptance of such amenities and comforts of life as are superfluous for the preservation of the physical existence. And the spirit of *Brahmacarya* is to experience [the] presence and authority [of Cosmic Consciousness] in each and every physical and psychic objectivity. This occurs when the unit mind resonates with Cosmic will.

"The five rules of *Niyama* are *shaoca*, *santośa*, *tapah*, *svádhyáya* and *Iishvara prańidhána*. *Shaoca* means purity of both physical and mental bodies. Mental purity is attained by benevolent deeds, charity, or other dutiful acts. *Santośa* means "contentment". It implies accepting ungrudgingly and without a complaint the out-turn of the services rendered by one's own physical or mental labour. *Tapah* means efforts to reach the goal despite such efforts being associated with physical discomforts. *Svádhyáya* means study of the scriptures or other books of learning and assimilating their spirit. The whole universe is guided by the Supreme Entity [that is, Cosmic Consciousness], and nothing that one does or can do is without [the Supreme Entity's] specific command. *Iishvara prańidhána* is an auto-suggestion of the idea that each and every unit is an instrument in the hands of the Almighty and is a mere spark of that supreme fire. *Iishvara prańidhána* also implies implicit faith in [the Supreme Entity] irrespective of whether one lives in momentary happiness or sorrow, prosperity or adversity.

"Only those who by their nature adhere to the above ten commands in their normal and spiritual conduct are *sadvipras*."[67]

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[3] Bussey, M. "Global Education: a Musical Exposition", in Bussey, M., Inayatullah, S. and Milojevic, I. (eds.) (2008). *Alternative Educational Futures: Pedagogies for Emergent Worlds*, pp 41-57. Rotterdam, Sense Publishers.

[4] It is worth consulting the OECD's Programme for International Student Assessment (PISA) to get an idea of how educational achievement is both assessed and also to see what is valued. Visit:

http://www.pisa.oecd.org/document/2/0,3343,en_32252351_32236191_39718850_1_1_1_1,00.html

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[8] Pragmatism is the field of philosophy concerned with how reality is constructed through personal and collective experience. Practical consequence and the experience of the effects of human action shape how we understand truth and meaning. Charles Pierce, John Dewey and William James are early proponents of this form of philosophy, which contrasts markedly with a distinctly idealist form of philosophizing that occurred before them. Richard Rorty has promoted it recently and it can be found at the heart of the work of French poststructural philosopher Gilles Deleuze.

[9] Epistemology is the field of philosophy concerned with the nature and scope of knowledge. Central concerns are how we know and how is what we know shaped by context. At issue here also, from a critical point of view, is who does knowledge privilege? Thus thinkers such as Michel Foucault, Jacques Derrida and Gilles Deleuze have paid considerable attention to issues of how we know and how our knowledge limits or enhances possibilities for collective movement.

[10] Ontology is the field of philosophy concerned with our understanding of being, existence and reality. This ultimately boils down to issues of purpose and function. Martin Heidegger famously dealt with such issues in his work *Being and Time*. For Sarkar human ontology is linked with a Tantric understanding of being as consciousness, and human purpose as being linked to an ever-deepening relationship with this consciousness – the ultimate Cosmic Consciousness.

[11] Sarkar, P. R. "The Cosmic Brotherhood", (PN3). Also in (I&I).

[12] Sarkar (LIN).

[13] It could be argued that Sarkar first introduced the concept of Neohumanism in 1957. "Moralism", the first chapter of *Human Society, Part 1,* which was dictated in 1957 and first published in 1959, concludes with:

"The concerted effort to bridge the gap between the first expression of morality and establishment in universal humanism is called 'social progress'. And the collective body of those who are engaged in the concerted effort to conquer this gap, I call 'society'." (Thanks to Jake Karlyle for this insight; *pers com*, 5 May 2009.)

[14] See: http://www.eraws.crimsondawn.info/

[15] Sarkar, P. R. "The Cosmic Brotherhood", (PN3), p 60.

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[26] Sarkar, "The Cosmic Brotherhood", (PN3), Op. Cit.

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[28] Deleuze and Guattari, (1994) Op. Cit.

[29] Bussey, M. "Neohumanism: Critical Spirituality, Tantra and Education". In S. Inayatullah, Bussey, M., and Milojevic, I (eds.), *Neohumanist Educational Futures: Liberating the Pedagogical Intellect,* pp 80-95. Taipei, Taiwan: Tamkang University Press, 2006b.

[30] The range of engagements in the process is large and growing exponentially, resembling a large choir singing a new anthem of freedom; it is worth checking out the following. See Gallegos Nava, R. (2001). *Holistic Education: Pedagogy of Universal Love* (Vol. 5). Brandon, VT, Foundation for Educational Renewal; Gidley, J. M., and Hampson, Gary P (2008). "Integral Approaches to School Educational Futures", in M. Bussey, Inayatullah, S. and Milojevic, Ivana (eds.), *Alternative Futures Education: Pedagogies for Emergent Worlds*. Rotterdam, Sense Publishers; Gur-Ze'ev, I. (ed.) (2005). *Critical Theory and Critical Pedagogy Today: Toward a New Critical Language in Education*. Haifa, The University of Haifa; Hicks, D. (2004). "Teaching for Tomorrow: How Can Futures Studies Contribute to Peace Education?" *Journal of Peace Education, 1*(2), pp 165-178; Loy, D. R. (2002). *A Buddhist History of the West: Studies in Lack*. Albany, NY, State University of New York Press; Miller, R. (2000). *Caring for New Life: Essays on Holistic Education* (Vol. 1). Brandon, VT, Foundation for Educational Renewal; Nakagawa, Y. (2000). *Education for Awakening: An Eastern Approach to Holistic Education*. Brandon, Vermony,

Foundation for Educational Renewal; O'Sullivan, E. (2001). *Transformative Learning: Educational Vision for the 21st Century*. London and New York, Zed Books.

[31] Sarkar (LIN), pp 99.

[32] Ibid. p 99.

[33] Ibid. p 100.

[34] The list would be huge, already gestured towards in the reference above listing a few of the educationalists seeking to develop the educational field – Paul Hawken maps some of this in *Blessed Unrest* and he estimates community-based, private, institutional and commercial movements with a sense of global community to be in excess of three million. Think also of growing grass-root movements such as permaculture and deep ecology; Hawken, P. *Blessed Unrest: How the Largest Movement in the World Came into Being and Why No One Saw It Coming*. New York, Viking, 2007.

[35] Bussey, (2006b) Op. Cit.

[36] Sarkar, (LIN), p 101.

[37] Prout is an acronym for **PRO**gressive **U**tilization **T**heory.

[38] Sarkar (LIN) p 53; also Sarkar, P. R. *Ananda Vacanamrtam, Part 2*, Kolkata, AM Publications, 1986. Sarkar also points out the implications of 'defective' culture: "…when one lacks proper culture one distorts the very spirit of his or her psychic object". (1992) *Subhasita Samgraha, Part 24,* Kolkata, AM Publications, p 94.

[39] Sarkar, (DNE), p 147.

[40] Sarkar, P. R. "Talks on Prout", (PN15), p 11.

[41] According to Prout, "The aim of education is: *Sa vidyá yá vimuktaye*; 'Education is that which liberates'." Sarkar, (DNE) Op. Cit. p 111.

[42] "The words *práńa dharma* mean the cardinal characteristic of a person which differentiates one person from another. Just as each human being has his or her own traits, similarly an entire race living within a particular geographical, historical and cultural environment will also inhere some traits which distinguish that particular race from other. These traits or specialities are inseparably embedded in the internal behaviour of the entire population, and they help to form a particular bent of mind, expression of external behaviour, attitude towards life and society, and on the whole a different outlook" (ibid. p 148).

[43] Ibid. p 150.

[44] Sarkar (DNE) Op. Cit. p 111.

[45] Sarkar, "Talks on Prout", (PN15), pp 22; "The Cosmic Brotherhood" (PN3), p 64.

[46] Apple, M. W. (ed.) *Cultural and Economic Reproduction in Education: Essays on Class, Ideology and the State*. London and Boston, Routledge and Kegan Paul, 1982; Gatto, J. T. *Dumbing Us Down: The Hidden Curriculum of Compulsory Schooling* Gabriola Island, Canada, New Society Publishers, 2002; Giroux, H. A. *Teachers as Intellectuals: Toward a Critical Pedagogy of Learning*. New York, Bergin and Garvey, 1988; McLaren. *Red Seminars: Radical Excursions into Educational Theory, Cultural Politics and Pedagogy*. Cresskill, New Jersey, Hampton Press, 2005.

[47] Bussey, M. "Mapping Neohumanist Futures in Education", in S. Inayatullah, Bussey, M. and Milojevic, I. (eds.), *Neohumanist Educational Futures: Liberating the Pedagogical Intellect,* pp 7-24. Taipei, Taiwan, Tamkang University Press, 2006.

[48] There should be a proper adjustment amongst these physical, metaphysical, mundane, supramundane and spiritual utilizations.

[49] Giri, A. K. *New Horizons of Social Theory: Conversations, Transformations and Beyond*. Jaipur, Rawat Publications, 2006, pp 5.

[50] Vivekananda.

[51] Senge, P., Scharmer, C. O., Jaworski, J. and Flowers, B. S. *Presence: Exploring Profound Change in People, Organizations and Society*. New York, A Currency Book, 2004; Tolle, E. *A New Earth: Awakening to Your Life's True Purpose*. London, A Plume Book, 2005.

[52] Sarkar, P. R. "Dialectical Materialism and Democracy", (PN6), p 20.

[53] Hooghe, M. and Stolle, Dietlind. *Generating Social Capital: Civil Society and Institutions in Comparative Perspective*. Palgrave Macmillan, New York, 2003; Krishna, A. *Active Social Capital: Tracing the Roots of Development and Democracy*. New York, Columbia Press, 2002.

[54] Grey, M. C. *The Outrageous Pursuit of Hope: Prophetic Dreams for the Twenty-first Century*. New York, Crossroad Publishing Co, 2000. The critical pedagogue Michael Apple also nicely profiles this memory work, as part of his critical pedagogic tasks, and describes this as part of bearing witness to past and present injustice. (2006: pp 681-682).

[55] Eisler, R. *The Real Wealth of Nations: Creating a Caring Economics*. San Francisco, Berrett-Koehler, 2007; Macy, J. *World as Lover, World as Self*. Berkeley, CA, Parallax Press, 2007; Noddings, N. *Caring: A Feminist Approach to Ethics and Moral Education*. Berkeley, University of California Press, 2003.

[56] Sarkar, P. R. "Prout and Neohumanism", (PN17), p 44.

[57] Developed by Sohail Inayatullah, Inayatullah, S. *Understanding Sarkar: The Indian Episteme, Macrohistory and Transformative Knowledge*. Leiden, Brill, 2002.

[58] An interesting example of this is the findings of social psychologists who have found that literacy when linked to the reading of quality novels and poetry raises the capacity for empathy in the readers. The historian Lynn Hunt has demonstrated that this increase in literacy and the emergence of the novel as a literary genre in the second half of the 18th century directly contributed to the development of popular (i.e., middle class) concern for human rights; Hunt, L. *Inventing Human Rights: a History*. New York, W. W. Norton and Co., 2007.

[59] Giri, A. K. *Reflections and Mobilizations: Dialogues with Movements and Voluntary Organizations*. London, Sage, 2005, p 14.

[60] Sarkar (HS2). See also "The Place of Sadvipras in the Samaja Cakra" (PN3); also of real value is Sohail Inayatullah's analysis of *varnas:* Inayatullah, S. *Situating Sarkar: Tantra, Macrohistory and Alternative Futures*. Maleny, Australia, Gurukula Press, 1999; Inayatullah, S. (2002). Op. Cit.

[61] The four *varnas* are *shudra, ksatriya, vipra* and *vaeshya*. Rough English equivalents are used here to reduce the amount of Sanskrit and thus make this section more accessible.

[62] Inayatullah, S. "Prabhat Ranjan Sarkar: Agency, Structure and Transcendence", in J. Galtung and Inayatullah, Sohail (eds.), *Macrohistory and Macrohistorians: Perspectives on Individual, Social and Civilizational Change* (pp 132-140). Westport, CT: Praeger, 1997, p 135.

[63] Jardine, D. W., Friesen, Sharon and Clifford, Patricia. *Curriculum in Abundance*. Mahwah, New Jersey, Lawrence Erlbaum Associates, 2006; Pinar, W. F., Reynolds, W. M., Slattery, P. and Taubman, P. M. *Understanding Curriculum: An Introduction to the Study of Historical and Contemporary Curriculum Discourses*. New York: Peter Lang, 2000.

[64] *Yama* and *Niyama* are outlined in Appendix 1.

[65] Structural functionalism suggests the work of Talcott Parsons who saw education performing a social (i.e., structural) function of maintaining the social cohesion of a society by replicating the processes necessary for continued social functioning. In Prout the structural functioning of any system needs to be dynamic and to problematize conditions that favour the dominance of one group over others.

[66] Korten, D., C. *The Great Turning: From Empire to Earth Community*. Bloomfield, CT, Kumarian Press, 2006, pp 354-355.

[67] Sarkar, P. R. "The Place of Sadvipras in the Samaja Cakra", (PN3), pp 55-56. Also in (I&I).

The Three-Tier Enterprise System

Michael Towsey

Introduction

This essay is an introduction to the three-tier economy of Prout, or to be more precise, to its three-tier system of enterprise management. Prabhat Ranjan Sarkar, the propounder of Prout, considered the three-tier system to be one of Prout's special features and we can better understand it by making comparisons to enterprise management in two economic systems that are well known to us, capitalism and communism.

There are generally considered to be three ways to own and manage a business: government ownership, private ownership and cooperative ownership. Ownership is an important consideration because whoever owns and controls the means of production usually gets the lion's share of what is produced. According to communist dogma, all businesses have to be government owned, and in theory 'the people' get equal shares of the product. According to capitalist dogma, all businesses ought to be in private hands, and in theory output is shared in proportion to the contributions made by the persons involved.

Despite their obvious differences, capitalism and communism have three characteristics in common: 1) they are both wedded to their dogma; 2) in both there is a huge gulf between theory and actual outcomes; and 3) both produce highly centralized economies. Communism is (or was) centralized by design (Sarkar called it *state capitalism*) whereas capitalism inevitably becomes highly centralized driven by the relentless pursuit of profit. Companies must merge in order to survive, leading to fewer but ever larger companies.

During the 20th century capitalism and communism battled for ideological supremacy and of course it is now a matter of history that capitalism defeated communism. It is generally agreed that a contributory factor to the demise of communism was a grossly inefficient system of production. According to one argument, the government controlled industrial complex of the USSR was unable to respond to President Reagan's Star Wars Program and the country collapsed in the endeavour to do so.[1]

Of particular interest is that in the ideological struggles of the 20th century the cooperative system did not play a visible role. In order to understand this invisibility and in order to understand Sarkar's three-tier proposal, it is helpful to review some of the history of the cooperative system.[2]

The Cooperative System

The basic principles of the cooperative system were laid out in the early 19th century by the Welshman Robert Owen (1771-1858) at a time when the British working class was reeling from the impact of the industrial revolution. Owen was a successful businessman who nevertheless believed that a company could maintain good labour relations and promote the welfare of workers while still remaining profitable. In 1800, when Owen became manager of the New Lanark mills and its 2,000 workers, he introduced a system of labour negotiations which relied on reason rather than violence to achieve workplace agreements. In 1829 he was instrumental in establishing the formal cooperative movement which held its first conference in Manchester, 1831.[3]

Owen's early views on management would be considered paternalistic by today's standards, but he quickly came to promote cooperative equality and self-management. It is not often appreciated that Owen's cooperative vision was more than just factory cooperatives. He saw cooperatives as part of a broader program of urban renewal and educational reform. However, such reforms would have required government participation and thus endorsement of the cooperative principle. Despite the fact that New Lanark enjoyed great success and became widely famous in Owen's lifetime, the British government of the day refused to embrace the cooperative model and refused to involve itself in social welfare more generally. The economist and academic Hugh Stretton believes that this *laissez-faire* doctrine cost Britain its early industrial leadership and allowed the French, Germans and subsequently the Americans to become greater industrial powers.[4]

By contrast, 100 years later, when Japan embarked on its own industrial revolution, and spawned its own Robert Owen in the form of Muto Sanji, also a successful director of a cotton spinning business, the Japanese government was prepared to embrace Sanji's cooperative doctrine. Sanji's initial intention was just to improve his own firm but success spurred him to develop a management philosophy which linked the welfare of factory workers to the success of Japanese industry and therefore to the success of the nation as a whole. With government backing, a system developed whereby Japanese workers enjoyed security, skills training and high levels of respect in return for cooperative service. This system, although not cooperative by the contemporary definition, nevertheless served Japanese workers and the nation well until the late 20th century.[5]

The cooperative system did not become an ideological force in the 20th century (despite a shadow of it persisting in Japan) because cooperatives do not lend themselves easily to centralized control. Hence capitalists and communists both oppose the cooperative system. Furthermore, cooperative production cannot compete with multinational companies which have the power to impose low wages and externalize social and environmental costs. Nor do they prosper in

the modern world of economic rationalism where profit and efficiency are very narrowly defined. Today, however, the defects of economic rationalism are all too apparent and the cooperative model is once again attracting attention. For example, cities such as Cleveland in the USA, hit hard by the Global Financial Crisis, are forming worker cooperatives to save their dying economies.[6]

Structure of the Essay

This essay is divided into five parts as follows:

- The three-tier enterprise system: We begin with a description of Sarkar's three-tier proposal and make comparisons with the enterprise system in contemporary capitalist society. We explore the possibility of intermediate or transitional enterprise models (that is, models which lie between private and cooperative and between cooperative and public). This part ends by promoting an expanded view of the traditional cooperative sector.
- Corporate structure and governance: This part compares the different governance requirements for public, cooperative and private enterprises and it discusses the problems associated with measuring and achieving productive efficiency.
- Regulation: This part looks at the regulatory challenges involved with the three-tier enterprise system and suggests, among other things, an enlarged role for the audit branch of government in a cooperative system.
- The rural sector: The essay so far has assumed that the enterprises under consideration typically belong to the manufacturing sector. This part describes how the three-tier enterprise system might apply to the rural or agricultural sector.
- The service sector: Finally we turn to the application of the three-tier system to the service sector with particular emphasis on health services and banking.

The Three-Tier Enterprise System

Prout's economic model is first and foremost based on the cooperative system and in this respect it stands in marked contrast to both capitalism and communism. However, Sarkar has not succumbed to a 'dogma of cooperatives'. Rather he recognizes (and experience has clearly demonstrated) that all three systems of business ownership are appropriate in different circumstances. Advocating a balanced and practical approach, he proposes "a three-tiered economic structure, that is, small-scale privately owned businesses, medium-scale cooperatives and large-scale key industries managed by the immediate government".[7]

This at least is a brief summary to convey the general idea. There remains some confusion partly because the early translations of Sarkar's works were ambiguous in crucial places and partly because he described the system over a period of years. In later years he summarized the idea in a single sentence such as the one quoted above and it is easy to forget that the discourses of 30 years earlier provided considerable detail. One motivation behind this article is to return to the early discourses with the most recent translations that have since become available.

Important Concepts

Sarkar formally introduced Prout in 1959, but in the two preceding years he had already described many of the important concepts, first in *Human Society, Part 1*,[8] and later in *Problems of the Day*.[9] (A more recent compilation, *Proutist Economics*,[10] contains most of the author's economic ideas.)

For our purposes the relevant part of *Human Society* is the section headed Business People. The context is India not long after achieving independence from Britain. The Cold War is underway and India is caught between the residual imperial might of Britain and the communist might of its northern neighbour, the USSR. There is much discussion within India about its economic direction – capitalism, socialism or a mixed model such as welfare capitalism? The ideas of Mahatma Gandhi (1869-1948) are also influential – in particular his opposition to modern technology and promotion of small cottage industries symbolized by the spinning wheel.

Sarkar approaches the topic by stating that there are three possibilities to owning and running a business: state control, cooperative and private. He quickly rejects the wisdom of widespread nationalization of industry. He argues that the technological complexity of the modern state makes it impossible for central bureaucrats to run and supervise all large-, medium- and small-scale enterprises. Nationalization of all business is simply inefficient. Note that with this argument Sarkar accepts the reality of the modern state, with all its technological complexity, and thus implicitly rejects Gandhi's anti-technology position.

Next Sarkar rejects as "unrealistic" the proposal that every business should be run as a cooperative. He observes that certain prerequisites must be satisfied before a business can be both successful and genuinely cooperative. A cooperative enterprise, he says, can only be built with the collective labour and intelligence of a group of people who "share a common economic structure, have the same requirements, and have markets available nearby for the goods they produce (or purchase)". Obviously not all businesses will have these characteristics. (More will be said on the necessary characteristics of cooperatives in a subsequent part, Corporate Structure and Governance.)

Finally Sarkar dismisses the (neoliberal) notion that every business must be a private enterprise but he also rejects an economic system based on state regulation of privately run businesses and the various mixed economic models that were popular at the time. His main argument is that private owners will always be fighting against the constraints imposed by government which will lead to black market activities, tax evasion, etc. He believes that welfare capitalism is an inherently flawed concept which is more concerned to preserve the power of capitalists than it is to promote the general welfare.[11]

So what does Sarkar propose? He presents his vision in the context of the Indian agrarian economy and the production of essential commodities. The dominant economic role is to be played by three kinds of cooperative: farmer cooperatives, producer cooperatives and consumer cooperatives. Farmer cooperatives, says Sarkar, offer economies of scale, sorely needed in India where agriculture is dominated by peasants working small plots of land. Aggregating small fields will allow farmers to arrange seed more efficiently and to increase crop production by taking advantage of "proper scientific methods".

Sarkar promotes a system where the production and distribution of each individual commodity is assigned either to the public, cooperative or private sector. The best option is for farmer and producer cooperatives to produce all essential foods, fibres, clothing and fuel, while consumer cooperatives should be responsible for the distribution and marketing of the same. Housing materials should be manufactured and distributed by the state government (through the mechanism of *autonomous bodies*) or by large cooperatives supported by the state government. The right to manufacture medicines should be entrusted to autonomous bodies which can distribute the medicines themselves or through consumer cooperatives. Autonomous bodies are not directly defined but appear to be statutory entities similar to public utilities.

Sarkar is explicit about the dangers of business people having a dominant role in the rural economy. He defines business people as "those who profit by trading and broking without being directly involved in production". It is important to be clear about this definition. Sarkar is not opposed to businesses that produce real wealth, that is, real goods or services – quite the opposite. He is however opposed to those people ('middlemen') who would insert themselves into a chain of production for the purpose of creaming off the surplus. Such people should not own arable land, nor should they act as intermediary merchants. He is also opposed to the feudal-like system where peasants work hard but must deliver their harvest to a wealthy landowner.

> Almost everyone in the world today has in principle acknowledged that only genuine farmers should own arable land, and that no third party should come between them and the revenue department of the government. So it must be accepted that in the production of food, the

> question of ownership by non-producing business people does not arise at all.[12]

Business people should not control the distribution of food grains because when in private hands "it is absolutely impossible to stop hoarding, speculation, black marketing and adulteration in food markets".[13] Nor should business people be given scope to gain control of key commodities. It is no accident that the greatest fortunes are made by those who control key commodities, such as oil, steel and communications. The production and distribution of non-essential foods, non-essential housing materials and the like is the appropriate domain for private businesses.

Sarkar sums up his general attitude in the following passage:

> The less private enterprise is provided with business opportunities and the more production and distribution are carried out through cooperatives and autonomous bodies, the better. The less the government is involved with the public in the areas of production and distribution the better its relationship with them will be, and the less power the central government has in these areas the better.[14]

In *Human Society*, *Part 1*, we begin to see Sarkar's vision of a cooperative economy. Other ideas appear which are to be elaborated over subsequent years, for example, the distinction between essential and non-essential goods and the importance of a decentralized economy. However there is no specific mention of the three-tier economy. That concept appears for the first time in the following year (1958) in *Problems of the Day*:

> Industry, agriculture, trade and commerce – almost everything – needs to be managed, as far as possible, through cooperative organizations. For this, special facilities will have to be provided to cooperative organizations whenever necessary. Adequate safeguards will have to be arranged, and slowly private ownership, or the system of individual management, will have to be eradicated from specific areas of agriculture, industry, trade and commerce. Only those enterprises which are difficult to manage on a cooperative basis because they are either too small, or simultaneously small and complex, can be left to individual management. Similarly, the responsibility for those enterprises which cannot be conveniently managed on a cooperative basis because they are either too large, or simultaneously large and complex, can be undertaken by the immediate state government (in the case of a federation), or by the local body (in the absence of a federation).[15]

It is clear once again that Sarkar considers the cooperative system to be the standard means of owning and managing a business. We depart from it only when there is good reason – when efficiency and common sense tell us to. Notice that the definitions of *size* and *complexity* are with reference to some standard of cooperative practice – more on this later. The term *immediate government* will also be explained later, but for the moment think of these

businesses as *public utilities* owned by and operated on behalf of the general public. Public utilities were a common way of producing key commodities prior to the ascendancy of economic rationalism.

The language of the above passage allows us to construct a table (Table 1) showing the operating domains of the three types of business. It should be mentioned in passing that Table 1 could not have been constructed from earlier translations of the same passage. Therefore it is important when studying Sarkar to obtain the most recent translation available.

Table 1

The mode of business ownership and management according to the three-tier system of Prout is determined by business size and complexity.

Size of Enterprise	Complexity of the Enterprise	
	Not complex	**Complex**
Too large for a coop	public utility	public utility
Large	cooperative	public utility
Medium	cooperative	cooperative
Small	cooperative	private
Too small for a coop	private	private

On 19th October 1959, Sarkar added another component to the three-tier enterprise system by introducing the concept of *key industries*.[16] The term is not defined directly but from context and examples key industries are those that have a central or strategic role in the economy. Obvious contemporary examples are the oil and coal industries. While Sarkar is generally in favour of economic decentralization, key industries are the exception. These are of such importance that they require centralized planning.

> If a particular country or district is highly industrialized, that will not help in uplifting or changing the economic standard of other parts of the world or country. Hence industry should be decentralized but key industries should be centralized. For example, the spinning industry should be centralized, and around it there should be a weaving industry run on [the basis of] decentralization principles. Even in areas where the climate is extreme, industries such as spinning can be established through artificial vaporization. This will help to create a self-supporting economic unit, which is badly needed.[17]

Most key industries will also be very large, so it often appears that the term is synonymous with very large-scale industry. However Sarkar later made a distinction:

> There are some special types of key industries which can conveniently function as either small-scale industries or medium-scale cooperative industries. If some key industries are structured in this way, they must be under state control. Care should be taken to ensure that they are properly organized and widespread. Such key industries should never be controlled by capitalists, otherwise the interests of the people will be partially, if not fully, ignored. Moreover if they are left in the hands of capitalists, many kinds of problems will arise.[18]

Key industries are a modification to the basic template of Table 1. When an industry is declared to be a key industry by an appropriate government authority, it comes under state control and central planning. Large-scale key industry is centralized while small-scale key industry is geographically distributed. This is a strategic consideration. Examples of small-scale key industries might be town water supplies, treatment of sewage and the manufacture of ball bearings. None of these is necessarily large scale but without them modern civilization would collapse. Factories that produced ball bearings were specially targeted in World War Two bombing raids.

We now have two refinements to the template in Table 1. One involves the distinction between a key industry and non-key industry and the other involves a distinction between essential and non-essential goods and services. Note that these two distinctions are independent of one another. The former distinction is made with respect to the strategic role of an industry while the latter distinction is with respect to what consumers normally buy. It is unlikely that ball bearings will appear in a weekly shopping list and a bakery does not rate as a strategic industry. But of course both distinctions will vary according to the circumstances of the age.

Sarkar formally introduced Prout in 1959 in the last two chapters of *Idea and Ideology*.[19] He traces the rise of capitalism as well as the individualism and selfish tendency which contain the seeds of its eventual demise. He then lays out the philosophical, constitutional, legal and socio-economic justification for Prout. He introduces ideas such as the *guaranteed minimum requirements*, *incentives*, *guaranteed purchasing capacity* and the need for a *merit based* economy. He concludes with Five Fundamental Principles (Appendix 1) which are a succinct statement of the economic principles of Prout. These are later included in a set of 16 aphorisms that summarize Prout.[20]

Sarkar's fourth exposition of Prout, *Discourses on Prout*,[21] includes a summary of the three-tier system:

> Large-scale and small-scale industries should remain side by side. Key industries should be managed by the immediate government, because it is

> not possible to run them efficiently on a cooperative basis due to their complexities and hugeness. Small-scale industries should run on a cooperative basis, and the small industries which cannot be managed by cooperatives should be left to private enterprise. Thus: 1) small businesses should be left to individuals; 2) big industries should be owned by the immediate government; and 3) the industries in between the big and small industries should be run on a cooperative basis.[22]

The three tiers of enterprise are described again in different ways over subsequent years. The wording varies on each occasion but all the important ideas were introduced by 1959. One should interpret the later summaries by returning to the original expositions.

Three Categories of Goods and Services

Something more must be said about the distinction between essential and non-essential goods and services because it is profoundly important in a Prout economy. Essentials and non-essentials are treated differently because if essential goods are in short supply people may suffer greatly, but an absence of luxuries can be tolerated, at least for a while! For example, excise taxes might be applied to luxuries but not to essential goods. Free trade in non-essentials is certainly to be encouraged but free trade in the essentials of life is quite another matter. Everyone must be guaranteed their essentials before trading the surplus. It is morally unacceptable that malnutrition is widespread in India and yet some 80% of its wheat crop is exported to developed countries to fatten beef cattle.

In 1988, Sarkar formalized the classification of commodities by introducing a third category.

> Commodities can be divided into three categories: essential commodities, such as rice, pulse, salt and clothing; demi-essential commodities, such as oil and antiseptic soap; and non-essential commodities, such as luxury goods. If hoarders create artificial shortages of non-essential commodities common people will not be affected, but if they accumulate essential commodities then common people will suffer tremendously. This situation can be avoided if consumers cooperatives purchase essential commodities directly from producers cooperatives or agricultural cooperatives.[23]

In subsequent paragraphs, Sarkar specifies the relation between commodity type and enterprise type.

> If the distribution of essential commodities is done through consumers cooperatives, middlemen and profiteers will be eliminated… Demi-essential commodities, which may be affected by artificial shortages causing suffering to common people, should be produced by producer cooperatives. The production of luxury goods can be left in the hands of the private sector. Essential commodities or services of a non-farming

> nature coming within the scope of producer cooperatives, and which require huge capital investments, should be managed by the government. The railway system is an example. So, for the establishment of a healthy society, agricultural cooperatives, essential commodity producer cooperatives and essential commodity consumer cooperatives are a must.[24]

A reading of the various texts suggests Table 2.

Table 2

The mode of production used to produce a commodity will in part be determined by its category, essential, demi-essential or non-essential.

Category of commodity or service	Public Utility	Cooperative	Private
Essential	✓	✓	X
Demi-essential	X	✓	X
Non-essential	X	✓	✓

The Enterprise Pyramid

To place the three-tier classification of enterprises in a more concrete context, it is useful to examine the distribution of business sizes in a well-developed economy, such as Australia. Businesses in Australia are typically divided into four categories. By far the largest category, embracing some 82% of Australia's 1.11 million businesses (in 2002), are the micro-businesses owned by one or two people and employing few or no staff. Micro-businesses have limited resources and each produces a limited range of goods and services. They are price takers and have no market power (Table 3). At the other end of the scale are huge businesses, employing more than 200 people. They dominate the market over a wide geographical range and are price setters.

Of particular interest is that there are very few large businesses and many small ones. In fact, research has established that the distribution of business sizes is so consistent between countries and over time that it appears to be governed by three laws.[25] The first law, known as the 95% rule, says that large businesses rarely exceed 5% of the total number of businesses in a country. In Australia it is less. The second law is the *pyramid law* which says that the number of businesses of a particular size is in inverse proportion to their size. The third law says that these patterns vary little over countries and over time.

The formal division into four categories is used in Australia to make distinctions concerning workplace regulations. It is tempting to propose that

the same categories could be applied to Prout's three-tiers of enterprise (right-most column in Table 3). Micro-businesses fall into the private enterprise category, small and medium businesses fall into the cooperative category, while large businesses fall into the public utility category. Assuming that the pyramid law persists in a Proutist economy (a quite reasonable assumption), then privately owned micro-enterprises would constitute the largest category of business.

Table 3

Like many other countries, business sizes in Australia follow the pyramid rule, that is, there are very many small businesses and few large ones. The term *frequency* in column 2 refers to the number of businesses in Australia. The numbers in columns 2 and 4 are obtained from the Australian Bureau of Statistics, Year Book 2002.[26] Note that these ABS figures exclude public trading and general government entities and businesses in the agriculture, fishing and forestry industries.

Business Category	Frequency (number of businesses)	Number of staff per business	Total persons employed in business category	Prout category
Large	2,700 (0.24%)	>200	1.75 million	Public Utility
Medium	36,900 (3.3%)	20-199	1.80 million	Large Coop
Small	167,100 (15%)	5-19	1.44 million	Small Coop
Micro	907,800 (82%)	0-4	1.74 million	Private
TOTAL	1,110,000 (100%)	-	6.73 million	-

However, as shown in Table 3, the total numbers employed in the cooperative sector would far exceed those in the other sectors. And when turnover is taken as the criterion for size, then the large-scale public utility sector is most likely to be dominant (Figure 1). The most meaningful of these criteria is the human one – number of persons employed. In a Prout economy, Sarkar's intention is that the majority of people would work in cooperatives. From a social and cultural perspective, it is desirable that cooperatives dominate the collective psychology.

The Enterprise Network

Another way to consider the relationship between public utilities, cooperatives and private enterprises is to view economic production as a network of enterprises (Figure 2). In Sarkar's vision of economic development,

cooperatives will tend to cluster geographically around sources of raw materials, which will often be extracted and processed by public utilities. In turn, private enterprises will tend to cluster around cooperatives exploiting non-essential niche markets wherever they can. For example, a factory producing yarn might be classified as a key industry in a particular area. It would be placed near sources of cotton, wool or artificial fibres as the case may be. Cooperatives producing a variety of fabrics and clothes would be located in the vicinity of the yarn factory. Finally a fabrics industry would attract a variety of individually working artists and fashion designers, whose services would be purchased by cooperatives interested in enhancing their products and gaining a competitive edge.

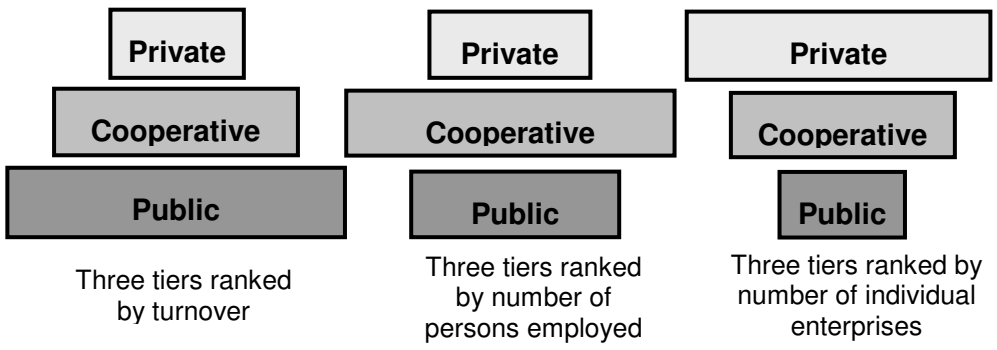

Figure 1: The relative sizes of the three industrial sectors in a Prout economy depend upon which feature is measured.

The notion of a production network can be used to formalize the concept of a *key industry*. As noted above, studies in many countries have revealed that there is a surprising consistency in the pattern of business sizes. When the ABS data in Table 3 are plotted using what is called a log-log plot (Figure 3), the result is close to a straight line. Such a result is highly significant and of immediate interest to scientists, because similar distributions are found in many parts of the natural world. For example, neurons in the brain are connected such that a few neurons have many connections and many neurons have few connections. One can draw a log-log plot of the distribution and obtain a straight line just like the one shown in Figure 3. Genes within living cells regulate other genes. Most genes will regulate only a few other genes but there are a few genes with many regulatory links. The same distribution occurs on the internet. Most internet web pages have only a few links to other pages but there are a few major pages, known as *hubs*, that have many links.

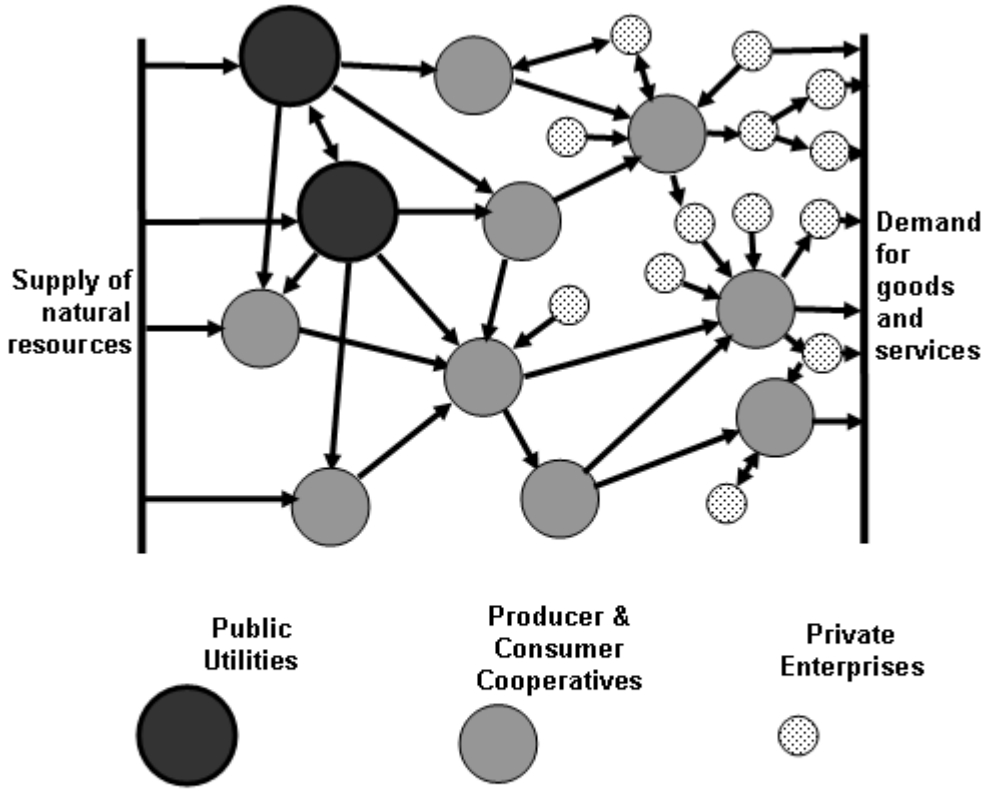

Figure 2: Economic production is the result of a network of enterprises. A more sophisticated diagram might show the arrow widths weighted according to the volume of trade between enterprises. The arrows between public utilities and cooperatives would be thick, while arrows to and from private enterprises would be thinner.

In general, networks of this type are called *scale-free networks*.[27] They are found widely in the natural world and they have interesting properties. If we assume that large businesses also supply (that is, have links to) many other businesses, then the enterprise network also appears to be scale free. Hub businesses, which are of particular importance to the integrity of the network, can be identified mathematically by the pattern of their connections. Key industries can be defined and identified in this manner as network hubs.

The Enterprise Life-cycle

Research is beginning to reveal many interesting parallels between national economies and biological systems. The existence of scale-free networks in both domains is just one example. Another is the pattern of business bankruptcies or dissolutions over centuries, which has similarity to the pattern of species

extinctions over evolutionary time.[28] It is also helpful to think of the founding and growth of a business as being a *life cycle*. Most commonly, businesses are born small, perhaps in a garage. Some succeed and grow to become multinational corporations (Apple Computing is the archetypal example) – others never get out of the garage.

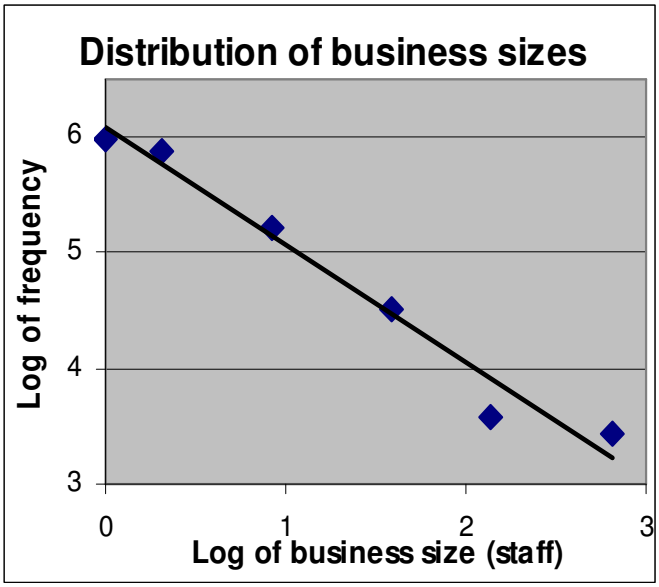

Figure 3: The ABS business size and employment data (summarized in Table 3 columns 2 and 3), when plotted logarithmically, yields a straight line graph. Business size is measured as the number of staff or employees (but excludes the owners and therefore a business can have size zero – no employees).

To get from garage to corporation requires an enterprise to catch a technological wave and to stay on that wave as today's convenience becomes tomorrow's necessity. Sarkar is explicit, even enthusiastic, in his support of science and technology to promote eocnomic development and to expand the domain of necessities as technology progresses.[29]

> The number of items considered essential commodities should be continually and progressively revised and expanded with the changes in time, space and person. Such revisions should be made by the government and not by the board of directors of a particular cooperative. What is considered a demi-essential commodity today may be treated as an essential commodity tomorrow.[30]

In a cooperative economy, the same dynamics will tend to push businesses through a life-cycle. Some thought needs to be given to the important transition stages in that life cycle; the transition from private business to cooperative, from cooperative to public utility, and even the transition from public utility back to cooperative when a technological wave has swept through and had its day. One way to ease a passage through these life-cycle stages would be to

consider the possibility of transitional enterprises and partnerships between the different enterprise types.

Transitional Enterprise Models

Businesses have a life-cycle. A successful business will grow and, in the three-tier framework, may need to negotiate its way through all three tiers during its life time. But are there only three business management models? Why could there not be a spectrum of management models from the single owner-operator of a micro-business to the complex hierarchical management of a large-scale government corporation? It would certainly be useful to have intermediate business models between the private concern and a cooperative because they are so different, not just in size but also in the psychology of their management.

One way to approach the issue of transitions is to think in terms of mixed models and partnerships. For example, Sarkar's discussion of service cooperatives (see later) includes doctors who pursue private practices within a cooperative framework. This is a model that already has successful parallels in Australia. The Independent Groceries Association (IGA) enables individual owners to manage grocery stores under the umbrella of a larger organization which achieves economies of scale by sourcing and distributing supermarket items nationally. This is particularly useful in sparsely populated parts of Australia where there may not be the population to support independent consumer cooperatives. Another example, closer to the author's home, is the Praxis Cooperative in Brisbane. Its six members and associates work both as individuals and cooperatively, offering a range of professional services.[31]

Many franchises in a capitalist economy could operate as cooperative-private partnerships. One might even imagine a multinational franchise, such as MacDonald's, operating as a group of dispersed national cooperatives, sharing the same recipes. The critical issue is that those resources which can be purchased locally are purchased locally and that profits (whether of the cooperative or the franchises) be retained locally.

In a mixed cooperative-private model, a business registered as a cooperative would retain within it individuals who are operating their own private business. This model would work particularly well for individuals providing professional services, that is, doctors, lawyers, accountants and artists. The arrangement would preserve the spirit of cooperation but allow for individual diversity.

In the same manner, a large public utility might act as the umbrella organization for a group of cooperatives. They might do this to undertake large-scale public works or, as in the case of the Mondragon cooperatives in the Basque region of Spain, to survive in a capitalist world dominated by large corporations. Mondragon's 100 worker-owned enterprises and affiliated organizations are today integrated into the Mondragón Cooperative

Corporation (MCC). MCC firms are the leading producers of domestic appliances and machine tools in Spain, the largest domestically-based supermarket chain in the country, and the third largest supplier of automotive components in Europe.[32]

The dubious PPPs (public-private partnerships) so popular in Australia over the past two decades could become public-cooperative partnerships (PCPs). The PCP model could assume considerable importance as a means to decentralize an otherwise centralized key industry. We have already noted Sarkar's opposition to highly centralized industry and his support of science to achieve *economies of decentralization*. PCPs might be the appropriate managerial structure to move in this direction.

So we now have a five-tier system instead of the basic three-tier system: the basic three tiers plus PCPs and cooperative-private partnerships. This is a richer way of viewing the possibilities and deals with transitional issues. Other intermediary managerial models will undoubtedly be adopted as required but we should not lose sight of the primary objectives – to ensure that everyone has their minimum requirements of life, to achieve efficient production and to decentralize production by building strong local economies.

An Expanded View of the Cooperative Sector

So far we have considered three kinds of cooperative: farmer, producer and consumer cooperatives. Sarkar also refers in various places to service, banking, housing and family annuity cooperatives.[33] Quite clearly cooperative enterprises can provide much of the range of goods and services required by a modern, technologically advanced society.

Over the past decade or so, traditional worker and consumer cooperatives (such as discussed above) have come to be regarded as just one component of a third economic sector sometimes referred to as the *social purpose* or *mutual* sector (see Figure 4). Social purpose can be defined more or less narrowly and any given enterprise, depending on its mix of social and commercial objectives, will lie somewhere on a continum between a purely social purpose enterprise and a purely commercial purpose enterprise. According to the Wikipedia entry on Social Economy (December 2009),[34] a purely social purpose enterprise must satisfy the following three critieria:

- The ideal of the enterprise must be a clearly defined ethical concept.
- The primary objective of the enterprise must be the improvement of disadvantaged peoples, to which we might add disadvantaged animals and plants.
- The profits and the resources must be verifiably reinvested for the benefit of the disadvantaged.

Pearce[35] divides the social purpose sector into three sub-sectors: first, the formal cooperative sector consisting of cooperative enterprises as described above; second, the voluntary sector which in Australia is called the *not-for-profit* sector; and third, the informal household economy. Two further terms are commonly used in reference to the social purpose sector, the *social economy* and *social enterprises*. The social economy, as can be seen from Figure 4, is the formal trading part of the social purpose sector. Social enterprises may be defined quite generally as those trading businesses whose principle objectives are something other than making a profit. This includes cooperative enterprises and *not-for-profits* and collectively they constitute the social economy.[36] Note that social enterprises will typically have a mixture of social and commercial purposes – it is their *principle* objective, however, which determines their classification. In the case of a worker cooperative, which clearly must have some commercial objectives, its principle objectives will nevertheless probably be concerned with: 1) provision of goods and services required by the local community, 2) provision of employment opportunities in the local community, and 3) safe and enjoyable working conditions.

In this essay, we will sometimes use the term *cooperative sector* synonymously with the social purpose sector. Using the word *cooperative* in this more general sense draws attention to the manner in which the various components of the sector operate – that is, cooperatively. They do not rely upon the command structure which is typical of private and state owned enterprises.

The voluntary sector in Pearce's enterprise typology consists of cooperatively managed NGOs, charities, clubs and societies. Examples are church groups, the RSPCA, AMURT, Amnesty International, the World Wildlife Fund and Greenpeace. Such groups exist for the welfare of marginalized people and care of the environment. They survive from donations and small business activities. They are increasingly important in the modern world and have a significant presence in the United Nations. Such organizations do not exist primarily for production or profit but they are economically important because they represent self-help, filling the gaps where governments and big business have failed. At the local level, they attend directly to problems of unemployment, disaster relief, injustice and pollution. It is estimated that the *not-for-profit* sector in Australia contributes over 4% to the GDP.[37] Given their essential contribution to providing people with the essentials of life, these organizations will continue to have a prominent role in a Proutist economy.

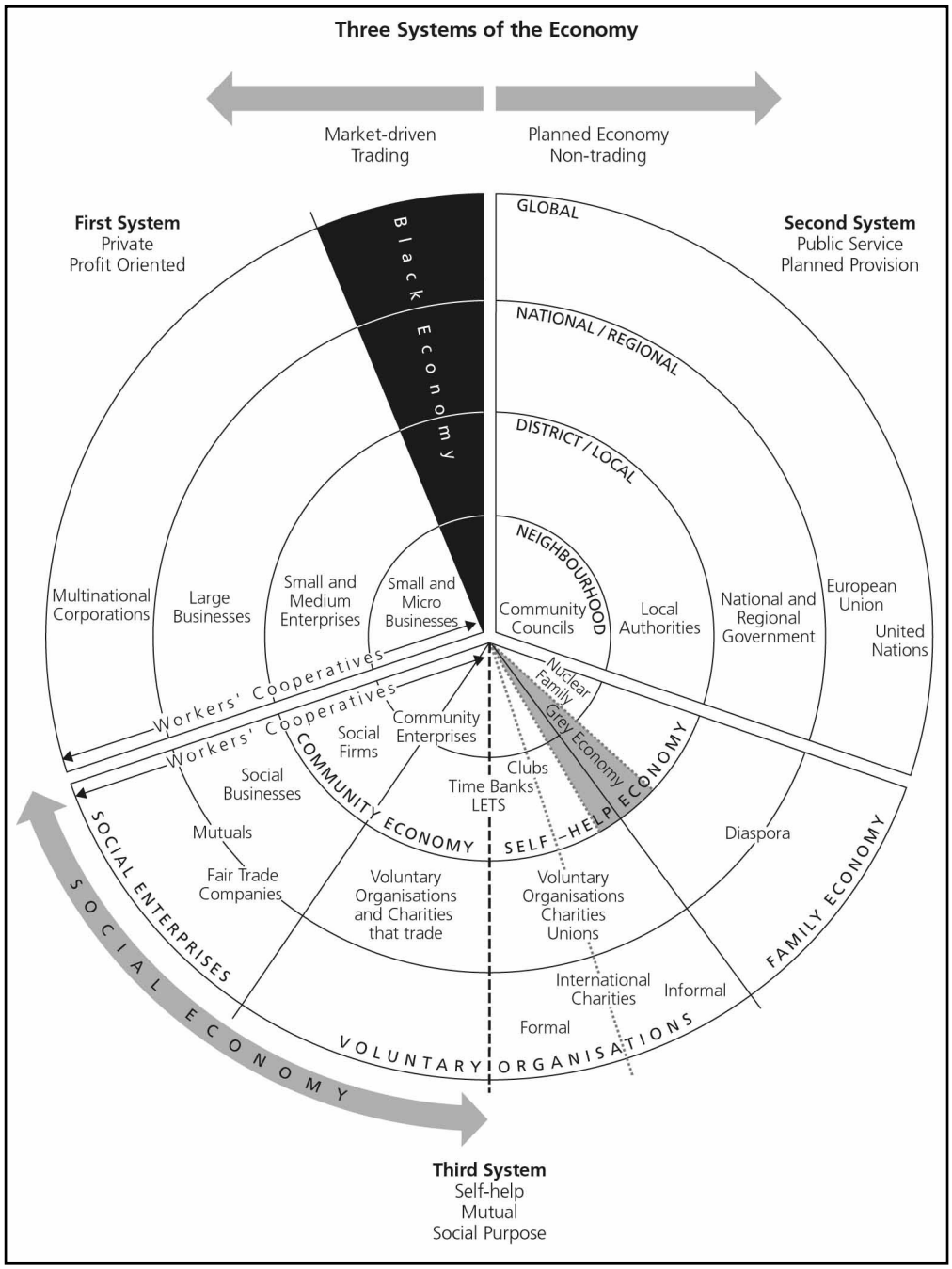

Figure 4: This diagram illustrates the different sub-sectors of the cooperative sector of a modern capitalist economy. The cooperative sector is more sophisticated and important in a capitalist economy than is indicated simply by the number of workers cooperatives. (Reproduced with the kind permission of John Pearce.[38])

One measure of the health of a community is the degree of participation in voluntary organizations, clubs and societies. Sociologists, such as Putnam,[39] have expressed concern about the decline in club memberships since the 1970s. It is interesting to note a parallel decline over the same period in the Calvert-Henderson real economic indicators.[40]

Recognition of the importance of the social economy has been a long time coming to Australia and the country is probably a decade behind Europe and the UK in this regard. However, this is about to change, judging by various institutes that have opened in the last few years, including the Centre for Social Impact at the University of New South Wales,[41] the Australian Centre for Philanthropy and Nonprofit Studies at the Queensland University of Technology,[42] and Social Traders.[43] A particularly important research interest for these centres is *social accounting*, that is, how to measure the success of the social purpose activities of social enterprises. More will be said on this subsequently.

The Informal Economy

The third component of the social purpose sector in Pearce's typology (Figure 4) is the almost invisible but tremendously important household economy. Best estimates suggest that informal household production accounts for as much as a third of productive economic activity in Australia[44] and yet it is totally ignored by the formal national accounts. Such activities include care of aged parents, construction of household furniture and the myriad acts of kindness that people do for one another in daily life. It would be futile to absorb the informal household economy into the formal economy (although tax collectors might dearly like to do so) but the health of the formal economy ultimately depends on the smooth running of the informal household economy. Hence the importance of public parks and other public amenities that help to make family life easier.

In passing we should mention the wider informal economy. In countries such as India and Brazil, less than 25% of the working age population is employed formally in the private or public sectors. The remainder make themselves a living invisible to the collectors of statistics and taxes. The informal economy is not planned or measured and therefore not incorporated within the national accounts. It includes undeclared small businesses, black market activities and criminal activity, in addition to the legitimate informal household production that we have already described.

Unfortunately we cannot ignore the contribution of black markets and criminal activity to the modern capitalist society (see the black sector in Figure 4). According to a United Nations report,[45] drug money worth billions of dollars kept the financial system afloat at the height of the Global Financial Crisis in

2008. Antonio Maria Costa, head of the UN Office on Drugs and Crime, says he has evidence that the proceeds of organized crime were "the only liquid investment capital" available to some banks on the brink of collapse in 2008. As a result, profits from global drug trafficking to the tune of about $350 billion were laundered through the banking system in order to keep the global economy afloat.

Corporate Structure and Governance

There is a wealth of literature on corporate structure and governance that would also pertain to enterprises in a three-tier economy. In this section we summarize some of the basic ideas, pointing out areas where the three-tier system might require differences from conventional practice.

Cooperative Enterprises

There are seven internationally recognized principles of cooperation:

1. Voluntary and open membership.
2. Democratic – controlled by their members.
3. All members contribute fairly to their cooperatives, which they own in common. Cooperatives pay a limited return on the money a person invests to become a member.
4. Autonomy and independence – cooperatives are autonomous, self-help organizations controlled by their members.
5. Education, training and information.
6. Cooperation among cooperatives.
7. Concern for the local community.

Besides these, Sarkar insists that successful cooperatives also depend on common motivation, strong supervision, ethical management,[46] wholehearted acceptance by the local community and the availability of local markets.[47] In the Prout system cooperatives are still subject to the discipline of the market place, and if a cooperative cannot get a viable market share in its own locality it is unlikely to get it elsewhere. Finally Sarkar notes that the cooperative system in general needs to be accepted at the government level with appropriate legislation to encourage a positive climate for cooperatives. (Recall Robert Owen's vision of government support for cooperative villages.) This includes everything from an education system which espouses the virtues of economic cooperation to legislation that offers protection from the predatory activities of large corporations (a situation that might occur if a government were trying to introduce cooperatives into a capitalist, free market economy).

The generally recognized advantages of the cooperative system include:

- There is no conflict between owners and employees because the employees are the owners. The adversarial basis of labour relations is removed. Sarkar puts it thus: "In capitalist and communist countries, the mode of production is defective. In capitalist countries, labour does not work in the interest of management and management does not allow the rolling of money due to wealth concentration. In communist countries, labour does not feel one with the job and that is why there is sluggish production. The cooperative model of Prout is free from both defects."[48]
- Workers have more incentive to work efficiently because they enjoy the benefits of their hard work.
- Cooperatives allow workers to reap the benefits of labour saving technology because automation reduces working hours but not income.
- A well-managed cooperative offers security of employment. Workers need not live in fear of losing their jobs because they are also the owners.
- Cooperatives do not exist purely to make a profit. They have multiple goals, multiple bottom lines – for example, to provide worthwhile work and to produce products that improve the quality of life of the local community.
- Cooperatives are closely linked to their communities ensuring that cooperative boards of management will make decisions that take community interests into account. For example, cooperatives are less likely to pollute the environment because their owner-workers must live with the pollution they create. A frequent criticism of private corporations is that they are not accountable to the communities affected by their decisions.

Sarkar admits that cooperatives have failed in many countries, giving rise to doubts regarding their viability as an alternative business model:

> On the basis of the examples to date, it is not appropriate to criticize the cooperative system. This is because most countries could not evolve the indispensable conditions necessary for the success of the cooperative system. Cooperatives depend upon three main factors for their success – morality, strong supervision and the wholehearted acceptance of the masses. Wherever these three factors have been evident in whatever measure, cooperatives have achieved proportionate success.
>
> Take the case of Israel. Because the country is surrounded by enemies on all sides, the people are extremely aware of the need to be self-reliant. People want wholeheartedly to consolidate the national economy. Thus, they have converted arid deserts into productive agricultural land through the cooperative system.
>
> As this kind of mentality was never created in India, India is a classic example of the failure of the cooperative system. Indian cooperatives were not created for economic development but for the fulfilment of

> political interests. Under such circumstances it was impossible for the cooperative system to succeed.[49] [50]

Fortunately, today we can say that there are many cooperative success stories around the world. The best examples of large-scale cooperatives are to be found in Mondragon.[51] Good examples of medium- and small-scale cooperatives can be found in Maleny, Australia. This small town boasts over 20 cooperatives, including a cooperative bank, a food co-op, an artists co-op and several housing co-ops. Housing co-ops are common in many parts of the world, especially Turkey and Scandinavia.

Government Business Enterprises

Recall that in the three-tier economy, all key industries and all enterprises which are too big to be run conveniently as cooperatives are operated as government enterprises. Their capital is 'owned' by the public and they operate in the public interest. Public ownership is established by a statute which also defines the goals and governance of the enterprise. The enabling legislation is the responsibility of the nearest appropriate level of government, or to use Sarkar's term, the *immediate government*. For example, in Australia, which has a federal system, the national airline operates under Federal legislation, the electricity boards operate under State legislation, and many of the water and sewage authorities operate under local government. In the 1940's, 50's and 60's, prior to the era of privatization, government enterprises had an important role in managing natural monopolies, for example, harbours, hospitals and airports. A Prout economy would certainly reverse the privatization trend, but Sarkar is cautious of politicians having a direct business role. It is important that the legislation which defines a government enterprise preserves a distance between politicians and management.

Business corporations, including those which are state owned, typically have a board of directors who represent the owners and who make policy. Policy execution, on the other hand, is in the hands of one or more executive officers headed by a CEO. A major issue in the case of state owned enterprises is the degree of government influence over policy making versus the degree of independent public control. This is determined by the enabling legislation which describes the composition of the board. The possibilities include government appointment, election by an appropriately constituted electoral college, election by the employees, election by the public, or some combination of these. Given Sarkar's preference for government to have minimal direct involvement in business, it is not surprising that he describes government enterprises as *autonomous bodies*. An autonomous body has the legal authority provided by statute but after that it operates independently of government control. Independence is ensured by having the board constituted independently of government and giving the board (and not the government)

power to appoint the executive. In New Zealand before privatization, the District Hospital Boards, the Port Authorities and the Electricity Boards, etc., were elected by the general public at the same time as other local body elections. Sarkar suggests that worker's representatives, elected by the workers themselves, should also have position(s) on the board.

Once a board is established, it (or the chair person) appoints the executive officers. The officers are answerable to the board and the board is answerable to the immediate government representing the people. Executive officers may be selected from among the board members or from elsewhere, but these days it is considered best practice to ensure a majority of non-executive directors.[52] In the various organizations which Sarkar founded, their constitutions allow executive officers to be selected from suitably qualified persons outside the board.

Consistent with their role as public utilities, government enterprises in the Proutist model operate on the principle of *no profit and no loss*. That is, they set their prices so as to equate income with expenditure. However, this raises three questions, concerning optimum pricing, efficiency and tax revenue.

Pricing

The public management of large-scale industries is justified where there are unavoidable economies of scale that lead to a natural monopoly. In these circumstances, market forces would push a cooperative or private enterprise to increase profits by restricting supply. According to standard economics text books, government regulation can correct such market 'distortion' in two ways. One is to require the firm to produce to its marginal cost (marginal cost pricing) and the other is to produce to its break even point (average cost pricing).[53] The former policy increases supply but the firm makes a loss over the long term. The latter policy ensures that the firm breaks even in the long term but there is a so-called 'deadweight loss' or inefficiency associated with lower production. Sarkar would appear to be an advocate for average cost pricing, since elsewhere his notion of a rational profit requires accounting for all long-term fixed costs, investment, sinking funds, etc.

However, there is strong argument that public utilities should produce up to their marginal costs because they are typically producing goods that are essential for public welfare. In other words, they should maximize production and fixed costs should be met out of government expenditure. A further argument is that the products of public utilities have *positive externalities* which are not captured in normal cost accounting. Proutists have yet to give adequate thought to these issues. The economics literature offers other proposals, such as a compromise between average cost pricing and marginal cost pricing, for example.[54]

Efficiency

The second issue to arise from the *no profit and no loss* principle concerns efficiency. In the capitalist system, profit is used as a surrogate measure of efficiency and therefore as a guide to long-term investment. Some might argue that removing the profit orientation of a large enterprise removes the possibility of monitoring its efficiency, but this is not necessarily the case. First, it must be remembered that efficiency is not to be measured purely in financial terms – public utilities also have community service goals; and second, there are other ways of striving for efficiency. The first point is well illustrated by a long-running debate in Australia concerning the privatization of Australia's telecommunications giant, Telstra. Opponents of privatization argued that a privatized Telstra would cut back on rural services because these yield lower profit margins. They argued that Telstra should be considered a public utility with social purpose objectives and that it should be compelled to accept lower profit margins in providing rural services. This proved to be such a potent political argument that the government delayed privatization for many years. (Up until the privatization era, it was accepted practice for public utilities to subsidize their rural services from more profitable urban services.)

Concerning the second point above, in the absence of profit motive, public enterprises can benchmark their performance according to the 'best practice' of the day. Relevant indices might be labour productivity, capital productivity and service standards. Companies can compare themselves with other companies and with international best practice.

Taxation

The third issue arising from the *no profit and no loss* principle is taxation. Tax is normally levied on profit and a well-run public utility can be an excellent source of public revenue. Venezuela is funding its ambitious social programs to reduce poverty from the profits of its state owned oil company, PDVSA. In Australia, some public utilities operate in the manner of private companies but with the government as sole or principle shareholder, which therefore reaps the dividend. At the time of writing this paragraph, Southeast Queensland's electricity company, Energex, runs on this model and it delivers substantial revenue to the Queensland State government. However it leaves Energex open to government interference and the State government (at the time of writing) stands accused of putting pressure on management to maximize the dividend paid to the government at the expense of maintenance and investment in infrastructure. Clearly there are conflicts of interest in this approach to revenue raising that threaten both business viability and the public interest.

Prout's taxation policy is discussed in Towsey[55] but suffice to note here that the tax mix depends more on resource taxes than on income and profit taxes. Public utilities consume a high proportion of natural resources, such as water,

air, minerals, fossil fuels, etc. In other words, the tax stream would come from the inputs to public utilities and not from their output. Resource taxes would not only yield revenue but also offer governments the opportunity to regulate the mix of resource consumption and thereby ameliorate environmental problems.

As a topical example, what might be an effective approach to reducing greenhouse gas emissions? Much argument rages over the merits of a carbon tax versus carbon trading. But it does not have to be either-or. We can learn much from two previously successful campaigns that changed public opinion and industry behaviour: the introduction of compulsory seat belts and the controls over cigarette smoking. In the face of initial strong opposition, both these campaigns were successful because both relied on a spectrum of tools, such as discriminatory taxation, incentives, regulation and education. Likewise reducing greenhouse gas emissions will require a combination of carbon taxes, carbon trading, incentives, regulation and education. In a three-tier economy a carbon tax might be applied to polluting key industries but the cooperative sector might respond better to a carbon trading scheme. The three-tier system encourages more flexible policy options.

Global Enterprises

As the world becomes increasingly globalized, industries may emerge that invite management on a global scale, presumably by an autonomous body legislated for by the United Nations or equivalent. The production of fibre optic cables is a possible contemporary example, where just seven companies produce 98% of the world's requirements. However Sarkar objects to centralizing industry on a global scale and always prefers to decentralize as far as is efficiently possible. Given the strategic importance of fibre optic technology, research should be directed towards efficient production on a national or even smaller scale.

Private Enterprises

Recall that private enterprises in the three-tier model are small scale and provide non-essential goods and services. In the Indian context, Sarkar gives betel shops, tea stalls and restaurants as examples.[56] Consequently there is no need for the more complex managerial apparatus of larger enterprises. Most private businesses would be family businesses or partnerships of a few people. They would operate pretty much as small businesses do today, chasing niche markets where these arise and setting prices as high as the market permits. They might also be crucibles of entrepreneurial activity that pave the way for larger cooperative enterprises. According to capitalist theory, private businesses need only be motivated by profit but in practice most small business

operators care about what they do and often continue in businesses that do not yield much profit.

Shareholding

A fundamental feature of the cooperative system is that the workers in a business are also its owners. Ownership is established by the workers purchasing shares, thereby having a personal stake in its financial success. This is the entrepreneurial or risk-taking element of being involved with a cooperative. It is also standard practice to place a limit on the proportion of the total shares that may be held by any one person or group.

If non-worker shareholders exist at all, they may receive a dividend but have no say in management. "In cooperatives, voting rights should be on an individual basis and not on the basis of the number of shares a person holds."[57] Furthermore, shares should return a dividend based on the "net profit earned by the enterprise", and there should be no system of preferential shares, that is, shares which earn a fixed amount of interest regardless of whether the enterprise makes a loss or profit. In other words, individuals who invest in a cooperative must share the risk of its success or failure. The fundamental principle is this – cooperatives must never be allowed to become purely investment or money-making ventures. If this happens, the spirit of cooperation will be destroyed and cooperatives will fall into the hands of commercially-minded business people who will forget the social and environmental objectives of cooperation.

With one exception, shares should not be transferable or tradeable.

> Members who purchase shares in the cooperative should have no power or right to transfer their shares without the permission of the cooperative, but their shares may be inherited. If some cooperative members have no descendants, then their shares should pass on to their legally authorized successors who will become members of the cooperative if they are not already members.[58]

The reason for this policy is once again to prevent a concentration of share ownership in the hands of business minded people who place commercial interests above community. The following passage demonstrates how Sarkar envisages cooperatives having strong community links.

> In different countries there are different systems of inheritance, so the right of inheritance [of a deceased person's shares in a cooperative] should be decided according to the system in vogue in a particular country. For example, in Bengal the Dáyabhága system is followed, in other places in India the Hindu Code is the established system, while in other countries other systems are practised. If this arrangement is followed, cooperative members will not need to go to court or get involved in litigation. As all members of the cooperative will be from the

> same vicinity or members of the same village, they will all know each other, and thus there will be little difficulty in deciding who should be the legally appointed recipient of the shares. The members of the cooperative themselves will be able to decide who can claim the right of inheritance to the shares owned by the deceased members.[59]

In order to raise capital, a cooperative would, in the first instance, turn to the cooperative banking system. Indeed, the role of cooperative banks is to build the cooperative sector. Large-scale investments in infrastructure, perhaps involving government-cooperative partnerships, could be allocated funds in the government budget. Some of the financial instruments in a modern capitalist economy may be appropriate in a cooperative economy, some not. Once again the guiding principle is to protect the practice of cooperation and to avoid the domination of profit motive. Public utilities might issue bonds if large capital investment programs were not to be entirely funded out of the government budget. But this would draw savings from the cooperative sector. Finance in a developed cooperative economy is clearly a topic for future research.

Profit in a Cooperative Economy

Profit motive lies at the heart of capitalism. To quote James Killen, a former Australian cabinet minister (1975-1982), also renowned for his wit: "Anyone who does anything for anything other than profit is either a bankrupt or a madman!" Indeed the pursuit of profit is so ingrained in the culture of modern capitalist society that we have forgotten how life might be different.[60] Sarkar argues strongly that the profit motive cannot be the dominant guiding principle of a healthy socio-economic system. Instead he promotes the principle of *production for consumption*, that is, the production of what people need.

We have already noted the disturbing contradiction between the fecundity of capitalism and the poverty which accompanies it. A combination of competition and the blind pursuit of profit concentrates business ownership to the point where most production is captured by a relatively few people who produce only that which yields *them* maximum profit. Basic necessities are therefore neglected even as luxuries become cheaper. Replacing the profit motive by a *consumption motive* will remove this defect. Indeed the *production for consumption* motive lies at the heart of a cooperative economy just as the profit motive lies at the heart of capitalism.

Obviously profit and loss accounting are essential in a cooperative economy because profits are an incentive to work and accounting is required, among other reasons, to determine a just distribution of profit. Sarkar promotes the idea of a *rational profit*. A well-run business, he says, should be able to add a mark-up of 15% after all costs, sinking funds, etc., have been taken into account.

> A rational profit is about 15%. This amount or part of it will be distributed among those who manufactured the machines. This will be their incentive. As they get more incentive, workers will try to manufacture more machines. This is not the case in state capitalism [Sarkar's terminology for communism as practised in the USSR] because workers get fixed incentives which become part of their salary. Incentives should encourage greater work and better quality work, so they should be directly linked to production. When this system is adopted, the per capita income and the standard of living of the workers will automatically increase.[61]

A 15% mark-up will not enable people to get rich fast, but it will promote productivity and a steady accumulation of wealth in the community. Note that from a macroeconomic point of view, a 15% mark-up for each individual firm will lead to an approximately 70%-30% split (between wages and profit) of total output from the entire business sector. This comes about because firms within a chain of production are adding a mark-up to the mark-ups of prior firms in the chain.[62] A 30% profit share of gross business output is fairly typical for a modern economy. A 15% mark-up is *rational* because it leads to a *balanced* income distribution between *secure income* (wages) and *incentive income* (bonuses and dividends). The crucial issue, of course, is that in a capitalist economy the major portion of profit goes to a few majority shareholders who constitute a very small proportion of the population. In an economy dominated by cooperatives, the 30% profit share is distributed to the owners of cooperatives who are the workers themselves. In other words, the cooperative system leads to a more equitable distribution of wealth. In the case of workers in public utilities, Sarkar advocates bonus systems and non-financial rewards.

Efficiency and Multilateral Accounting

We have already noted that profit in the capitalist system is frequently a surrogate for efficiency. Obviously, therefore, the systems of accounting used to determine profit are worthy of attention. *Efficiency* (the ratio of outputs divided by inputs or benefits divided by costs) is an important criterion by which we measure the success of many human endeavours. In theory, more efficient businesses should yield larger profits. Capitalism prides itself on being an extremely efficient system to allocate resources and to build wealth, yet in truth it is a very inefficient system if we take into account the poverty and pollution that always accompany it.

From a theoretical point of view, the inefficiencies of capitalism can be traced to a market mechanism that is unable to signal the true short- and long-term costs of the traded goods and services. This problem is compounded by accounting systems that are concerned only with financial costs and ignore so-called *external costs* which typically emerge over the longer term. In fact the

competitive pursuit of profit encourages businesses to externalize as many costs as possible and to think only in the short term. For example, it is estimated that US corporate profits in 2000 amounted to $500 billion, but the unaccounted *external costs* associated with producing that profit amounted to $2,500 billion. These costs, which included diseases associated with air pollution, cancers induced by workplace conditions, environmental clean-ups and so on, did not appear as costs in corporate balance sheets but rather were paid by taxpayers or victims. See the Endgame website[63] for more detail about this analysis.

Capitalist accounting also ignores *positive externalities*, that is, benefits that arise from work such as care of children and the elderly, and hence these jobs are relatively poorly paid. A just released report from the New Economics Foundation[64] has compared the remuneration of bankers with child care workers and found the discrepancy to be at odds with a proper accounting of cost-benefit to society.

> High-earning investment bankers in the City of London are among the best remunerated people in the economy. But the earnings they command and the profits they make come at a huge cost because of the damaging social effects of the City of London's financial activities. We found that rather than being 'wealth creators', these City bankers are being handsomely rewarded for bringing the global financial system to the brink of collapse. While collecting salaries of between £500,000 and £10 million, leading City bankers destroy £7 of social value for every pound in value they generate.
>
> Both for families and for society as a whole, looking after children could not be more important. As well as providing a valuable service for families, childcare workers release earnings potential by allowing parents to continue working. They also unlock social benefits in the shape of the learning opportunities that children gain outside the home. For every £1 they are paid, childcare workers generate between £7 and £9.50 worth of benefits to society.[65]

From the foregoing it is apparent that measures of profit and efficiency very much depend upon what one decides to count as costs and benefits. And this, in turn, depends on the state of scientific knowledge and the relative political power of the stakeholders involved. In other words, measures of economic efficiency are highly political and intensely contested. Given what is at stake, this will probably always be the case, even in a cooperative economy. However, the principles of Prout clearly indicate a commitment to incorporating a broad range of factors in the balance sheet, including intellectual, social, affective and spiritual. Is it possible to account for such a diverse range of resources in a meaningful way, thinking for the future as well as the present? Yes, it is. In fact several exciting initiatives have already been adopted by businesses and local governments around the world.

Triple bottom line accounting

A widely adopted initiative is *triple bottom line accounting*. It attempts to make hidden costs explicit by having three parallel balance sheets that account for the economic, social and environmental performance of a business. The balance sheets identify all known benefits and costs to all stakeholders, including workers, local community, nation and the environment.[66]

It is worth mentioning recent interest in a *fourth bottom line* concerned with the ethical dimension of economic activity.[67] [68] Very few companies have an ethical audit of their activities. As noted already, the success of the cooperative system is dependent on high ethical standards of management.[69] The ethical bottom line has come under the spot-light following the bankruptcies of high flying companies, such as Enron and WorldCom. According to Wong,[70] Enron was brought down by its paucity of social-spiritual capital:

> Enron's senior management failed to maintain a relationship of openness and trust with employees… Senior management cared more about self-enrichment than the needs of employees. They showed little regard for meaning and ethics beyond the bottom line… Enron's deficiency in social-spiritual capital proved to be fatal.

We can expect the number of accounting dimensions to increase over coming decades as we become ever more aware of the multiple social, environmental and ethical consequences of our economic activity – hence the open-ended term, *multilateral accounting*. But this is for the future. In 2009, social and environmental accounting must still be regarded as very much in their infancy. Protocols are still being developed and contested.

Social accounting

Two social accounting models that we shall note here are those promoted by the Social Audit Network[71] (SAN) and Social Ventures Australia (SVA).[72] They serve to illustrate two sides of an important debate about whether the three bottom lines should be accounted in real physical quantities or whether they can meaningfully be merged into a single bottom line accounted in dollars. SAN is a grassroots network that grew out of an initiative of the New Economics Foundation. Over the past decade it has developed widely used tools for social accounting and auditing. SVA is a more recent entry into the field and commands the support of some big businesses. In particular it promotes the social accounting tool known as SROI (Social Return on Investment). The SAN tools and SROI are very similar in all but one crucial respect – whereas the SAN approach is to account in quantities and qualities, the SROI approach finally converts all quantities to dollar values. This is a step some would question on the grounds that the social quality of life cannot (or should not) be quantified in dollars. The motivation for converting the triple bottom line to a single dollar bottom line is precisely the difficulty of making

comparisons between the three differently accounted lines. SROI attempts to estimate the financial benefits generated by an organization's commercial and social acitivites and then compares those financial benefits to the investment required to generate them. "This return ratio tells us the extent to which the funds are being effectively leveraged."[73]

Environmental accounting

Exactly the same debate arises in environmental accounting. The Wentworth Group of Concerned Scientists (an Australian group) has recently put forward a proposal for a set of National Environmental accounts.[74] Data for the accounts would be collected on a regional basis and would monitor the health of five classes of environmental assets: land, water, atmosphere, marine and urban. The accounts would be published each year and would become the basis for determining the effectivness of all environmental restoration programs. One consequence of a set of water accounts would be, for example, a sustainable allocation of irrigation water in the Murray-Darling Basin.[75]

The Habitat Hectares program[76] in the State of Victoria offers another example of environmental accounting, in this case land quality and in particular its biodiversity. However the Habitat Hectares program goes a step further and sets up a market that allows land developers to trade in biodiversity. The idea is that the environment provides ecosystem services, that is, it performs important functions that improve human life. For example, trees purify water, prevent erosion and so on. If a dollar value can be put on those services, then market mechanisms can be put in place to retain or even increase that value.[77] As an example of this approach, which is the environmental equaivalent of SROI, New York's water supply comes from a large natural watershed and it is estimated that it would cost $9 billion to purify the city's water supply if nature were not doing it for free.[78] If water is priced with this cost in mind, the revenue can be used to further improve environmental quality.

Politicians like putting a dollar value on ecosystem services because it makes it easier to weigh up conservation costs against competing budget items. But the approach is fraught with difficulty. Most obviously it assumes that all the services provided by a particular ecosystem can be known. But ecosystems are incredibly complex and all its services cannot possibly be known. Furthermore how does one put a price tag on the aesthetic, cultural or spiritual value of a particular lake or forest. There is, however, a more fundamental objection – the notion of ecosystem services is entirely focused on benefit to humans. But an ecosystem is a living entity in itself, not an abstract concept, and therefore has its own moral right to be healthy, quite independent of its value to humans.[79]

To reiterate, social and environmental accounting are still very much in their infancy but they point the way to the future.

Philanthropy

The distinction between philanthropy and social enterprise is to be noted. Philanthropy is the practice of a person or business investing their savings in a community without expectation of a financial return. Typically philanthropy is practised by individuals who have made much money running a privately owned and highly profitable business. A social enterprise on the other hand is a business whose dominant concerns are with community benefit rather than with profit. The distinction can become confused because the object of many philanthropic organizations is to help social enterprises in various ways.[80]

Philanthropy has long been a strong tradition in the United States but it has not been so strong in welfare economies such as that of Australia. But over the past decade, the Australian government has been attempting to increase the role of big business philanthropy, while at the same time constraining its own budget commitments to social welfare, tertiary education and scientific research. One response of big business has been the adoption of formal accounting systems to monitor the performance of what they call their *community investment programs*. One such is the London Benchmarking Group (LBG).[81] A question arises as to the appropriate roles for government social programs versus philanthropy and the balance between the two. While business philanthropy is obviously to be encouraged it should not be a substitute for well-planned government social action. In particular, it does not absolve governments of the responsibility to seek out and fill gaps of disadvantage.

Regulation

In a modern economy, the different enterprise types require legislative support, that is, acts of parliament which lay out basic principles of governance and broad parameters of what can and cannot be done using that enterprise structure. In the case of public utilities, each typically has a dedicated act of parliament, or statute, which lays out the social purpose of the enterprise, its governance and the nature of its link to the executive branch of government.

The legislative support for cooperatives in Australia is weak and varies from State to State, reflecting the weakness of the sector in general. For example, it used to be that a cooperative could not be formed in Queensland without the active involvement of 25 persons. That number has since been reduced because it was an unnecessary impediment. An interesting new development in Australia is the emergence of national cooperatives that operate in several States and therefore do not come under the umbrella of any one State's legislation.[82] To respond to this need, the Federal, State and Territory governments have agreed to adopt a national scheme for cooperative legislation. Of interest is that a cooperative can be formed with a minimum of

five people, which is the boundary (in the Australian system of business classification – see Table 3) between a micro-enterprise and a small enterprise.

As noted earlier, there is a spectrum of enterprise possibilities and those which are selected as relevant for a particular country will require acts of parliament to support them.

Regulatory Authorities

The success of the three-tier enterprise system will depend on the formal acceptance of some regulatory decisions that are today made informally. Two decisions will be of particular importance: first, the classification of goods and services into essential, demi-essential and non-essential, and second, how to determine which enterprise type is most appropriate for a given business. These are qualitatively different kinds of decision. The former deals directly with people's quality of life and therefore properly belongs to the legislative branch of government, that is, to the elected representatives of the people.

Decisions about enterprise demarcation will require expert legal and economic knowledge. How large can a private business become before cooperative management is appropriate? And, in the case of an essential commodity, how to choose between a cooperative or key industry as the best mode of management? Such decisions should be the province of a dedicated regulatory authority, not dissimilar to Australia's existing competition authority known as the ACCC (Australian Competition and Consumer Commission). It would also resolve disputes, for example, between the participants in private-cooperative partnerships and public-cooperative partnerships.

It is worth reiterating why we even care about such considerations. We care because the *way* in which goods and services are produced is as important as *what* is produced. The way goods and services are produced affects the efficiency with which we use scarce resources; it also affects our economic security and ultimately our quality of life.

According to Sarkar, decisions about enterprise demarcation "should be based on the principles of self-reliance, maximum utilization, rational distribution, decentralization, rationalization and progressive increases in the standard of living of all peoples".[83] These principles interact in complex ways but nevertheless we attempt a brief introduction to each of them.

Principle of self-reliance

The principle of self-reliance or self-sufficiency is concerned primarily with social, political and economic security. Countries which import many of their essential foods and medicines are vulnerable to foreign pressure. Brazil in the early 2000's contemplated abandoning its free trade agreement with the USA

until it discovered that it was dependent on the latter for supplies of some essential drugs such as insulin.

As usually defined in the Proutist literature, the principle of self-reliance refers to the ability of a country or local community to produce its own minimum requirements of life, namely basic foods, clothing, housing, education and health care. However, in "Economic Self-sufficiency for Bengal",[84] Sarkar clearly extends the concept to include the production of cash crops and manufactured goods to be traded for semi- and non-essential commodities. In other words, self-sufficiency includes the ability to maintain a balance of trade as well as the ability to produce one's minimum essential requirements.

Such is the importance of self-reliance that Sarkar advocates the establishment of key industries even if it is not immediately efficient to do so. We have already had the example of establishing a spinning industry using artificial vaporization in regions where climate is unsuitable for crops. Why? Because textiles and clothing are an essential requirement but a secure weaving industry can only be established if local yarn is available. In these cases, the spinning industry would be considered a key industry and given appropriate support even though purely economic considerations might support importation of cotton.

Principles of maximum utilization and rational distribution

Businesses must manage the coming together of the *factors of production* – labour, space, raw materials, tools, machinery, capital, etc. The managerial process itself must satisfy some measure of efficiency. The principle of *maximum utilization* implies that the number of managers and their degree of involvement should be sufficient but not excessive. The principle of *rational distribution* implies that the managerial style will depend upon the technology and degree of automation. In short, the pursuit of efficient management will frequently suggest the business category.

Principle of rationalization

In its broadest sense, rationalization is any reorganization of operations to increase efficiency – but by what definition of efficiency? In recent times the term has become associated with the ideology of economic rationalism, where efficiency is very narrowly defined. We interpret the principle here to mean the adoption of new technology to achieve not just increased output but also other goals such as shorter working hours and safer and more interesting work. We note, in passing, that in a cooperative economy automation gives scope for decreasing work hours without decreasing income, because the rewards of increased labour productivity are distributed to the owner-workers.

Most usually, rationalization is intended to take advantage of economies of scale, leading to larger enterprises and increased managerial requirement.

Assuming that economies of scale motivate a cooperative to expand, at what point is it advantageous to convert to a public utility? At least three factors come to mind.

1. Cooperatives are community based enterprises and ideally they adopt *appropriate technology*, that is, *technology which, for a given level of output, maximizes the use of locally available resources.* In a decentralized economy, a cooperative's community would be its local shire or geographical area known (in Prout parlance) as a *block*. A *block* has a population of around 100,000 persons, about the same size as the average local government area in Australia. For a typical cooperative, the *block* would be its major source of labour, raw materials, finance and of course the market for its product. The linking of cooperatives to *blocks* having a particular population immediately sets some constraints on the maximum size of a cooperative. If a cooperative outgrows its community and its technology can no longer remain *appropriate* by the above definition, then converting to a public utility may be the best solution.

2. Within a *block*, cooperatives compete for market share. They extend their market indirectly by trading with coops in other *blocks*. If economies of scale cause cooperatives to merge with one another, the point will come where a large coop can exert undue influence on the local price by restricting supply. Placing upper limits on the size of a cooperative is the equivalent to anti-monopoly legislation. If splitting a large coop cannot be justified then forming a public utility may be the only option.

3. The persons working in a cooperative are also a community. Larger cooperatives in Mondragon, Spain, have reported difficulty in maintaining cooperative integrity when the number of workers exceeds about 500. One of the defining characteristics of a cooperative is that all workers have a sense of personal responsibility for the final product and for the quality of the workplace. When a company becomes very large, a major shift in management style becomes necessary, not just to handle complexity, but also to maintain a sense of personal responsibility. This is achieved by shifting to hierarchical systems of management, where personal responsibility revolves around one's team or department within the company.

Principle of decentralization

In today's world, we take it for granted that companies must search for economies of scale if they are to survive under competition. In our discussion of the principle of rationalization, we noted that an expanding cooperative in a decentralized economy would eventually come up against the boundaries of its community, more formally the *block* in which it resides. For the capitalist, such a restriction is an intolerable frustration. Nothing should be allowed to stand in the way of the search for profit. In a cooperative economy, however, value is

given to the economic security of a community. An appropriately decentralized economy offers local people control over their resources, and over how their community develops. They are not subject to blackmail by large companies who threaten to move elsewhere if workers do not accept lower wages.

Capitalist society is so driven by the need to chase economies of scale that most scientific and technological research is devoted to meeting that objective. But the research impulse could just as well be steered towards *economies of decentralization*. Economic decentralization is probably the most significant strategic feature of a Proutist economy. It motivates economic planning, scientific research and collective psychology.[85]

Key industries are usually large scale, capital intensive and difficult to decentralize. However, Sarkar recognizes many "adverse effects of industrial centralization" and encourages attempts to decentralize key industry as far as is consistent with principles of efficiency.

> Normally only very large-scale key industries should be centralized instead of decentralized. But industries which cannot be readily decentralized today may be decentralized in the future due to changing circumstances. At that time the decentralization of key industries must be implemented.[86]

Advocates of free markets, deregulation and globalization dismiss the importance of a decentralized, community oriented economy. They might derisively refer to the failure of Mao Tse-Tung's development program symbolized by the slogan "an iron foundry in every backyard". Sarkar is not advocating this kind of irrational decentralization. Rather he advocates decentralization driven by the desire for economic security and made possible by scientific research.

> As far as possible, the establishment, operation and distribution of all industries should be done at *block* level. Only when this cannot be done should industries be organized at a higher level. Obviously, industries such as iron and steel factories cannot function in every village, block and district, so they should function in a larger area.[87]

Principle of progressive increase in the minimum standard of living

It is obvious from the foregoing discussion that there will be tensions between the various principles when deciding how an industry is best managed. Efficiency may suggest public utility management, but economic security may favour cooperative management. Both calculations will depend on what criteria are taken into account. The ultimate arbiter in these cases is another principle, *the endeavor to progressively increase the standard of living for everyone*. This endeavor is the driving force of a Prout economy and finds its justification in human psychology – years of work with no apparent improvement in one's

circumstances have a depressing effect on the individual and society. Stagnancy of this kind was a causal factor in the collapse of communism. There are three parts to this principle: 1) an index with which to measure the standard of living, 2) an increase in the index over time, and 3) that the index should increase for everyone. This principle has many ramifications but here we are only interested in its bearing on enterprise management. There are two levels of concern, the microeconomic and the macroeconomic.

At the microeconomic level, work should be safe, healthy and interesting. But just as important, it should be socially useful and personally meaningful. Decisions about the mode of management for an industry must consider such factors. The bigger the enterprise, the more likely it is that workers become cogs in a machine. The great advantage of cooperative management is that it enables workers to feel at one with their job.

At the macroeconomic level, a variety of indices are becoming available to measure the different components of quality of life. According to economic rationalists, increasing per capita GDP is said to be evidence of an increasing quality of life. This assertion is wrong on two counts. First, per capita GDP is an average figure that hides great inequality of incomes and especially inequality of access to the minimum requirements of life.[88] Second, GDP measures any kind of economic activity whether it contributes to quality of life or not. Military spending, policing, surveillance and the like contribute magnificently to GDP, but the circumstances which make them necessary suggest something is wrong with our quality of life.

An exciting range of new economic indicators has been developed by the Calvert-Henderson group.[89] These include literacy rates, school dropout rates, infant mortality, nutritional indices, cholesterol levels, average calorie intake, water quality, sanitation standards, access to telecommunications, access to affordable housing, tests for various types of intelligence, the status of women and minorities, pollution levels and natural resource depletion. Friends of the Earth have an interactive website[90] which demonstrates how different combinations of socio-economic indicators can be combined into a single index. The Kingdom of Bhutan is the first nation to have formally adopted a new economic indicator known as the *happiness indicator*, an innovation which has reportedly attracted the attention of the UK Treasury.[91]

The way in which large-scale businesses are managed impacts directly on standard of living indices. For example, consider a privately owned telecommunications enterprise. As the business grows, its sphere of operations will eventually encompass both rural and urban areas. Rural areas are the least profitable, so the easiest way to increase profits is to cut rural services. GDP might increase but the standard of living for some will decline. The same company operating as a public utility would subsidize rural services with its

more efficient urban services because its enabling legislation (an expression of public will) requires it to do so. GDP increases (perhaps not as much) but the standard of living in rural communities also increases.

The Audit Branch of Government

The *separation of powers* is a fundamental principle of democratic societies. It emerged out of a 2,000 year struggle in Europe to establish the Humanist ideal, that is, to put human dignity and worth above the dictates of kings, queens and tyrants. Sarkar expresses grave concerns about the gradual erosion of the separation of powers in the 20th century. He goes further and suggests that, in addition to the *legislature*, the *executive* and the *judiciary*, there should a fourth branch of government, the *audit branch*.[92] In simplest terms, the role of the legislature is to decide what to do, the role of the executive is to do it and, in Sarkar's proposal, the role of the audit branch would be *to ensure they have done it*. (And of course the role of the judiciary is to resolve disputes between the other three branches.) The audit branch would not have any role in preparing the budget because this is a policy matter that remains the preserve of the legislature.

In keeping with the notion of triple bottom line accounting, the audit branch of government might also be responsible for a country's social and environmental auditing. It might subsume the bureau of statistics and calculate economic indices, measures of welfare, etc. It would monitor the degree of self-sufficiency of local government areas (*blocks*) and report to the legislature when there is an unhealthy draining of wealth from one *block* to another. In the environmental arena, it would monitor the hydrological cycle, soil erosion and greenhouse gas emissions. Apart from reducing the scope for corruption in the public sector, a separate audit branch of government would have other advantages, including, for example, preventing politicians from redefining *quality of life* indices to suit their own agendas.[93]

Competition and Cooperation

One of the seven international principles of cooperatives is *cooperation among cooperatives*. And yet, at the same time, cooperatives are subject to the discipline of the market place. If a cooperative does not produce good quality products, consumers will seek other suppliers. This raises the interesting synergy of cooperation and competition. Australia has a competition watch dog whose job, in theory at least, is to ensure fair and efficient competition. There are many instances, especially with very large corporations, where competition does not make sense. A classic example is competition which leads to a proliferation of competing protocols and standards in telecommunications and computing. To avoid such non-productive competition (the fierce war between Betamax and VHS for video format dominance is a classic example), large

businesses cooperate. Finding the right balance of competition and cooperation, that is both rational and serves the interests of consumers, is probably a never ending struggle. It may turn out to be helpful to study the synergy of cooperation and competition in the natural world. (See, for example, the section Patterns of Competition and Cooperation in Nature and Society in David Holmgren's treatise on permaculture.[94])

Worker's Organizations and Unions

Traditional trade unions sometimes have difficulty coming to terms with the cooperative model. A case in point is a long running dispute in Italy, where cooperatives form an important sector of the Italian economy. There are estimated to be some 40,000 cooperatives in Italy, which of course give work to many times more people. Many of these workers are not employees in the traditional sense but rather *working partners*. As they combine features of a partner in a commercial company (some sort of entrepreneurship) with those of an employee (the fact of earning a wage), working partners are at the centre of an important fight between trade unions and cooperative associations. To simplify greatly, the question is whether the working partner should be considered more of a 'partner' and therefore bear the risks of economic activity, or more of a 'worker' and hence be fully protected by industry-wide collective agreements.

Unfortunately this debate takes place against the backdrop of the historical struggle between workers and bosses who see their interests as antagonistic. And indeed they usually are in a capitalist society. Cooperatives do not fit conveniently into the polarized world of labour versus capital. Yet, as the Italian author of a report on this debate comments,[95] trade unions around the world promote many cooperative initiatives, mainly in the field of social welfare. The *working partner* dispute exposes an ideological tension between unions and cooperatives – two worlds that actually have many cultural and practical connections, despite their differences.

Sarkar accepts the view that workers should organize unions where they see the necessity. He does not, however, address the issue of the relationship between unions and cooperatives. The easiest interpretation is that trade unions are primarily relevant to the large government run enterprises. And in these, Sarkar also advocates worker representatives elected to the boards of directors.

In the case of cooperatives, many of them will employ workers from the spectrum of social classes. It is quite easy to imagine a scenario where better educated upper middle class workers become entrenched in better paid management positions and the differential wage between managers and non-managers increases excessively. Sarkar accepts that intellectual and managerial skills should be adequately rewarded but he also insists that there should be

some maximum ratio between the lowest paid and the highest paid.[96] Indeed most existing cooperatives have such a maximum ratio, but it is interesting to note that the managers of the Mondragon cooperatives have increased that ratio from 1:3 to 1:6 as they were obliged to compete in the capitalist world.[97]

The lesson appears to be that there will always be a need for regulatory authorities to monitor working conditions in all enterprises, whether private, cooperative or public. Furthermore, workers organizations will be helpful to guard against class exploitation within cooperatives, and they could also take the role of guilds and trade associations to assist in the dissemination of new technology and to ensure a uniformity of quality standards through an industry. However, care should also be taken that trade unions do not undermine the cooperative spirit. It will probably take some time for the appropriate balance to emerge.

The Rural Sector

The Corporate Conquest of Farming

Agriculture in under-developed countries has long been problematic, but as we enter the 21st century even agriculture in developed countries has reached a critical juncture. The combination of climate change, rising energy costs and exposure to unfair competition in the name of 'free trade' has rendered the traditional family farm unviable. The family- or owner-operated farm is rapidly giving way to *corporate agriculture*, that is, large-scale farming dominated by a few corporations able to command large-scale investment funds. The Australian government is promoting corporate agriculture as the way of the future, arguing that family farms no longer have the economies of scale to survive in a globalized world. Large multinational corporations have long dominated the production of inputs to farming and also the distribution of farm output, but until recently the actual farming itself had mostly remained in the hands of small family businesses.

The corporate conquest of farming will have hugely important consequences. A particularly worrying feature is that the agri-corporates see themselves first as financial investment managers and only second as farmers. Yet they are now the largest holders of prime agricultural land in Australia and by contracting out the actual farming they still determine what is planted and where. One of Australia's largest agri-corporates, Primary Yield,[98] describes itself as follows:

> Primary Yield is an investment manager specializing in the agricultural sector. For investors and advisors looking to build a well-diversified portfolio, Primary Yield offers simple access to a range of quality agri-business investments managed by industry leading specialists in sectors participating in strong global markets.

The *yield* in Primary Yield is not bushels per acre but cents in the dollar – with the disturbing consequence that farming will inevitably become embroiled in speculative take-over battles, as one agri-corporate attempts to swallow up another.

Needless to say many Australian farmers are disturbed by the shift to corporate agriculture. They use terms such as *corporate feudalism* to describe emerging trends in the rural economy,[99] where arable land is farmed by a class of essentially powerless 'serfs' but owned by a class of aristocrats (powerful corporations) who also reap the product. The term is ironic, since it also describes the reality of farming in Third World countries, despite the great difference in technology and scale. Sarkar is adamant in his rejection of the feudal nature of agriculture in India.

The previous four paragraphs were researched in 2006-2007. At that time there were three major agri-corporates in Australia: Primary Yield, Great Southern and Timbercorp. The government of the day had great faith that such companies would be the salvation of Australian agriculture.[100] It is worth noting the status of these three giants as of 2009. Primary Yield collapsed in November 2008 with a debt of $100 million AUD. Timbercorp collapsed in April 2009 with a debt of $300 million AUD.[101] Great Southern declared bankruptcy in May 2009 owing investors up to $4 billion AUD. The managing director of Great Southern gave himself a $2 million retirement benefit just before the company collapsed.[102] Billions of dollars of prime agricultural land are now tied up in legal battles.

A Cooperative Rural Sector

Sarkar accepts that farming must be viewed as an industry and subject to the same criteria of efficiency as required for manufacturing industries. However he insists that farms must be owned and managed by the farmers themselves and that in order to achieve the required economies of scale farming is best organized cooperatively. Sarkar envisions the rural economy as dominated by a variety of cooperatives, primarily farmer cooperatives, producer cooperatives and consumer cooperatives. The first is engaged in primary production. The second are of two kinds: *agro-industries*, which produce tractors, hoes and other commodities required to grow food and fibre, and *agrico-industries*, which value-add by processing and refining farm output. Consumer cooperatives are responsible for the distribution, marketing and sale of agricultural produce. Sarkar also refers to *farmer-cum-producer* cooperatives which both grow and value-add. Public utilities would supply key raw materials requiring large-scale infrastructure for their production and distribution, for example, fertilizer, irrigation water and fuel. Privately owned small businesses would provide specialized agronomic and veterinary services and of course specialty foods and gourmet items (Figure 5).

Cooperatives are nothing new in the world's rural economies. Indeed in the 19th century and well into the 20th century, farmer owned cooperatives dominated the processing and distribution of agricultural produce. It is only in the last 20 years with the emergence of economic rationalism that private corporations made concerted efforts to take over rural cooperatives in a process known as *demutualization*. Farmers allowed this to happen partly because they were not able to stand against the power of large corporations and partly because they had forgotten the advantages that lead their predecessors to form cooperatives in the first place.

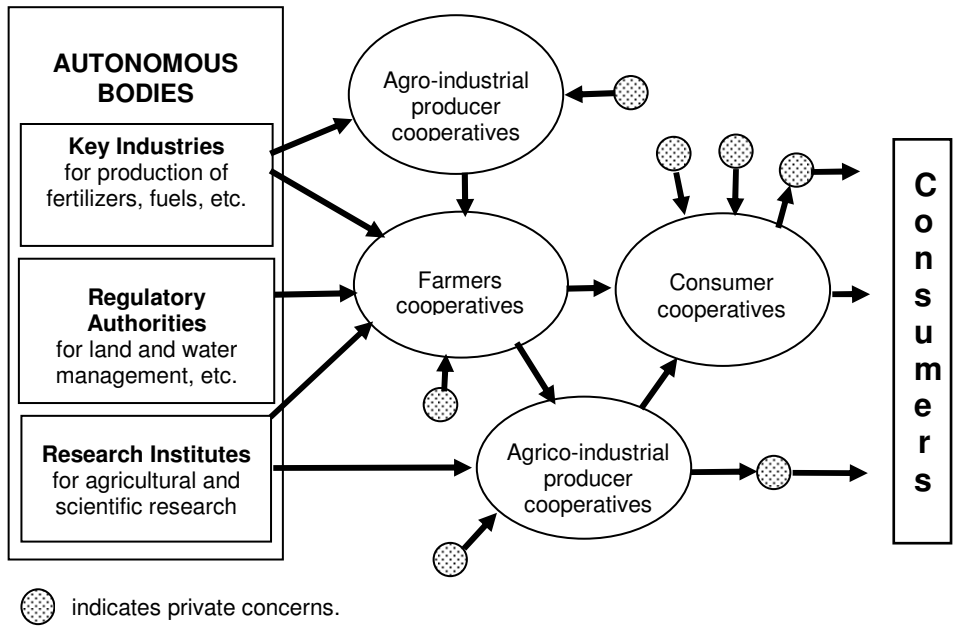

Figure 5: The agricultural sector from a three-tier enterprise perspective.

Sarkar's proposal might be described as the *remutualization* of the rural economy, with the difference that the actual farming is also mutualized. Farming cooperatively, says Sarkar, offers many advantages, three of which are mentioned here. First, it offers economies of scale and therefore financial stability. Farmers will be able to invest in the latest machinery and take advantage of the latest scientific and technological developments. Second, farming planned over larger areas of land will achieve environmental benefits through more effective management of water, soil erosion, drainage, etc. Third, and as important as the first two, financial and ecological stability will allow farmers to enjoy an enviable lifestyle. Automation will reduce hard physical

labour and allow time for intellectual, artistic and spiritual activities. This last advantage has also been emphasized by Colin Tudge, author of *The Secret Life of Trees*:

> …once we start to think seriously about the fate of cities, and environmental stress in general, and human employment and dignity – we see that for the foreseeable future, and probably forever, the economies and physical structure of the world must be primarily agrarian. In the current crude, unexamined dogma, 'development' and 'progress' mean urbanization. The primary requirement, in absolute contrast, is to make agrarian living agreeable. It can be. It's just that at present, all the world's most powerful forces are against it.[103]

The increased significance of agriculture does not mean a majority of people 'toiling in the fields'. Rather it means that the economy and culture of a region would be securely grounded in the ecological dynamics of its landscape. In Sarkar's view, a healthy, well-developed society would have about 25% to 30% of its active work force engaged directly in agriculture. This compares with 80% in underdeveloped countries and 5% in what Sarkar calls over-developed countries, such as Australia and the USA. A strong cooperative sector is required to make agrarian living agreeable. However, Sarkar warns against the hasty formation of farmers cooperatives.

> …it is not wise to suddenly hand over all land to cooperative management because cooperatives evolve out of the collective labour and wisdom of a community. The community must develop an integrated economic environment, common economic needs and a ready market for its cooperatively produced goods. Unless these three factors work together, an enterprise cannot be called a cooperative.[104]

Even worse would be any attempt to impose the cooperative system on an unwilling rural population. This would inevitably lead to failure, as was the case when the Soviet Union attempted to imposed collective farming.

> The leaders of the Soviet Union were ignorant of the collective psychology of the people, so they tried to impose collective farming by force. This produced severe famines and massive civil unrest. While trying to cope with these problems, the administration resorted to brute force instead of adopting psychological measures, and as a result they annihilated many people.[105]

Those attempting to establish a Proutistic economy, says Sarkar, "will never go against the spirit of a country and cause its ruin".

Four Phase Program for a Cooperative Rural Economy

Sarkar proposes a four phase program for the introduction of farming cooperatives.

Phase one

In the first phase, *uneconomic* farms, that is, those where the market price of the produce is less than the cost of production, including all capital, labour and machinery costs, would be encouraged to join a farmers cooperative. The contributing farmers would still retain title to their land. 50% of the net profit would go to the landowners (in proportion to the productivity of their contributed land) and 50% to the labourers (in proportion to their net wage). The advantage of cooperative management at this stage is an increase in production because uneconomic land holdings become economic. Economies of scale are achieved in the more efficient provision of irrigation, use of machinery and land management practice. In this phase, there is no point in attempting to include economic holdings. Parallel to the formation of farming cooperatives would be the formation of agro- and agrico-cooperatives to generate local demand for farm produce and to provide employment within the local community.

Phase two

In the second phase, farmers owning economic holdings would be invited to join the cooperative system but this phase begins only after all non-economic holdings have been consolidated. Profit in farmer cooperatives is now divided 25% to landowners and 75% to labour. Landowners would still enjoy two income sources, one from their labour, the other from their land contribution.

Phase three

In this phase, there would be rational redistribution of land. Rational means that farm boundaries would be adjusted to landscape management requirements and that farm sizes would be sufficient to support a family. This policy implies, although Sarkar does not explicitly state it, that family farms would be the norm, just as they are today, but that families would work cooperatively with their neighbours in order that the landscape might be managed as a whole.[106] In addition, the family would have the financial and social security of working under the umbrella of a larger cooperative. However there would now be no distinction between farm labour and landowner. All farming members would own the land through their cooperative and consequently 100% of the profit is shared in proportion to the contribution of a member's labour.

While one of the advantages of a farmer cooperative is economies of scale, the farms should not be too large:

> In this phase, it will be easy to establish big cooperatives with the extensive application of science, but these cooperatives will not be anything like the huge collective farms of the Soviet Union or China. If cooperatives are allowed to become extremely large, it will be difficult to utilize natural resources efficiently and this will lead to complications in

> the sphere of production. One of the main defects of the collective farms in socialist countries is their unmanageable size.[107]

The ultimate size and composition of the cooperatives, says Sarkar, should be determined by the farmers themselves.

Phase four

Sarkar notes that the establishment of a cooperative rural sector will not happen overnight. Indeed he implies that it may take many years for a culture of thinking cooperatively to gradually permeate society. This process is what sociologists would refer to as the accumulation of *social capital*. The final phase will be characterized by no conflict over the ownership of land, by full employment and by an agreeable rural lifestyle.

The most important feature of Sarkar's rural development program is that it works from bottom up. It proceeds at a pace determined by the willingness of farmers and rural communities to embrace the cooperative system. When cooperatives are pushed from the top with little psychological preparation, the outcome must be uncertain. Venezuela and Bolivia make an interesting comparison. President Chavez in Venezuela is creating cooperatives and communal councils from top-down. In Bolivia, by contrast, cooperatives are arising out of a people's movement, bottom-up. If Chavez loses power the entire Venezuelan cooperative program could possibly fall apart. In Bolivia, political leaders are almost irrelevant because their cooperative movements have been built by local communities who offer ultimatums to politicians. One reason for the difference is that Bolivia's movement has indigenous roots, with a culture quite different from traditional Latin-American culture.[108]

The Service Sector

In this section we describe the application of the three-tier enterprise system to the structure of two service industries, health and finance. Sarkar defines a service cooperative as "a subtle type of cooperative coming within the arena of cultural cooperatives". Into this category he includes the work of intellectuals and artists. But he gives as an example the formation of physicians service cooperatives. The reader may like to extend the application of the three-tier enterprise concept to other sectors, such as education, media and communications.

The Health Sector

Health services constitute a significant part of a modern economy and consume a large portion of its resources. Consequently delivery of health services must

be subject to principles of efficiency, decentralization, etc., as described in the previous section.

> Doctors should start service cooperatives. These cooperatives may also be called "physicians service cooperatives". Suppose a doctor is not able to open his or her own practice, he or she may form a service cooperative with five or ten other doctors. Such a cooperative is an intellectual service cooperative. Doctors who have little capital and cannot afford to establish their own practices can also work in this type of cooperative. Such a system will solve the unemployment problem of doctors. In addition, doctors can start research through these cooperatives, although a doctor's job is ninety-nine percent practical and hardly one percent theoretical.[109]

It seems natural to adopt the three-tier system to structure the provision of health services through hospitals, clinics and private practitioners. A public hospital would be a large institution typically with several hundred staff and managed as they usually are today by an autonomous or government body of some kind. Cooperative clinics and hospitals would offer a wide range of standard and specialty services under the same roof but would not offer the high-tech diagnostic services of a major hospital (such as MRIs). Finally, private practitioners would offer a variety of health services and premium services, such as home visits.

With regard to the provision of medicines, Sarkar argues that the right to manufacture medicines should be entrusted to autonomous bodies, while their distribution can be through the same autonomous bodies or through consumer cooperatives.[110]

It is interesting to note that with the advent of economic rationalism, public hospitals in the State of Queensland are employing more bureaucrats and fewer nurses, with administrative staff constituting almost 75% of new staff employed in the five years up to 2005.[111] Despite this, Queensland hospitals continue to be plagued by crisis. Doctors are scarce, nursing is more stressful than ever and hospitals are overcrowded. When business people run hospitals, efficiency apparently comes at considerable cost.

In most developed countries, health care is funded partly by government and partly by personal health insurance. Sarkar does not discuss this contentious issue, other than to insist that everyone must be guaranteed their minimum health requirements. The issue has been discussed briefly in Towsey (2003) who observes that "there is a common perception that government involvement in public insurance promotes equity while non-government insurance schemes are economically more efficient". He then proposes a mixed health funding scheme:

> There is an important distinction in Prout between the *minimum required* allocation of a commodity or service and the additional *amenity* component which makes life easier but is not essential. In the case of

> health care, the Australian government makes the same distinction. The government provides essential health services, while private insurers cover *optional extras*, such as doctor of choice, massage and optometry. This arrangement, or something like it, seems elegant. In a Proutist system, government would have a constitutional obligation to ensure that everyone gets the minimum health care services so it should be given the necessary powers to achieve this goal, thereby taking care of the equity objective. Health insurance cooperatives could provide cover for the additional health amenities that become desirable as a community becomes more wealthy.[112]

Given the expensive medical technology currently available to save lives, this apparantly elegant solution hides extremely difficult policy decisions – what is a minimum health requirement and what is an amenity? A workable health policy is yet another area requiring attention from Proutists.

The Financial Sector

> It is patent that in our days not alone is wealth accumulated, but immense power and despotic economic domination is concentrated in the hands of a few... This power becomes particularly irresistible when exercised by those who, because they hold and control money, are able also to govern credit and determine its allotment, for that reason supplying so to speak, the lifeblood to the entire economic body, and grasping, as it were, in their hands the very soul of production, so that no one dare breath against their will.
>
> Pope Pius XI[113]

Sarkar would probably have appreciated the intensity of language used by Pius XI. His response would have been to insist that the banking system should not be in the hands of private individuals "because past experience has shown that managers who are dishonest business people have seldom protected the hard earned savings of ordinary depositors. Many have profited by illegally or recklessly investing the bank's money; their activities have also ruined many middle-class families."[114] As if to prove his point, in recent years the United States has witnessed the Savings and Loans scandals, Enron, WorldCom and the sub-prime mortgage meltdown, to mention just the big ones. In Australia we have had the collapse of HIH. Each of these calamities wiped out the life savings of many families. They were caused in each case by a few dishonest and reckless managers.

Ideally the central bank should be an *autonomous body* at arms length from political interference. In fact the current practice of an independent central bank, whose operations are defined by statute, appears to be entirely appropriate. The problem is that the banking system to be regulated is in private hands and managed to serve the selfish interests of a comparatively few very wealthy shareholders. Furthermore, those appointed to the Reserve Bank

Board come from the private sector and support its ethos and culture. In a cooperative economy, the banking system would be a combination of comparatively few large-scale banks, operating as key industries on a *no profit and no loss* basis, and many smaller community-scale cooperative banks or credit unions.

A widespread system of cooperative banks and credit unions would decentralize money allocation decisions. Cooperative banks build local prosperity because they keep money circulating within the local community rather than letting it bleed to outside investors. To reap this advantage, it is necessary to ensure that the majority of a credit union's funds are borrowed from and lent within their *block* or community. Prout's three-tier system would place an upper limit on the expansion of individual credit unions, thereby preventing any one institution gaining disproportionate power. The profits of cooperative banks would be distributed to shareholders, the majority of whom would be employees and customers living within the same *block*.

There are many innovations in the field of community banking and currencies, for example, micro-credit,[115] the interest free loans of Starr-Bowkett Societies,[116] the JAK banks in Sweden[117] and LETS trading schemes.[118] They deserve the opportunity to achieve success, but within the constraints of cooperative management, strict supervision and social purpose objectives.

Broking and advisory services are appropriate roles for the private and cooperative sectors, depending on the scale of the service provided. Sarkar refers to *family annuity cooperatives* which, although undefined, would presumably provide superannuation and life insurance services. They could operate in conjunction with other cooperatives to provide workers with pension-saving schemes. Conceivably payments to annuity trusts could become compulsory, just like superannuation payments are today, in which case retirement savings would become an important source of capital for new cooperative enterprises.

The financial sector, even in an established cooperative economy, will always require careful regulation to guard against unscrupulous activity. A cardinal rule for policy makers is that a regulatory authority should always be independent from the actual providers of the regulated products and services and there should be no conflicts of interest between the regulator and the regulated. It is an obvious rule born out of centuries of experience. Yet it is a rule often broken. Consider, for example, the case of the Australian Securities Exchange (ASX) that supervises trading in Australian shares and securities.[119] The ASX is also a for-profit company (having a duty to maximize returns to its shareholders) that stands to profit from an increased volume of the trading it supervises – a conflict of interest that inevitably led to accusations that the ASX compromised its regulatory role by promoting dubious investment products so as to increase turnover. This in turn placed superannuation savings

at risk.[120] One is reminded again of Sarkar's warning about financiers recklessly investing the savings of middle-class families, thereby bringing about their ruin.

To conclude, financial management will always be about walking a tightrope – it should enable entrepreneurs to respond to perceived opportunities but without giving the selfish minded of them a chance to rort the system. The larger goal is to ensure financial security into the future.

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About the Author

Michael Towsey studied biology at Auckland University (New Zealand) in the late 1960s and later obtained his PhD in computer science from Queensland University. For most of his career Michael has been a research scientist. He started in the field of plant physiology, moved to crop physiology and after obtaining his PhD turned to biological applications of machine learning. Michael is a founding member and associate of Prout College. In relaxed mode, he plays in two recorder ensembles and potters around in a community garden.

Appendix

The Five Fundamental Principles of Prout

1. No individual should be allowed to accumulate any physical wealth without the clear permission or approval of the collective body.

2. There should be maximum utilization and rational distribution of all mundane, supramundane and spiritual potentialities of the universe.

3. There should be maximum utilization of physical, metaphysical and spiritual potentialities of unit and collective bodies of human society.

4. There should be a proper adjustment amongst these physical, metaphysical, mundane, supramundane and spiritual utilizations.

5. The method of utilization should vary in accordance with changes in time, space and person, and the utilization should be of progressive nature.

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Note: In the following endnotes, a space may have been inserted into some URLs in order to facilitate formatting. If a URL does not work, check for the insertion of a gap.

Endnotes

[1] In the later phases of the Cold War, the US adopted what became known as the *Strategy of Technology*. The idea was to overwhelm the Soviet Union's economic ability to maintain military parity. See http://en.wikipedia.org/wiki/Strategy_of_Technology, link valid 12 December 2009. Of course this economic or technological argument is only part of a more complex story. Suppression of intellectual freedom and human rights must surely have contributed to the relatively sudden collapse of the USSR.

[2] For a more detailed account of the early cooperative movement, see Michael Towsey, "The Biopsychology of Cooperation", in *Understanding Prout*, *Volume 1*, 2010.

[3] For more on Owen's life, see George Cole, *A Century of Cooperation*, George Allen and Unwin Ltd., for The Cooperative Union Ltd. First Edition, 1944. Download from: http://www.archive.org/stream/centuryofcoopera035522mbp/centuryofcoopera035522mbp_djvu .txt. There is also a Wikipedia entry on Owen.

[4] Stretton (ENI) p 101.

[5] For more on Japan's industrial revolution, read chapter 11 of Stretton (ENI).

[6] See http://www.thenation.com/doc/20100301/alperowitz_et_al for the story of Cleveland.

[7] Sarkar, P. R. "Socio-economic Movements", (PN13).

[8] Sarkar (HS1).

[9] Sarkar (POD).

[10] Sarkar (PE).

[11] Elsewhere, Sarkar acknowledges Bertrand Russell's description of Nehru and colleagues as 'socialist show-boys'.

[12] Sarkar (HS1).

[13] Sarkar (HS1) p 139.

[14] Sarkar (HS1) p 142.

[15] Sarkar (POD). Section 11.

[16] Sarkar (DOP). Also in (PN4).

[17] Ibid.

[18] Sarkar, P. R. "Socio-economic Decentralization", (PE) pp 226.

[19] Sarkar (I&I).

[20] Sarkar, P. R. *Ananda Sutram*. AM Publications. First Edition, 1962. Second English Edition (second printing), 2001.

[21] Sarkar (DOP). Note: *Discourses on Prout* is chronologically the fourth book in which Sarkar outlines his comprehensive socio-economic theory but it is only the second in which he explicitly uses the term *Prout*.

[22] Sarkar (DOP) Section 3.

[23] Sarkar (PE) Ch 15.

[24] Ibid.

[25] Gittens, Ross. "Few are Great, Many are Small." *The Age*, Melbourne, 23 August 2006.

[26] http://www.abs.gov.au/

[27] This is a technical term to describe the connectivity structure of a certain kind of network. It is of interest because such networks occur widely in the "real-world", for example, social networks, computer networks, neural networks, gene regulatory networks and even disease transmission. In scale-free networks, a few nodes are highly connected hubs despite most nodes having few connections. This pattern of connectivity remains the same no matter

how large the network. For more information, see the Wikipedia entry http://en.wikipedia.org/wiki/Scale-free_network

[28] Ormerod, Paul. *Why Most Things Fail: Evolution, Extinction and Economics*. Faber and Faber, 2005. ISBN 0-571-22012-6.

[29] See Michael Towsey, "The Biopsychology of Cooperation" in *Understanding Prout*, *Volume 1*, 2010, for a further discussion of the controversial issue of economic growth.

[30] Sarkar (PE) p 140.

[31] http://www.communitypraxis.org/, link valid 12 December 2009.

[32] http://www.ownershipassociates.com/mcc-intro.shtm, link valid 12 December 2009.

[33] Sarkar (PE) p 271.

[34] http://en.wikipedia.org/wiki/Social_economy, link valid 21 Decmber 2009.

[35] Pearce, John. *Social Enterprise in Anytown*. Calouste Gulbenkian Foundation, 2003.

[36] Another useful typology of enterprises describes four types based on two dichotomies – private versus public ownership and social versus commercial purpose. See http://en.wikipedia.org/wiki/Social_economy, link valid 21 December 2009.

[37] See 2010 report, http://www.pc.gov.au/projects/study/not-for-profit/report and press release http://ministers.treasury.gov.au/DisplayDocs.aspx?doc=pressreleases/2010/024.htm&pageID=003&min=njsa&Year=&DocType=

[38] Pearce, John. 2003 Op. Cit.

[39] Putnam, Robert D. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster, 2000.

[40] Henderson et al. *Calvert-Henderson Quality of Life Indicators: A new tool for assessing national trends*. Editors: Hazel Henderson, Jon Lickerman, and Patrice Flynn; 2000. See also http://www.flynnresearch.com/calvert.htm, link valid 12 December 2009.

[41] http://philanthropywiki.org.au/index.php/Centre_for_Social_Impact, link valid 21 December 2009.

[42] http://www.bus.qut.edu.au/research/cpns/, link valid 21 December 2009.

[43] http://www.socialtraders.com.au/, link valid 21 December 2009.

[44] Stretton (ENI).

[45] See report in *The Guardian*, http://www.guardian.co.uk/global/2009/dec/13/drug-money-banks-saved-un-cfief-claims, link valid 16 December 2009.

[46] Sarkar (HS2) p 277.

[47] Sarkar (HS1) p 136.

[48] Sarkar, P. R. "Economic Dynamics", (PN13), 1987.

[49] Sarkar (PE).

[50] Firdaus Ghista (*pers com*) has also alerted the author to the uncooperative behaviour of some cooperatives in India. "In Bihar today, some coops grow their own crops, use the proceeds to buy up other crops very cheaply from poor farmers and then sell that produce for a hefty profit to the government. The government is unable to control this type of cooperative capitalism even if it wanted to do so. How do you stop coops from becoming predatory

corporations? If the government does so, then it gives the state a loophole to interfere in the cooperative economy whenever it wants. So moral struggle in coops is something people must be psychologically prepared for."

[51] http://www.mondragon.mcc.es, link valid 12 December 2009.

[52] Carver, John. *A Theory of Corporate Governance – finding a new balance for boards and their CEOs*, 2000. http://www.carvergovernance.com/pg-corp.htm, link valid 12 December 2009.

[53] The main difference between these two is that with marginal cost pricing one does not attempt to recover fixed costs from revenue. With average cost pricing both fixed and variable costs are recovered from revenue.

[54] Futagami, Koichi. "The Range of the Public Sector and Efficiency". *Financial Review*, **52**, pp 1-13, 1999. http://www.mof.go.jp/english/f_review/fr52e.htm#futagami, link valid 12 December 2009.

[55] Towsey, Michael. *Tax in a Proutist Economy*, Prout Institute of Australia, 2003.

[56] Sarkar (DOP) Section 3.

[57] Sarkar (PE).

[58] Sarkar, P. R. "Cooperatives", (PE) p 128.

[59] Ibid.

[60] Adam Smith, in *Wealth of Nations*, acknowledged the importance of cooperation within an economy. It was the subsequent neoclassical approach (later to become *neoliberalism*) which narrowed and distorted economic thought. (Alanna Hartzog, pers com.)

[61] Sarkar (PN18) p 69.

[62] Stretton (ENI) p 427.

[63] http://www.endgame.org/endgame.html, link valid 17 December 2009.

[64] Eilis Lawlor, Helen Kersley and Susan Steed. *A Bit Rich: Calculating the real value to society of different professions*. New Economics Foundation, © NEF December 2009, ISBN 978 1 904882 69 5. Down from http://www.neweconomics.org, link valid 18 December 2009.

[65] Ibid, p 3.

[66] Pearce, 2003, Op. Cit. Chapter 11.

[67] Garratt, Bob. *Thin on Top*. Nicholas-Brealey Publishers, 2003.

[68] Cruver, Brian. *Enron – anatomy of greed*. Arrow Book, 2003.

[69] Sarkar (HS2) p 277.

[70] Wong, Paul. *Lessons from the Enron Debacle: Corporate Culture Matters*! 2002. http://www.meaning.ca/articles/print/lessons_from_enron.htm

[71] http://www.socialauditnetwork.org.uk/, link valid 21 December 2009.

[72] http://www.socialventures.com.au/, link valid 21 December 2009.

[73] http://www.socialventures.com.au/content/Social_Return_on_Investment_SROI_Tool/, link valid 22 December 2009.

[74] Wentworth Group of Concerned Scientists. *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*. April 2008. Download from http://www.wentworthgroup.org, For an introduction see also, Peter Cosier, *Accounting for Nature*, Fenner Conference on the Environment, 10-12 March 2009, Canberra.

[75] For the issues surrounding the Murray-Darling Basin water allocations, see Michael Towsey "Water and Land Management – A Foundation for Economic Planning in Australia", in *Understanding Prout – Essays on Sustainability and Transformation*, *Volume 1*, 2010.

[76] http://www.environment.gov.au/archive/biodiversity/toolbox/templates/pubs/habitat-hectares.pdf, link valid 23 December 2009.

[77] http://www.abc.net.au/rn/backgroundbriefing/stories/2008/2392756.htm, link valid 23 December 2009.

[78] Ibid.

[79] This is the distinction between the deep ecology and the utilitarian approaches to environmental management. See http://en.wikipedia.org/wiki/Deep_ecology, link valid 23 December 2009.

[80] For example, the Westpac Foundation is a charitable trust providing grants to help not-for-profit organizations in Australia. It seeks to create and sustain social enterprises in disadvantaged communities. http://www.westpac.com.au/about-westpac/sustainability-and-community/westpac-foundation/, link valid 20 December 2009.

[81] http://www.lbg-online.net/, link valid 12 December 2009. See also the "LBG Review", a special six page report in *The Australian*, Thursday 12 November 2009.

[82] http://www.coopdevelopment.org.au/natlinks.html, link valid 12 December 2009.

[83] Sarkar P. R. "Socio-economic Movements", Section: 100% Employment for Local People, (PN13).

[84] Sarkar (PE) Part 6, p 295.

[85] Firdaus Ghista (*pers com*) has offered the author an interesting historical perspective on the origins of the centralized national economy. He cites Braudel's *Civilization and Capitalism, 15th-18th Centuries (The Wheels of Commerce, Volume 2)* for the argument that economic centralization and imperialism go hand in hand. "In medieval France, there were a number of kingdoms/dukedoms, such as Bordeaux, Provence, etc. Each of these kingdoms had their own economies, market networks. These economies were not very developed and not very centralized. They were largely based on geography and were in a sense bioregional. As a result of the struggle between the monarchs and nobles, some of these economies, like Bordeaux, became regionally centralized. During the age of *absolutism*, the economy of France became more and more centralized to feed the growing imperialism of Louis XIV. After the Revolution this centralization accelerated as the new government broke up the provincial structure and created smaller geometrical divisions that had no relationship to geography or market networks. This was essentially the destruction of the provincial economies by the national economy (that is, the economy of elite Parisian merchants). The entire infrastructure was then developed to enable all these provinces to feed the Parisian hub. In our time these national hubs now feed global hubs like London, Tokyo, Amsterdam and New York." Economic decentralization would transform the highly centralized structure of modern global trade into a global network of trade between bioregional entities.

[86] Sarkar (PE) p 227.

[87] Sarkar (PE) p 226.

[88] Summary statistics commonly reported in the media can grossly distort the true state of an economy. For example, the overall U.S. unemployment rate of about 10% (in January 2010) hides gross disparities between income groups. According to a New York Times article, 8 February 2010, the unemployment rate of the top decile income group is 3.2% while that of the bottom decile income group is a staggering 30.8% - almost one in three. That is more than five points higher than the overall jobless rate at the height of the Great Depression. The second lowest income group had an unemployment rate of almost 20%. http://www.nytimes.com/2010/02/09/opinion/09herbert.html

[89] Henderson, 2000. Op. Cit.

[90] http://www.foe.co.uk/campaigns/sustainable_development/progress/, link valid 12 December 2009.

[91] Desty, Amos, "The New Wealth of Nations – Does Bhutan have a better way to measure national progress?" *American Scientist*, Nov-Dec, 2004, p 513.

[92] Sarkar, P. R. "Compartmentalized Democracy", 1961, (PN14). In the U.S.A. the Government Accountability Office (GAO), an investigative arm of Congress, fulfils some of the proposed audit functions. http://www.gao.gov/, link valid 12 December 2009.

[93] Definitions of unemployment and under-employment have been altered over the years to make the figures look better.

[94] Holmgren, David, *Permaculture: Principles and Pathways: Beyond Sustainability*. Holmgren Design Services, 2002, p 167.

[95] http://www.eurofound.europa.eu/eiro/1997/08/feature/it9708210f.html, link valid 12 December 2009.

[96] See Michael Towsey, "The Biopsychology of Cooperation", in *Understanding Prout – Essays on Sustainability and Transformation*, *Volume 1*, 2010.

[97] Pay differences between the lowest and the highest paid workers has been one of the most contentious issues in the Mondragon cooperatives. Originally, the ratio was set at 3:1, but was later raised to 6:1 to attract quality managers. Nevertheless this ratio pales into insignificance compared to the income ratios prevailing in U.S. and U.K. companies. For more background on the Mondragon cooperatives phenomenon see the Australian Employee Ownership Association's discussion forum. http://www.aeoa.org.au/0024/_forum/topic.asp?TOPIC_ID=178, link valid 12 January 2010.

[98] http://www.primaryyield.com.au, link valid in 2007, broken in 2009.

[99] Masters, Chris, *Treechange*, Four Corners, ABC Television, Australia, 2007. Transcript online at http://www.abc.net.au/4corners/content/2007/s1892893.htm, link valid 12 December 2009.

[100] Ibid. See for example the promotion of Managed Investment Schemes by Australian politicians, especially the zeal of Wilson Tuckey.

[101] Australian Associated Press, "Timbercorp rent default jeopardises ownership of crops", *The Australian*, 8 August 2009.

[102] Klan, Anthony, "Big payout as forestry group Great Southern teetered", *The Australian*, 19 May 2009.

[103] Tudge, Colin. *The Secret Life of Trees*, Penguin Books, 2005. ISBN-13: 978-0-141-01293-3, p 368.

[104] Sarkar (PE) p 113.

[105] Sarkar (PE) p 115.

[106] See Michael Towsey, "Water and Land Management – A Foundation for Economic Planning in Australia", in *Understanding Prout – Essays on Sustainability and Transformation*, *Volume 1*, 2010.

[107] Sarkar, P. R. "Farmers Cooperatives", (PE) p 125.

[108] This perspective on the cooperative movement in South America was suggested by Firdaus Ghista (*pers com*).

[109] Sarkar (PE) p 271.

[110] Sarkar (HS1) p 141.

[111] "Administration replacing nurses in Qld." (Brief Article) *Australian Nursing Journal*, 1 April 2005. © 2005 Australian Nursing Federation. http://www.highbeam.com/doc/1G1-131762954.html, link valid 28 December 2009.

[112] Towsey, 2003. Op. Cit., p 6.

[113] Pope Pius XI., *QUADRAGESIMO ANNO: Encyclical on the reconstruction of the social order*. Saint Peter's, Rome. 15 May 1931. Paragraphs 105 and 106. A slightly different translation is to be found at http://www.vatican.va/holy_father/pius_xi/encyclicals/documents/hf_p-xi_enc_19310515_quadragesimo-anno_en.html, link valid 20 January 2010.

[114] Sarkar (HS1) p 142.

[115] http://www.planetfinancegroup.org/EN/, link valid 17 December 2009.

[116] A Starr-Bowkett Society is a co-operative, non-profit financial institution that provides interest-free loans to its members and operates on the principle of mutual self-help. They were first promoted in 1843 by Dr T.E. Bowkett and became popular in Australia from the late 19th century through the early and mid 20th century. They are all but non-existent today partly due in Australia to legislation banning them. For further information see, http://en.wikipedia.org/wiki/Starr-Bowkett_Society and M. Darnell, "Freehold Property for Mechanics: A brief insight into Starr-Bowkett societies" in G. Patmore, J. Shields and N. Balnave (eds) *The Past is before us; Proceedings of the Ninth National Labour History Conference*, University of Sydney 2005, pp 97-106.

[117] The Swedish JAK bank appears to be a variant of a Starr-Bowkett Society. See, http://www.jak.se/, link valid 12 December 2009.

[118] More information on LETS see, http://en.wikipedia.org/wiki/LETS

[119] The ASX was formed from the merger of the Australian Stock Exchange and the Sydney Futures Exchange in December 2006.

[120] Ferguson, Adele. "Traders Plunder Super", *The Australian*, 16-17 February 2008, p 1. In 2009, the Australian Labor Government changed the legislation to remove the conflict of interest in ASX's operations.

Water and Land Management

A foundation for economic planning in Australia

Michael Towsey

Introduction

In most parts of the world, supplies of fresh drinking water are diminishing. The reasons are not hard to understand – population increase, pollution of ground and surface waters, over-exploitation of existing resources, deforestation of catchments and increasing demand for agricultural purposes. Finding new sources of water and managing demand are problems exercising water authorities everywhere. At the time of writing, even economically developed regions such as Australia and California are facing severe water shortages.

I started writing this essay in 2007 when the worst drought in 100 years dominated headlines around Australia. My initial motivation to broach the topic was the intense and often perplexing debate about the best water policy for Australia. It quickly became apparent that water policy cannot be discussed in isolation, even though this is how politicians attempt to frame the debate. A holistic approach is required, which at the very least includes land use policy. It then became clear that water and land use policy are implemented within a social and economic framework, and from a Proutist[1] perspective water and land use planning must be the starting point for local or *block-level* planning.

Block-level planning is one of the key features of Prout's economic agenda. The *block*, in Prout parlance, is equivalent to a local government area (LGA).[2] Prout broadly supports economic decentralization and therefore promotes cooperatives (locally owned and managed businesses) and economic planning at the local (LGA) level as well as at the federal or country level.

Those wishing to promote an economic plan for their local area will have to turn their minds to water and land use policy. But developing policy is not easy. The Australian Greens summarize their water policy in just seven points (see Appendix 3) and the Wentworth Group of Concerned Scientists[3] in just five points (see Appendix 4), but behind these summaries lies the deliberation of some of the best informed minds in the country. It may be politically expedient to present water policy in succinct statements, but such statements must be supported by a depth of research – sufficient to handle the controversies that will undoubtedly arise. This essay offers some general background information to help formulate a water and land use policy

informed by a Proutist perspective (that is, a perspective which promotes economic decentralization and cooperative enterprises). While the focus is on Australia, the ideas should be applicable to most parts of the world.

The politics of water is intense. Supposing a community or country could come up with a water policy that represented the best possible compromise between the desires of urban consumers, farmers, environmentalists, miners and business, the reality when it came to implementation would be something different. Water scarcity threatens livelihoods which fuels fear and greed. If you want to get some taste for the intensity and complexity of water politics in Australia, an arid country suddenly confronted with water scarcity, read Ticky Fullerton's highly readable account, *Watershed*[4].

Developing policy is also difficult because one has simultaneously to deal with big picture thinking (ethics, culture, long-term future) and technological detail. Furthermore, water policy must vary from place to place, so it is difficult to make definitive statements that suit every situation. Nevertheless it seems worthwhile to make the effort because water policy is not just about water, but about land management, resource management, agriculture and industry, all of which are located at the heart of block-level planning.

Structure of the Essay

The obvious water policy issues revolve around supply, demand and storage. But a long-term water policy requires a holistic approach and this document is based on the premise that water policy cannot be separated from land management, agricultural practice and of course economic policy.

We begin with a brief historical review which is necessary in order to appreciate contemporary water policy issues, both general and Australian. Next we deal with the supply, demand, storage triangle because these present the obvious policy challenges. Finally we review the all important issues of land management and water administration.

To give you a feeling for what is to come, here are some key features of the approach to water policy advocated in this essay:

1. A decentralized approach to water harvesting and storage, that is, local planning and management.
2. Water harvesting integrated with land management and planned on a catchment by catchment basis.
3. Water harvesting preferentially (but not exclusively) by the capture and storage of rainwater where it falls.
4. Water is a public resource, a minimum requirement of life and necessary for collective security. The proposition that water should be

privately owned and traded, like any other economic commodity, cannot be supported.

5. Maximum utilization of water will require demand management and scientific research directed to water efficiencies.
6. Rational distribution of water to be achieved through water trading by publicly owned utilities and farmers' irrigation cooperatives, with independent statutory bodies having a regulatory role.

Some History

Water policy in the 20th century is best understood in the light of European experience in the preceding century. The story begins early in the 19th century with the introduction of the water closet, first into fashionable homes, followed by more general adoption. Today we might assume this to represent a step forward in public hygiene, but quite the contrary – it inaugurated a disaster that killed hundreds of thousands of people over the coming century. The water closets discharged into sewers which, in turn, discharged into rivers. Private water companies drew water from those same rivers and returned it to the taps and pumps of the general populace. European rivers were sewers and not enjoyed by those of delicate disposition. "I counted two and seventy stenches – all well defined – and several stinks", wrote Samuel Coleridge of a boating trip on the Rhine where it passes through the romantic city of Cologne. A sitting of the Houses of Parliament in London, 1848, had to be adjourned because of the appalling stench bubbling up from the Thames.[5]

As early as 1828, a distinguished physician, William Lambe, warned the public that drinking water known to contain "the decayed and decaying remains of myriads of animals and vegetables, in every stage of decomposition and putrefaction", might be harmful to health. Yet despite repeated epidemics of cholera and typhoid (a cholera epidemic in London, 1848, claimed 3,000 lives in one week alone), it took 100 years of heated controversy before common sense prevailed and drinking water was kept separate from sewage. Why did it take so long?

The first difficulty confronting water and sanitation experts of the period was lack of an appropriate theory of disease. Bacteria had not yet been discovered – cholera and typhoid were believed to be caused by a *miasma*, 'something in the air'. Without an adequate germ theory to stimulate investigation, progress was difficult. An important discovery was made in 1854 when all the cases of cholera in a Soho epidemic could be traced to a particular water pump. This discovery forever linked public health to water quality and was an important turning point in the history of public sanitation. But controversy persisted because there was still no agreement on the causative agent linking the two.

Indeed the controversy increased because of a second difficulty. The first water analysts, whose job it was to determine water quality, were inorganic chemists. (The science of organic chemistry was not yet recognized.) And their primary interest was the degree of enrichment of water by health giving salts believed to cure dyspepsia, rheumatism and other disorders. Money could be made from the right kind of mineral water and hence Bath and Harrogate became fashionable spas frequented by the rich.

As towns competed with one another to promote the therapeutic value of their springs, water quality experts felt the pressure to provide favourable analyses. From which it was but a short step for private water companies in London and other cities to promote the quality of their water over that of their competitors. It was a battle of the experts, with water quality chemists opposed to sanitary engineers. Here is a sample of the 19th century debate:[6]

> *Sanitary engineer*: "…a stream which receives daily the evacuations of a million human beings… with all the filth and refuse of various offensive manufacturers… cannot require to be analyzed, except by a lunatic, to determine whether it ought to be pumped up as a beverage for the inhabitants of the Metropolis of the British Empire."
>
> *Response of water chemist*: To drink tap water containing microscopic animalculae is "no more harmful than eating fish".

It was a case of reformers invoking science to sanction change and conservatives invoking science to prevent it, a situation which is disturbingly reminiscent of contemporary debates about environmental pollution and water quality. This situation deserves additional comment precisely because it is so relevant.

Scientists like to claim that they arrive at theories through observation and experimentation. Experience precedes theory. In practice the process is more cyclical, with experimentation stimulated by pre-existing theory to build new theory. If the cycle is broken for want of a satisfactory theory, investigation stagnates. Furthermore, scientific knowledge is not absolute – it is always subject to review. Scientists are happy with this state of affairs. Indeed they see it as a strength and as a necessary protection against dogma. But when science is required to inform public policy, its open-endedness becomes a weakness which powerful people exploit to serve their own interests. Thus we observe, even today, that scientific uncertainties about, for example, pesticide toxicity levels or climate change, are deliberately exploited to frustrate the political decision making process.[7] [8] While a solution in these cases would be an appeal to common sense or adherence to the pre-cautionary principle, in practice politics today is no better at framing public policy based on science than it was in the 19th century. The policy debacle surrounding climate change is a case in point. And future generations will look back in disbelief!

Something to think about

How long can we live?

Life expectancy in developed countries has risen steadily since 1840, and for women at the rate of about three months every year![9] Despite the recent epidemic of lifestyle diseases in developed countries, such as obesity, diabetes and hypertension, some scientists believe that there is no reason why longevity should not continue to increase. We may well ask why longevity is increasing. Is it due to modern antibiotics and drugs? In fact the greatest increases have come from low-tech public health measures such as the following (in order of importance):[10]

1. Clean drinking water.
2. Sewage treatment and separation of sewage from drinking water.
3. Use of soap for personal hygiene.
4. Mass vaccination.
5. Public housing – ensuring dry, disease free shelter for the great majority of the population.

Contemporary Issues

The realization that drinking water quality was an important determinant of public health had a profound effect on European social consciousness, one that is difficult to appreciate in the 21st century. But with regard to water policy that impact persisted pretty much throughout the 20th century. The provision of *plentiful, safe and palatable water for all* became a primary duty of the state. Water and sewage companies were nationalized because private companies were resistant to implementing changes that served the public interest but did not advantage themselves. For the liberal conscience, clean water became a matter of human rights. For the conservative, it was a matter of state security because epidemics sweeping through squalid city slums incited public unrest. And if further justification was required, archaeologists were uncovering evidence that great civilizations of the past, such as Mesopotamia and Acadia, had fallen for wont of good water management.[11]

Another hallmark of 20th century water policy was *water as an engineered product*. To obtain water in abundance required the building of large dams far from cities. The water then had to be piped to treatment plants where complex quality control ensured that the water delivered to houses was of a satisfactory standard. Indeed the greater the engineering prowess of a nation's water infrastructure, the greater its industrial might. The Hoover Dam (USA) and the

Snowy River Scheme (Australia) were very much products of that mind set. It has been described as the epoch of the *hydraulic society*, the apex of modernism.[12] Of particular note is that the provision of water in the *hydraulic society* had almost nothing to do with land management, ecology and the dynamics of biological systems.

From an economic point of view, 20th century water policy was dominated by the so-called *supply side paradigm*. Water resources planning, at least in developed countries, attempted to ensure that consumers did not suffer a restriction of supply. Attempts to restrain water use played a role only in times of drought and could be accomplished only if the public perceived a crisis.[13]

In retrospect it was inevitable that such a system would break. Population increase and growing per capita consumption increased the demand for water, while pollution of surface and ground waters made it more difficult to maintain supply. The privileging of water supply within the hydraulic society encouraged both excess quantity and excess quality for routine uses such as toilet flushing and garden watering. In short, the supply side paradigm proved unsustainable.

And so we come to the 21st century, where the emphasis has shifted from supply to *demand management*. While governments continue with efforts to increase water supply, they are confronted by the political costs of building large dams and recycling sewage and the energy costs of desalination. Thus the new approach is to reduce demand and to make much more efficient use of what water is available.

The emergence of economic rationalism in the late 20th century has also had an impact on water policy. Why, the rationalists ask, should water be different from any other commodity? The excess demand for water can simply be corrected by increasing its price. Besides, the price of water in the *hydraulic society* does not reflect its true economic cost. If water were privatized as it was in Britain in 1986, the increased price would provide incentives for entrepreneurs to find new methods to produce more water. Water freely traded in an open market would solve the mismatch of supply and demand. Perhaps not surprisingly the Business Council of Australia issued a report in September 2006 titled *Water Under Pressure: Australia's Man-made Water Scarcity and How to Fix It.* Its main argument, well publicized in the media[14] was that water shortages are due to economic mismanagement and could be solved by private investment to build water infrastructure. The then Federal Environment Minister, Malcolm Turnbull, welcomed the report by saying:

> The big urban water utilities are very profitable businesses. If those businesses are allowed to invest and do what they should do, which is to deliver the water the cities need, then we will not have – on a long-term basis at any rate – water restrictions in our major cities.[15]

Democrat Senator Bartlett was more circumspect. While admitting that the primary water issue is not about scarcity but about management, he cautioned against private ownership of water utilities because of the likelihood of profiteering.

> Water pricing and water markets desperately need to be reviewed; however, we should be wary about private ownership of water. Water availability is in the national interest and we should be concerned about profiteering to the detriment of water users or the environment. We need to separate ownership from pricing.[16]

Water is one of the last essential commodities in Australia not yet privatized. It has therefore become a focal point for competing visions about the future. For example:

- Water privately owned and traded in free markets to achieve efficient distribution versus water as a public commodity managed in the interests of the community.
- Water as a highly engineered product for a modern hydraulic society versus water cycled through ecosystems, passed from one community to another, with purity maintained by wetlands and managed aquifers.
- Public health as a product of mass inoculations and antibiotics versus public health as a product of a clean environment from which healthy food and pure water are harvested.
- Farms as agri-business, financed by *managed investment schemes* offering high rates of return to wealthy, city-based corporate investors versus farmers as custodians of the land and water and as producers of high quality food.

It turns out that visions about water management impinge on visions about the future of our society.

Australian Water Issues

Australia is a large continent. It is geologically old, it is mostly flat and it lies in the sub-tropics where temperatures are high but rainfall uncertain. These features conspire to produce a continent with a unique relationship to water. Except for the northern and eastern fringes, much of the continent is arid and afflicted with salt. Perhaps because of this, 80% of the Australian population is urban and almost all of it is coastal. And yet, surprisingly given the obvious aridity of the continent, Australians have a higher per capita water use than any other country in the world.

Commenting on Australia's profligate use of water, Dr. Rick Evans told the ABC science programme Catalyst:

> In a broad sense we have been spoilt. We have been used to using far more water than we need to use. We have been used to seeing it as an infinite resource for which we can just turn on a tap, or pump water out of a bore and it's just there. In reality that is not the way the rest of the world operates. We need to have a culture change.[17]

One is also reminded that Australians are among the highest per capita emitters of greenhouse gases and second only to the USA in per capita production of landfill waste. It is clear that Australia urgently requires policy initiatives to encourage maximum utilization of scarce resources.

The classical European water cycle, which usually informs hydrology text books, does not apply to most of Australia. Instead of mountain fed rivers that flow to the sea, Australia has shallow catchments most of which flow in-land across vast flood plains. Compared to other continents, Australia's big rivers hardly rate. The combined flow of all Australia's major rivers is about one-hundredth that of the Mississippi alone. The annual flow of Australia's greatest river, the Murray, equates to just one day in the life of the Amazon.

In her seminal publications, Mary White (described by Fullerton[18] as Australia's own Rachel Carson) argues that the early Europeans failed to understand the Australian landscape and the movement of water through it. Despite its dried and rugged appearance, the continent is ecologically fragile and it was perhaps inevitable that the imposition of European-style agriculture would wreak havoc.[19] For White, salt pans in agricultural land are a harbinger of impending disaster, just as the decimation of insects by DDT was for Rachel Carson. Of great concern is the long lag time between cause and effect in large-scale ecological systems, and the continent is only just starting to show the effects of 200 years of abuse.

Today about 70% of water consumption in Australia is used for agriculture. Furthermore farmers holding free-hold title are responsible for some 70% of the land. Consequently most of the difficult water policy decisions in Australia are directly concerned with land use and farming practice. The following is a list of just a few of the issues we face. There are no simple answers – these are deep moral and social questions:

- Much of Australia's agricultural land is in fact marginal for farming. Difficult decisions must be made about what farming is sustainable in a given catchment. These decisions require balancing long-term costs against short-term gain.
- Unwise irrigation practices have caused environmental devastation in Australia. Difficult decisions must be made about allocations to irrigation. This will involve trade-offs between economic and environmental costs.
- Water has multiple uses – irrigation, electricity, drinking supply and environmental flows. How to apportion scarce water will involve difficult

decisions. The power company Snowy Hydro was recently attacked for buying electricity from coal-fired power stations.[20] Its own hydro-electricity would of course come without a carbon cost. The company argued that it was preserving dwindling water supplies for town consumption and irrigation.

- Farmers care for 70% of Australia's land. If we are to reverse the destruction of wetlands, recover biodiversity, improve water quality and plant more trees for bio-sequestration, who is going to bear the costs? On-going civil disobedience campaigns by farmers (for example, see reports of deliberate illegal land clearing[21]) highlight this question.
- Australia's iconic tree, the eucalyptus, does not mix well with traditional agriculture. It has deep tap roots which lower the water table. Indeed it might be argued that the eucalyptus contributes to the aridity of the Australian continent. Elsewhere in the world, notably India and the Middle East, the eucalyptus has been ruthlessly removed from cultivated areas. Difficult decisions will need to be made as to how much we alter Australia's natural landscapes to satisfy human food and fibre requirements.
- Indigenous land management involves burning, partly to aid hunting and partly to encourage growth of edible herbaceous and tuberous plants. This practice, which is common to savannah communities around the world, is sustainable but maintains the landscape ecosystem in a state of arrested development. In particular it reduces tree cover almost 100 fold – trees which are needed for building soil, biosequestration, agroforestry, to name just a few. Choices will have to be made between legitimate land management practices.

Something to think about

If only Australia were in the northern hemisphere!

Australia is a major producer of wheat, wool, mutton, beef and cotton. The country has made a lot of money growing food and fibre. But for how much longer? Australia's past agricultural practices, in particular its profligate use of water and reckless land clearing, are simply not sustainable. European farming practices have provided a short-term bounty, but the creeping cancer of dryland salinity and soil erosion are a warning that the bounty will indeed be short term.

Why is so much of the Australian landscape so fragile for agriculture? Cotton has been grown in the USA for two hundred years, in some places for three hundred, without insurmountable problems. Cotton has been

grown in Australia for around 50 years and already some would argue the crop should not be grown in the country. Why the difference?

It is partly about rainfall reliability. The cotton belt in the USA enjoys a sub-tropical climate with abundant rain, well distributed through the year. This is ideal for cotton and the crop can be grown in Georgia and Mississippi without irrigation. Rainfall in Australia is less reliable, making irrigation essential. But irrigation in an arid climate with mobile salt requires more care and self-restraint than has been exercised to date.

However, it is not only about water. More importantly, according to Fullerton[22] US soils "are much deeper and richer, and able to buffer the abuse". Northern hemisphere soils were formed comparatively recently. The repeated advance and retreat of glaciers during the last ice ages pulverized rock, creating deep fertile soils. By contrast Australian soils are ancient and depleted. The last time glaciers performed their rejuvenating function was 300 million years ago. Dry, desiccating winds and water have long since eroded the surface, leaving a flat landscape with shallow soils and flood prone.

Australian ecosystems have adapted well to unpredictable rain. After a downpour, the deserts burst into life, a cacophony of plants and animals, all anxious to complete their life cycles before the return of arid conditions. But agriculture requires certainty, and the attempt to create certainty with dams, weirs and irrigation has destroyed a surprisingly fragile landscape.

Key Concepts

1. Just as 20th century water policy focused on hydraulic engineering, so the 21st century approach will be about ecosystem management and biotechnology. It will be about working with the water cycle and ecological and biological processes rather than usurping them. We cannot live outside ecosystem dynamics.
2. Water policy requires a *holistic* or *integral* approach. That is, it must simultaneously address global warming, drought, deforestation, land management, biodiversity, environmental flows for rivers, agriculture and so on. In Australia, it must also accommodate our unusual geography.
3. Except for the peripheral fringes of the far north, water is the limiting factor for human settlement and agriculture in Australia. Consequently water deserves to occupy a central place in community and economic planning. Water harvesting must be integrated with land management and planned on a catchment by catchment basis.

4. Harvesting and storing rainwater where it falls is the preferred method to obtain water. This approach lends itself to decentralized planning and management.
5. Deforestation contributes to climate change. Apart from producing food, Australian farmers should also have the responsibility for reafforestation and biosequestration. Agro-forestry is an ideal way to combine these two with food production.
6. Water is an essential requirement of life. Consequently, it should be managed as a public resource for the welfare of all. This will require appropriate cooperation of all levels of government and a regulatory role performed by independent statutory bodies.
7. Maximum utilization of water can be achieved through demand management and scientific research.
8. Rational distribution of water can be achieved through a mix of both planned allocation and water markets. Water traders would be licensed public utilities and irrigation cooperatives, with strong regulation to ensure that the community interest is served.
9. Water management has a cultural component. Encouraging respect for the Earth and its resources should be a central feature of an education for a sustainable future.

Supply – Water Production and Harvesting

The Water Cycle

Every schoolchild learns about the water cycle. Ocean water evaporates, falls as rain on the land and then flows back to the ocean either over the surface or underground (Figure 1). The cycle is driven by the heat of the sun, by wind and by gravity. So why reiterate this here? Because what is not necessarily clear from school is that the cycle is a unitary system on a global scale – its various parts all around the globe are interconnected. Rain in Europe is affected by currents far away in the Indian Ocean. Disrupt one part of the cycle and the entire global cycle is disrupted.[23] The importance of this fundamental truth cannot be over-emphasized. Some disruptions are obvious – if we take too much water from the rivers for irrigation ground water dynamics are disrupted. If we take too much ground water, surface waters suffer. Ground water flows and surface water flows are not separate systems.

Some human interventions, however, are not so obvious. Human induced climate change is already having an impact on currents in the Indian Ocean which can affect rainfall in far away Greece.[24] Clear felling large tracts of land

reduces rainfall because rain clouds do not form so readily over cleared land. India and Western Australia offer good examples.[25]

We ought not to discount the consequences of disrupting the global water cycle. A WHO report[26] estimates that "almost two billion people were affected by natural disasters in the last decade of the 20th century, 86% of them by flood and droughts". That's well over a quarter of the world's current population affected by severe water imbalance. Floods are the second most frequent kind of natural disaster, after windstorms. The largest cause of deaths through natural disaster is famine brought on by drought.[27] Many of these catastrophes can be attributed in part to human interference in the landscape and the water cycle. In what follows, we compare the merits and demerits of individual sources of water. But it is to be remembered that whatever the diversity of sources, humans are tapping into one and the same water cycle and that such interventions on a large scale can have unexpected consequences.

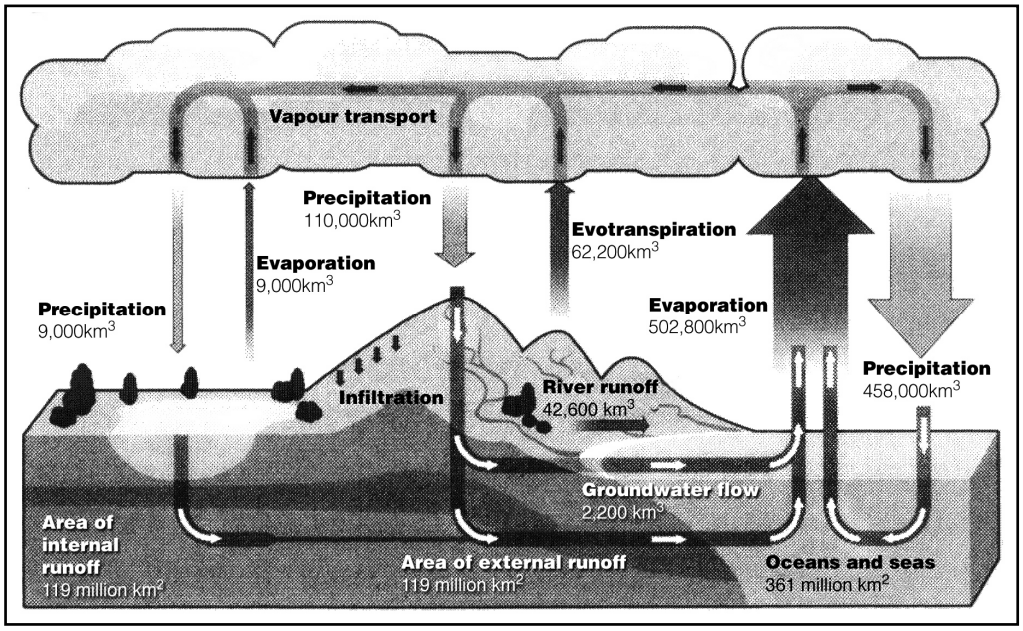


Figure 1: The water cycle on a global scale. Volumes attached to arrows represent annual flows. Numbers at the bottom of the diagram represent areas and static volume. In one year, the sun evaporates the equivalent of 125 cm depth of water off the world's oceans. However two thirds of this falls back onto the ocean and only one third makes it over land. But small fluctuations in this ratio can have major consequences for life on land. Australia has a higher rate of evapo-transpiration than other continents. In fact, because much of its river water is used for irrigation, some 90% of rain falling on the continent is returned to the atmosphere by evapo-transpiration. Note that one km^3 of water equals one million megalitres and a megalitre is the approximate equivalent of an Olympic swimming pool. Diagram from Black[28], reworked by Sahitya Graphics.

Surface Water

The harvesting and management of surface waters to provide potable water has been the primary focus of water policy in Australian cities until recent times. There is a strong logic to this. Rainwater is (assuming the absence of air pollution) fit for immediate drinking. The further water disperses through the environment, the more likely it is to become contaminated with pollutants, salts and other minerals. Furthermore once it reaches the ocean or deep aquifers it becomes more difficult to recover and process. In theory, the earlier we catch rainwater, the cheaper it should be to process and the better the public health outcomes.

The difficulty of course is that captured rainwater needs to be stored. Nature provides lakes and ponds but these are not necessarily located where humans can make best use of them. Hence the necessity to construct tanks, weirs, reservoirs and dams. The issues of storage will be discussed subsequently.

The harvesting of rainwater is most efficiently achieved where the rain falls on hard surfaces. Placing a dam at the bottom of a river catchment is rather like placing it below a sponge. As an example, despite heavy rain on 6th June 2007 on the Brisbane River catchment, very little of it entered the dam because the catchment soils were so dry. By contrast, rain which falls on a hard surface can immediately be diverted to a collection point. Consequently the possibilities for harvesting water in cities are extremely good given the large expanse of roofs and roads. Stormwater run-off from most Australian cities goes directly to the ocean where it is lost. The obvious problem with harvesting water in cities is pollution. Sydney and Adelaide are now addressing this problem by purifying water in aquifers – more on this below. Brisbane already harvests stormwater for its parks.[29]

If a policy of harvesting rainwater where it falls were actually followed, it would result in a highly dispersed system of collection and storage, since one cannot predict where rain will fall. In practice, the 20th century hydraulic society has opted for large dams sited at the end of large catchments. The principle argument in favour of this strategy is economic efficiency. We return to this issue in a subsequent section.

To summarize the advantages and disadvantages of using surface waters:

Advantages

- Easy to access.
- Rainwater should have high purity.
- Trapping water high in a catchment prevents fast moving water concentrating too quickly and causing erosion.

Disadvantages

- Surface waters require surface storage. Rainfall is unreliable – the more unreliable the rain, the bigger the storage required.
- Rain does not necessarily fall where it is most needed. Transporting water can be expensive.
- Many parts of the world cannot use surface waters because they are polluted. In developing countries 90% of domestic sewage and 75% of industrial wastes are released directly into lakes and streams.
- There are significant evaporation losses when water is stored in farm ponds, shallow dams or transported through canals. This is a particularly serious problem in Australia. Irrigators in the Murray Basin, for example, get just 80% of the water pumped to them. The rest evaporates in transit through canals, with concomitant concentration of salts.
- It is difficult to construct deep dams in much of Australia's flat landscape. The average depth of the proposed Traveston Dam north of Brisbane will be five metres. This is sufficiently shallow to allow the waters to heat up, leading to rapid evaporation and eutrophication.[30]

Ground Water

Ground water constitutes some 98% of the available liquid freshwater on the planet but the intemperate use of it is creating many problems. Ground water accumulates from the downward percolation of rain, river and lake waters and is stored in the pore space of soils, sand and rock. Sometimes it is useful to make a distinction between sub-surface water and deeper aquifers. Sub-surface water is closely associated with surface water and is immediately available to plants. By contrast, aquifers contain older water which is not necessarily accessible to plants.

Aquifers consist of thick layers of sand or stone permeated with water and trapped underneath (and sometimes on top) by impermeable rock. Thus, depending on the placement of the impermeable rock layers, an aquifer may or may not be isolated from the water table upon which farmers depend for growing crops. The water in deep aquifers is sometimes called *palaeo-water* or *fossil water* because it will have been underground a very long time, perhaps millions of years.

Many parts of the world rely heavily on ground water for town supply. Denmark, for example, obtains some 98% of its water supply from ground sources, Saudi Arabia 75%, London 70-75% and U.S. cities average 30-40%. By comparison, Australian cities acquire about 10% of their water from underground. There have been demands that this percentage increase.

Management of aquifers is necessarily an important component of water policy in Australia because, although the surface is arid, massive amounts of water lie beneath the surface. How that water should be used is not a simple issue. For some 60% of the continent, there is little or no surface water, so it inhabitants are entirely dependent on ground water. For ground water use to be sustainable, the rate of extraction must be less than the rate of recharge. In arid regions, recharge of local aquifers is likely to be minimal – the water is fossil water accumulated in the distant past when rainfall was much higher than today. For decades, hundreds of bores into the Great Artesian Basin (currently there are 892 of them[31]) have been allowed to spill water senselessly onto a sunburnt landscape 24 hours a day, every day of the year. Obviously such practices are unsustainable. For many aquifers it is difficult to measure the rate of recharge and therefore to determine whether current use is sustainable or not.

The advantages of ground water use

- Aquifers tend to be spread over a large area so it is possible to extract water where it is required, obviating the need for expensive pipelines and transport.
- Water stored underground does not evaporate.
- Ground water is typically filtered and purified as it moves through an aquifer and hence tends to be less polluted than surface water, especially in heavily populated areas. It is precisely for this reason that European cities have come to depend on ground water for town supplies.

The disadvantages of ground water use

- Ground water abstraction, in excess of replenishment, lowers the water table thereby affecting local wells and agriculture. The famous Ogallala aquifer in the USA (containing 20% more water than Lake Huron in the Great Lakes) is being depleted at a rate 14 times faster than nature can replenish it. Likewise irrigation in India is using water so fast that local water tables are dropping year by year. A well of 10 metres a few years ago now needs to be 80 metres deep and in some locations wells must be refilled by tanker. China, with a population of 1.2 billion people, has only half the water it needs, and relatively insufficient areas of arable land. It relies heavily on ground water but its water table is falling at about 1-2 metres per year. The country's development policy requires diverting most of its useable water to industry at the expense of agriculture. According to Mary White,[32] China is an *ecological catastrophe* waiting to happen. What happens when China cannot feed her people?
- While not subject to evaporation, ground waters can become saline due to leaching or seepage from irrigated farmland. Even when not polluted by human activity, water in aquifers can be contaminated with heavy metals

and other minerals, such as arsenates, leached from the rock matrix. In just three districts of Bangladesh alone, arsenicosis kills over a million people a year, with many more suffering side effects. This problem could be entirely prevented by collecting rainwater, which is abundant in Bangladesh.

- Irrigation with ground water containing even low levels of salt can exacerbate salinity due to evaporation.
- Abstraction of ground water is a form of mining which can lower the land. For example, abstraction of water for industry is causing Venice to sink into the sea.
- Professor Lance Endersbee[33] claims that much of the world's ground water is a non-renewable resource, that is, it is not replenished by percolation from the surface. He claims that rapid consumption of ground water has put the world on the edge of a catastrophe, far more serious that global warming. This is a controversial and disputed claim but it has received some media coverage.[34]

Despite the call for Australian cities to use more ground water, this strategy should be approached with extreme caution. Unlike other Australian cities, Perth in Western Australia gets some 80% of its water from ground aquifers. The consequences for local eco-systems have been devastating. Lakes and wetlands are drying up with spread on effects to animal and bird populations. Furthermore, excessive freshwater abstraction has sucked in salty ocean water from the coast.

Desalination

Desalination involves the removal of salts from ocean or brackish water to generate freshwater. The most common methods are distillation and filtration (which includes reverse osmosis). Both of these are energy intensive and therefore expensive. Consequently the oil-rich, rain-poor Middle East has been the only part of the world to rely primarily upon desalination – at least until now. In response to the worst drought in 100 years, Australia is contemplating a desalination plant in all of its major coastal cities. Indeed the Queensland government recently flirted with plans to build a desalination plant on Bribie Island to supply Brisbane city. With a $3 billion price tag, it would have been the world's largest.

Distillation consists of applying heat to salty water to create water vapour, which is then condensed to produce pure water. Distillation is more cost-effective in conjunction with steam-turbine power generation because the steam released from the power plant can be sent directly for distillation. Distillation technologies account for approximately one-half of the world's installed desalination capacity.

Reverse osmosis is a low temperature, high-pressure membrane filtration process that forces water through the molecular structure of several sheets of thin plastic membranes to filter out minerals and other impurities, including salts, viruses, pesticides and organic molecules. The membranes are like microscopic strainers. A difficulty with current technology is that the plastic membranes become clogged with bacterial bio-films and offer unnecessarily high resistance, adding to costs. However, scientific research directed to these problems is bearing fruit.

For more information on desalination see the accompanying endnote.[35] Like all other water sources, desalination has it advantages and disadvantages.

The advantages of desalination

- An obvious advantage is that desalination is climate independent. Rainfall is irrelevant. When placed by the coast, desalination plants have virtually unlimited supplies of ocean water.
- Desalination, particularly using filtration technologies, provides superior quality water, regardless of the quality of the source water.
- Water desalination is commonly described as a *hardware technology*, meaning that it is accomplished by means of pumps, filters and other pieces of equipment that can be scaled to meet the expected demand. Additional capacity can be added with relative ease by increasing the numbers of filtration elements. This flexibility is important when trying to optimize capital investments to match demand projected over time.
- The hardware nature of desalination allows for new cost-saving innovations, such as foul-resistant membranes and improved energy recovery devices, to be incorporated into existing plants with relative ease.
- Desalination plants have more flexibility of siting compared to conventional surface-water alternatives, thus minimizing treated water transmission costs.
- Desalination is gaining cost competitiveness as surface and ground waters become more difficult to manage.

The disadvantages of desalination

- Desalination is energy hungry. Power costs can account for 30-60% of the operational costs. Thus, slight variations in power rates (remember peak oil) directly impact the cost of treated water. Note, however, that Sydney and Perth, unlike the Gold Coast, have opted for desalination plants powered by renewable energy.
- A by-product of the desalination process is a highly concentrated saline stream that requires careful management and disposal. Anticipation of strong objections from the fisheries industry operating around Bribie Island

possibly persuaded the Queensland government to delay plans for a plant on the island. Some of the most common methods for disposal of the concentrate are: solar evaporation ponds, injection into depleted oil and gas fields and open-ocean discharge. Safe disposal of the concentrate is a significant cost factor.

- Desalination requires both pre- and post-treatment of the water. The objective of pre-treatment is to remove suspended matter in the source water and to condition the water by adding anti-scalants and lowering the pH to improve membrane performance and prolong operational life. Desalination by reverse osmosis is so effective that a post-treatment phase is required to re-mineralize the product water and readjust the pH. As in all public water supplies, treatment concludes with chlorination. As a matter of interest, drinking highly demineralized water is extremely bad for health, since, on its passage through the body, water is re-mineralized by drawing on the body's reserves.

We are entitled to view desalination as the apotheosis of the *hydraulic society*, the ultimate in the engineering of water. It is yesterday's thinking fulfilled with the latest in modern technology. It does not require that we carefully manage catchments. It does not require that we use water more efficiently. It does not require that we stop polluting surface and ground waters, or that we stop using the oceans as the ultimate sewer. It is a business as usual solution. It is however a rational solution in a country where surface and ground waters are polluted, where energy is cheap and where greenhouse carbon is not costed. In 2010, Australia is just such a place, but what about 2020?

Other Water Sources

Cloud seeding

Cloud seeding has a controversial history. The first documented case of human-made rain occurred in 1947 near Bathurst. Ongoing research led to the commencement of cloud seeding experiments by Hydro Tasmania and CSIRO[36] in 1964. Typically silver iodide, dry ice or hygroscopic salts are sprayed onto already existing rain clouds. It takes about 30 minutes for the ice crystals formed to grow to sufficient size and fall out of the cloud under their own weight. As the ice falls, it melts to become rain.

While Hydro Tasmania claims three successful experiments, CSIRO remains sceptical. Trying to prove that a particular rainfall event is caused by seeding is a difficult statistical exercise because of the great variability of normal rainfall. The CSIRO says its trials conducted in Victoria in the 1970s and 1990s were unable to prove that cloud seeding worked. Scientists at the National Academy of Sciences (USA) in 2003 came to the same conclusion. The official position of the American Meteorological Society (AMS) is that there has been some

statistical evidence showing a 10% increase in precipitation after cloud-seeding, but no conclusive cause and effect. Another observation to emerge from cloud seeding experiments concerns the effect of air pollution. The AMS claims that clouds in the USA are full of aerosols, dust and industrial pollutants, which impair a cloud's capability to produce rain.

Despite the uncertainties, some forty countries, including South Africa, the United States and China spend big money to practise weather modification and the emerging consensus appears to be that cloud seeding works but one has to get the conditions exactly right – and there are many variables. Snowy Hydro has announced it will undertake a six-year $5 million trial in the Snowy Mountains, spraying clouds with silver iodide. The company predicts that snowfall could increase by 10% and deliver improved environmental flows to the Murray River. The Queensland government also plans to trial cloud seeding in the drought stricken southeast of the State.[37]

The budget for cloud seeding experiments runs into millions. Would the money be better spent achieving water efficiencies in other ways? A desalination plant costs in the hundreds of millions, an order of magnitude greater, but of course the yield is certain. If a cloud seeding experiment works, the increased crop yields for farmers in one season alone can be worth hundreds of millions. These are the kinds of calculation that exercise water engineers.

Figure 2: A 'hole' remains in a deck of stratus clouds after seeding with dry ice.

Caption in the lower right reads: "Effects of seeding Altostratus Clouds over Green Bay, Labrador: 45 minutes after seeding with dry ice." USAF photo from Sewell 1973.[38]

Perhaps cloud seeding becomes a more viable proposition if we do not think in terms of increasing rainfall but rather targeting rainfall. Much rain has fallen in parts of Southeast Queensland over the past few years, but not in the catchments which supply Brisbane city. The cloud seeding experiments

proposed for the region are intended to target rain towards dam catchments rather than have it fall over the ocean or in places where it cannot be stored.

Something to think about

It's not just about drinking water!

Clouds are not only seeded for rain. Other motivations for weather modification include attempting to reduce the severity of hurricanes and dispersing fogs that threaten to drift over airports. Here are some more unusual experiments in cloud seeding:

- From 1967 to 1972, the US military seeded clouds with silver iodide to extend the monsoon season over North Vietnam, specifically the Ho Chi Minh Trail. The targeted areas experienced monsoon seasons extended by an average of 30 to 45 days. The motto of operation Popeye was *make mud, not war*.
- Russian military pilots seeded clouds over Belarus after the Chernobyl disaster to remove radioactive particles from clouds heading toward Moscow.
- During the July 2006 G8 Summit, Russian President Putin deployed air force jets to seed incoming clouds, intending that the rain should drop over Finland rather than the summit location. The attempt failed and rain drenched the summit anyway!
- In Southeast Asia, large-scale forest burning produces a haze that pollutes the regional environment. Cloud seeding has been used to improve the air quality by encouraging rainfall.
- For other interesting information, see the Wikipedia entry on cloud seeding.[39]

Air dehumidification

One of the side effects of the drought in Australia has been a downward pressure on metropolitan property values as gardens die for lack of water. An enterprising Brisbane company is selling modified refrigeration units which cool air and extract the moisture. One unit generates 500 litres a day. Compared with other sources of water, the process is extremely expensive (the units sell for $20,000 AUD) but apparently justified in some city blocks by the retention of property values.[40]

An Australian inventor claims to have invented a wind turbine which can extract an average of 7,500 litres of water per day from the air.[41] This is enough for a small village but the device is yet to be independently tested.

Afforestation

It is well known that deforestation or land clearing has a major impact on local hydrology. In Australia, the effect is to raise the water table and bring salts to the surface where they are concentrated through evaporation. However it is now becoming clear that deforestation has another effect – it directly impacts on rainfall. Studies in the Western Australian wheat belt suggest that drought is as much a product of land clearing as it is of global warming. How this works has only recently been understood.

The wheat belt in Western Australia is the largest artificial feature on the Australian continent visible from space. One sees it as an orange strip of cleared land, surrounded east and west by darker native vegetation. The natural vegetation to the east is separated from the wheat belt by a rabbit proof fence that extends north from Esperance to Geraldton. It was originally designed to keep rabbits from invading the wheat belt, but today it provides an ideal opportunity to study the effect of land clearing. The soil type and geological features are identical on both sides of the fence. The only difference is that to the west of the fence, the land has been totally cleared for cropping.

Since the clearing of the land, rainfall on the wheat belt has declined by 20% with devastating effect on yields and soil fertility – a consequence of global warming, one might presume. But the problem with this explanation is that over the same period of time rainfall to the east of the fence has increased by 10%. According to Professor Tom Lyons[42] at Murdoch University, who has studied the weather on both sides of the fence, even the clouds over the native vegetation are quite different from those over the wheat belt. Wheat requires a lot of water to grow and transpires a lot of moisture into the atmosphere. By contrast the native vegetation is frugal with water and yet rain clouds form overhead. So what is going on?

It seems that the dark native vegetation absorbs much more heat than the cereal crops and the warm humid bush air therefore ascends high into the atmosphere to the level where clouds are formed. Furthermore, the warm rising air passes through cooler air and generates turbulence which is also helpful for cloud formation. By contrast, the cold humid air above a wheat crop is stable and does not rise into the atmosphere. It can be blown away by winds.

The conclusion from the Western Australian study is that it is possible to increase rainfall over land by maintaining tree cover and that failure to do so allows clouds to pass overhead and drop their water elsewhere. In India, it appears that de-forestation makes the difference between clouds dropping their rain over land versus over the ocean. According to Professor Lyons, tree cover has its effect on a scale of about 20 km. The take-home message – trees bring rain.

Inter-catchment Transfer

Water grids

The strategy behind water grids, and even their terminology, is derived from the electricity grid. The idea is to link multiple suppliers and consumers into a large network. This allows for more flexibility in providing power where it is needed and it increases security in the event that one generator should break down. The Queensland Water Commission is preparing plans for a Southeast Queensland Water Grid that will link dams hundreds of kilometres apart.[43] Their website claims the following advantages for a water grid:

- It provides a network of two-way pipelines to connect major bulk water sources in the region.
- It allows water to be moved from areas of surplus to areas of shortfall.
- It allows risk to be managed at a regional level rather than on a storage basis.

The proposed water grid will link three existing dams, two proposed dams, a desalination plant on the Gold Coast (currently under construction) and a recycled water plant.

The Queensland government has even more ambitious plans. It has authorized a $2 million feasibility study into the construction of a $7.5 billion, 1200 km water pipeline from North Queensland to Brisbane over the next 50 to 100 years. The justification is that the north of the State has plentiful water[44] but it is needed in the southeast to cope with population increase and climate change. The pipeline would draw water from the Burdekin and feed into the southeast water grid. Apart from the huge capital cost, the running costs are likely to be more than $250 million a year.

The northern parts of Australia have always tempted the south with the allure of limitless water, and schemes to take that water south are at least 100 years old. More recently (in 1998) Western Australian MP Ernie Bridge claimed that Australia could be drought proof within 10 years using only a minute percentage of the major northern rivers to achieve the result. And in the 2006 State election, the Western Australian Liberals ran (and lost) on a pledge to build a canal from the Kimberleys to Perth. That would have been a canal of some 3,700km and costing $2 billion.

Grandiose hydraulic engineering projects are usually rejected by environmentalists. Multi-billion dollar desalination plants, canals and pipelines have one element in common – "faith in large-scale engineering solutions to solve environmental problems".[45] But all too often such grand ideas turn out to be grand follies. The Snowy River Hydro-electric scheme, it is beginning to appear, may be no exception.

The Snowy River Hydro-Electric Scheme

Australia's greatest of all public works is the iconic Snowy Mountains Hydro-Electric scheme, an unquestioned marvel of hydraulic engineering. But at 30 years old it is beginning to look a bit sick. Grand idea or grand folly? As might be expected, the answer is hotly contested.

The Snowy Scheme brought new sources of electric power on line to feed industrial growth and it opened up vast tracts of land for irrigated agriculture. Economic statistics tell a story of unparalleled success. The gross value of Australian agriculture in 1997 was about $28 billion. Much of it came from the Murray-Darling Basin – Australia's bountiful food bowl, as big as France, and producing food and fibre worth $10 billion a year, about a third of it attributable to irrigation waters diverted from the Snowy.

In fact, 99% of the headwaters of the legendary Snowy River were diverted through mountain tunnels into the Murray-Darling Basin. Put another way, one catchment was killed in order to give life to another. But the profligate use of water in the Murray-Darling Basin has created a litany of serious environmental problems – salinity caused by a rising water table, destruction of wetlands that purify ground water, loss of wildlife habitats and loss of native fish due to polluting algae. It is also becoming apparent that not even the economic advantages are unambiguous. Lost agricultural production in the Murray-Darling Basin due to land degradation, salinity and soil erosion was estimated in 1998 to be around $220 million per year. In a 1998 ABC Lateline program Dr Judy Messer of the Nature Conservation Council, NSW, stated:

> Clearly the Snowy Mountains Scheme is ecologically flawed. Whether it is economically flawed or not is yet to be proven. But it may turn out that way in the future, if the lands go out of production because of salt.[46]

Transporting water by ship

A business called "Solar Sailor Holdings Ltd." is planning to ship 50 super-tankers per year of water (500,000 tonnes per ship) from the west coast of Tasmania to Sydney. The ships will be powered by wind and solar-power. According to CEO Robert Dane, the business expects to make a profit of $300 million AUD per year per city supplied. The economic feasibility of the plan has however been questioned.[47]

Towing icebergs and towing freshwater in large plastic bags

Towing icebergs to nearby ports was once considered a serious option for cities at high latitudes. However the melting of ice sheets due to global warming makes this a doubtful long-term option. Freshwater floats on salt water and it is therefore theoretically possible to tow water over the oceans in large plastic bags. But once again the economic viability of this approach is doubtful.[48]

Advantages of inter-catchment transfer

- Allows water to be moved from areas of surplus to areas of deficit.
- Allows risk to be managed at a regional level rather on an individual storage basis.

Disadvantages of inter-catchment transfer

- Water is expensive to move up-hill and even horizontally through pipes.
- There is a real and demonstrated danger of a *disconnect* between the ability to supply and willingness to consume. This is because the environmental and social costs of wasteful consumption are not entirely met by those who are profligate.

Figure 3: A cheaper way to transport freshwater over the ocean. The world's first commercial merchant ship pulled by a giant high-tech kite aiding its engines to slash fuel consumption and cut greenhouse gas emissions was launched in Hamburg, 14th December 2007. The SkySails system purports to be able to lower a ship's annual average fuel costs by between 10% and 35%.[49]

Indirect Potable Reuse

Indirect Potable Reuse is the technical term for water recycling. The traditional urban water cycle works something like this. Water is taken from an elevated river or dam, gravity fed to town, treated and then made available to the consumer. Typically the water is used once, for anything from drinking, toilet

flushing to dust suppression at a building site. The waste water is then pumped to a sewage plant (but not necessarily), from which the effluent is pumped to a downstream location or to the ocean. This *one-use urban water cycle* is wasteful.

Recycling water, especially sewage water, is a contentious issue and it has taken a severe drought for it to become electorally possible in Australia. The genuine concern of consumers is that, given the great diversity of drugs, hormones and chemical pollutants ingested by people today, can we be sure that those also will not be recycled.[50] The chairman of National Water Commission (as reported in *The Age*, 1st May 2007) argues that this problem can be solved by technological innovation. He claims that recycling will make "unlimited supplies of urban water" available.

The truth is that people in most parts of the world are already, albeit unknowingly, drinking recycled water, because downstream towns are drawing on waters that have previously been used by upstream towns. The fraction of wastewater effluent in a European river can be as much as 50%.[51]

In planned indirect potable reuse, treated wastewater is intentionally returned upstream to be mixed with native water and then treated again for potable use. Critical to the acceptability of water recycling is the intervention of multiple *barriers* to remove contaminants. These barriers may include all or some of: settling ponds, filtering, reverse osmosis, dilution, sterilizing and use of wetlands and aquifers for natural cleansing.[52] However the entire process is extremely expensive – better surely, to minimize water consumption in the first place.

Water Storage

Homeostasis

The primary objective of water management is to supply water of appropriate quality, when and where there is a demand for it. The policy challenges are quantity, quality, location and timing. Behind this simple statement lies a deeper and more fundamental concept, *homeostasis*. Homeostasis is the ability of a living system to maintain a stable internal environment despite a fluctuating external environment. It is the *sine qua non* of life – indeed one might say that the struggle to achieve or maintain homeostasis *is* life. Simple cells maintain a constant internal concentration of critical nutrients, such as sodium and potassium, and they expend considerable energy to do this. Animals and plants maintain a metabolic equilibrium between all parts of the organism. The development of warm-blooded animals capable of maintaining metabolic activity even in sub-zero temperatures was a momentous milestone

in the evolution of life on planet Earth. From an evolutionary point of view, it seems as if the more a species can guarantee the constancy of its internal environment, the greater are the opportunities for it to develop sophisticated behaviours and to push the boundaries of life.

A common means of maintaining homeostasis is the *reservoir*. For example, a reservoir of fat or starch enables plants and animals to have instantly accessible energy to meet unexpected demands in an unpredictable world. The reservoir is drawn down in times of hardship and replenished in times of plenty. This mechanism is fundamental to life and is referred to in Sarkarian philosophy as *prama trikona*,[53] that is, equilibrium established through the triangulation of forces. The intuition is that a triangulation of vectors (three forces interacting with one another) forms a stable structure, whereas larger polygonal sums of vectors are not stable.

Interestingly enough, despite the critical importance of water for life, very few animals have developed the ability to store water internally. Even the camel only stores water in virtual form as fat. Animals typically adopt the *just in time* strategy, drinking from a water hole when thirsty. This inadequacy at the individual level is dealt with in human communities by collective approaches to water storage and management. Indeed, we may trace the story of human civilization by its ability to manipulate and store water. The core idea is that the more a society is able to maintain stable supplies of water, the greater the possibility to develop the social, political, military and cultural institutions that define human civilization. Nomadic life was constrained by the need for proximity to clean flowing water. Subsequent to the development of agriculture, the ability to construct canals and irrigate fields was of momentous importance, because it ensured a stable supply of water despite the fickleness of rain. This is as true in the modern capitalist era as it was 3,000 years ago.

In Sarkarian philosophy, a modern economy is a living system. Just as cells, animals and plants maintain homeostasis, so also an economy. A healthy economy is one which can maintain a stable supply of the necessities of life at stable prices despite the exigencies of weather, etc. Hence communities maintain stores of rice, businesses maintain inventories and capitalists maintain hedge funds. Homeostasis of the total economy is the result of all its individuals and businesses maintaining their own equilibria. Even the home refrigerator is a manifestation of homeostasis – it obviates a trip to the shops after every meal.

Yield

Water management strives to maintain an equilibrium between the supply, demand and storage of water and to influence the biological and psychological impulses that impinge on achieving that equilibrium. From a purely engineering perspective, it is convenient to think of water resources in terms of

reservoirs, inputs and outputs. Reservoirs may be lakes, dams, weirs, aquifers or even, as we shall see, soil and tree roots. Input to surface reservoirs depends on springs, precipitation and snow melt in the upstream catchment. Input to aquifers depends on the amount of water entering recharge zones. The output from a reservoir is the natural outflow plus that which is abstracted for human use, the *yield*. Determining a sustainable yield for any particular catchment or reservoir is surely the most contentious issue in water policy.

Consider the Snowy River whose water has three uses: 1) diversion to the Murray Basin to grow some 30% of the nation's food, 2) to meet the needs of the 6,000 or so inhabitants of the Snowy Basin and 3) to provide environmental flows, that is, to allow the Snowy River to be a river. From an engineering perspective the third use was at one time not considered important, so the *yield* of the Snowy was the 99% of flow diverted to the Murray. But once in the Murray, the water was over-allocated for irrigation. Indeed approved abstractions from the Murray-Darling system amount to some 80% of its average annual flow. No wonder the river is in trouble! In both river basins, yield is at the expense of environmental flows.

Speaking on the ABC Lateline program,[54] Dr. Judy Messer of the Nature Conservation Council of NSW argued:

> The water belongs to the public. It's a public resource which the irrigators are allowed to purchase under license conditions. If you are going to have healthy rivers, you have to allow the environment, the receiving environment, to get enough water to keep the rivers healthy. That is absolutely critical.

Responds Laurie Arthur, a rice farmer in the Murray Basin:

> It sounds very easy – take water off the irrigators, let it run down the river and everything will be fixed. Well that's not the case! White man is on this continent now and we have made radical changes to the landscape and we have to address those changes and the only way we can do it is with profitable farmers.
>
> Our profitability comes from our water use. We need that profitability to put back into our farms for all the environmental projects – we are putting in recycling dams, we are lasering our country. We are using less water. We need profitability to continue with that work.

Responds Dr. Judy Messer:

> Well, the irrigators are the ones that are making the profits so there's no reason why they shouldn't bear the cost. If there is a cost to the environment then everybody has to wear it – it's as simple as that.[55]

Ideally, the yield of a river or reservoir should be determined by its ability to supply over the long term while also maintaining a healthy environment. In practice, yield is determined by a balance of political pressures, and once a

population and its economy become dependent on a water supply it is almost impossible to turn off the tap. But the painful truth is that water for irrigation in the Murray Basin is greatly over allocated. Past yields are not sustainable because nature is turning off the tap.

Surface Reservoirs

Conserve water on multiple scales

We have noted earlier the advantages of collecting rain where it falls – the water is of high purity, it is easy to access and trapping water high in a catchment minimizes soil erosion. However, storing water where it falls requires dispersed, decentralized storage facilities on multiple scales, that is, small house tanks, ponds, weirs, reservoirs and dams of various sizes. As appropriate they can be interlinked by pipelines, canals, culverts and tunnels so that water can be moved from regions of surplus to regions of deficit.

Debates about water storage in Australia are highly polarized. For a concrete example consider the Queensland government's intention, announced in 2006, to build a large dam on the Mary River at Traveston Crossing some 200 km north of Brisbane. This dam will have a surface area larger than Sydney Harbour, it will inundate 600 to 900 farms (numbers have varied between announcements), wipe out a small community and threaten a species of lung fish having great scientific importance. The government is making its case with dramatic photos of dry dams and the threat of no water. The residents of the Mary Basin are adamantly opposed.[56]

What has been the environment movement's response to the dam? The only alternatives mentioned in a recent edition of ECO (a newspaper published by the Sunshine Coast Environment Council[57]) were house tanks and recycling. Of course house tanks and recycling must be essential ingredients in Australian water policy but it seems that, in the Queensland debate, there is nothing between a house tank and a huge dam. Such polarization is limiting our options.

The power scaling law

An important principle of systems that operate on multiple scales is the *power scaling law*. A cryptic version of this law might be: *the smaller it is, the more of them there are.* In the case of water harvesting, this translates into the installation of very many house tanks but the building of very few large dams. But it also means the construction of intermediate size storages, town weirs, ponds and public water tanks of many sizes.[58]

Why is this idea so important? Because the power scaling distribution is observed everywhere.[59] In fact, it is observed so widely in the natural world that it is thought to have survival value, that it offers resilience in the face of

external stresses and change. In the case of water, *reservoirs on multiple scales* (many small reservoirs, few large ones) enables local communities to have control over local catchments but to enjoy the advantages of global connectivity. It offers local security within global security.

Opposition to large dams

The power scaling principle begs the question – what is the maximum sensible size for a water reservoir? Political opposition to large dams has grown rapidly in recent years due to the social and environmental damage that they cause. Large dams are usually defined as those having walls over 15m in height and holding 3 million cubic meters of water.[60] Mega-dams can be over 100 metres tall and hold billions of cubic metres of water – for example, the Aswan Dam contains 168,000 million m^3, or 168 cubic kilometres.

China, the USA and India are the top three dam builders in the world. Most are built for irrigation and proponents point to increased agricultural productivity and the ensuing economic benefits. But the benefits are not evenly distributed. Those downstream benefit but those upstream tend to be losers, especially displaced families. Since 1947, the 4,300 large dams built in India have displaced over 42 million people, predominantly indigenous minorities. When the Mekong River in Thailand was dammed, the numbers of fish, staple food of the locals, dropped by two thirds. But because dam management is centralized, local populations did not derive equivalent compensating benefits. Proponents of large dams simply ignore the negative social and environmental consequences. Opponents argue that a larger number of small reservoirs would have the same benefits for agriculture without the severe environmental and social consequences.[61 62 63]

Opposition to big dams is growing everywhere in the world and their construction proceeds only where highly centralized power can squash local opposition.[64] People who promote centralized economic power are invariably not interested in distributing its benefits. Hence in the harvesting of water, as with the other essential requirements of life, it is better for communities to pursue a decentralized approach.

Managed Aquifer Recharge

Water enters aquifers in recharge areas and emerges from aquifers in discharge areas. We may analyze sub-surface water resources in the same way as surface resources. They are stores of water having both inputs and outputs, and we wish to determine their sustainable yield. However there is a critical difference: the input to storage ratio is much reduced and monitoring aquifer flows and therefore calculating a sustainable yield is difficult. Consequently it is easy to draw on sub-surface waters for a long time before the consequences of excessive abstraction are realized. As noted earlier, Perth derives some 80% of

its town water from ground aquifers but the devastating effect on local eco-systems is only belatedly apparent.

Some cities around the world have introduced *managed aquifer recharge* to help replenish aquifers. For example, Perth has plans to return 20% of its treated sewage to aquifers.[65] Adelaide already has such a system and Sydney has an experimental system where stormwater runoff from roads is captured and returned to an aquifer which runs under the city from Centennial Park to Botany Bay. Just ten metres of aquifer are sufficient to remove phosphate pollutants and twenty meters to remove coliform bacteria. But water moves slowly through the aquifer, taking ten years to traverse its eight kilometre length.

Something to think about

Fossilized water

Water moves through the Great Artesian Basin at about one metre per year. The time taken to travel from recharge areas on the western slopes of the Great Dividing Range in Queensland to discharge mound springs in arid South Australia is around two million years.

Soils and Wetlands

Soils

A handful of average soil consists of about 45% by volume of minerals, silt and sand, 25% air, 25% water and the remaining 1-5% is organic matter. Of course these proportions vary greatly from soil to soil but the point to note is that soils can store an extraordinary quantity of water over an entire catchment. The figure of 25% is typical for a loam soil that has been saturated with water and then allowed to drain. Of that 25%, about half is water available to plants and the remainder is tightly bound to soil particles. The water holding capacity of a soil is, however, greatly influenced by its organic matter content, enabling a healthy soil to soak up water like a sponge.

We have already noted that harvesting water in a soil covered catchment is rather like catching water on the surface of a sponge. However sub-surface water is not necessarily lost to the water engineer. Rather the soil, microbial life and plant roots constitute a *biological reservoir* of water. The *bio-reservoir* is yet another manifestation of ecosystem homeostasis – water is stored in times of plenty and slowly released in dry periods, thereby helping to maintain an even flow of water in rivers despite seasonal fluctuations of precipitation.

Trees are an excellent form of flood control, and planted in appropriate places within a catchment they mitigate the need for costly engineering of embankments, drains, etc. And of course water is purified as it passes through a tree plantation. The planting of native water-frugal species along river banks is an important water conservation measure. The most appropriate choice of tree species will depend on the individual catchment and its function in the larger water management plan. The bigger objective is to restore the biological diversity and ecological integrity of waterways.

Wetlands

The term *wetland* is the more general and more modern name for swamps, billabongs, ponds, salt-marshes, mudflats and mangroves. Wetlands are simply areas of land that have acquired special characteristics from being wet on a regular or semi-regular basis. The term also applies to depressions in the landscape of our more arid regions that only occasionally hold water, but which, when they do, teem with life and become environmental focal points.[66]

Wetlands are a crucial component of the normal water cycle because they link surface and sub-surface waters. Indeed in a country as flat as Australia, surface and sub-surface waters cannot be considered separate systems. During the wet season, water flows as a sheet over the landscape. During the dry season, the water shrinks to a chain of ponds. Water still flows but more slowly, sometimes on the surface, sometimes below ground. Wetlands are not wastelands. Destroying a wetland breaks a link in a chain and the entire water cycle breaks down. Some additional benefits of wetlands include:

- Wetlands improve water quality by removing, using or retaining nutrients, organic waste and sediment which is carried to the wetland with runoff from the watershed.
- Wetlands reduce severity of floods downstream by retaining water and releasing it during dryer periods.
- Wetlands protect stream banks and shore lines from erosion.
- Wetlands recharge groundwater, potentially reducing water shortages during dry spells.
- Wetlands provide food and other products, such as commercial fish and shellfish, for human consumption.
- Wetlands provide fish and wildlife, including numerous rare and endangered species, food habitat, breeding grounds and resting areas.
- Wetlands offer opportunities for recreation, bird watching, photography and outdoor education.

The Commonwealth Government of Australia is signatory to an international convention on wetlands known as the Ramsar Convention. This commits

countries to maintain an audit of wetlands and to preserve and improve their quality. Approximately 4,700 regionally important wetlands have been identified in Australia. Those in the north tend to be in better condition than those in the south, where grazing pressure, exotic weeds, feral animals and urban development continue to threaten wetland integrity.

Demand – Water Consumption

Demand Management

Water consumption is frequently divided into four categories:

- Domestic consumption serviced by water companies.
- Power generation – steam is used to drive generators.
- Industrial – everything from beverage manufacturing to pulp mills.
- Irrigation waters for agriculture.

More recently environmental uses of water have leapt into prominence – water to maintain biodiversity and flows in streams. And of course there are lesser uses of water for recreation (fishing, parks, sports) and art (e.g., fountains).

Worldwide, it is estimated that irrigation accounts for about 70% of water use. 15% is used by industry and 15% for household purposes. The figures for individual countries vary greatly depending upon economic development. As might be expected, undeveloped countries use more in agriculture, developed countries more in industry.

Water use in Australia is also dominated by agriculture. The breakdown is: agriculture 70%, households 8%, water service 8%, electricity and gas production 6%, manufacturing 3%, mining 3%, other 2%.[67] The 8% household consumption is divided between: gardening 106 kL (average annual volume per household), bathroom 50 kL, laundry 39 kL, toilet 32 kL, drinking and cooking 23 kL and miscellaneous 10 kL.[68] Statistics such as these are useful because they inform efficient water saving programs. No wonder that garden watering is the first activity to be banned in a drought.

As noted earlier, the modern trend in water policy is to place more emphasis on limiting demand and to make more efficient use of limited supplies. Supply-driven policies are not sustainable in a world where water is becoming relatively scarce. Factors that have forced communities to adopt demand management are:

- Climate change: Catchments which once received rainfall to fill dams no longer do. Rain appears to fall more frequently over the ocean or in places where it is not easily captured. People in hot climates use more water than those in cooler climates. The average daily per capita water consumption in

Darwin is 522 L, in Brisbane 300 L, in Sydney 230 L, in Melbourne 220 L and in the UK 150 L. Thus within Australia the current mass migration of people from the colder southern States to warmer Queensland is placing increased demand on the nation's water.

- Population increase and changing demographics: Even if population remains stable, changing demographics have a remarkable influence on per capita consumption. For example, a single person household consumes about 220 litres per person per day (Lpd) compared to about 100 Lpd in a five person household. The trend to single person households in Australia will increase water consumption even if population declines slightly.
- Higher expectations: Affluence has increased per capita consumption in recent decades. Up market houses, often with a swimming pool, use 225 Lpd versus 96 Lpd for poorer suburban houses.[69]
- Pollution of surface waters by chemical and organic pollutants originating from both our agricultural and industrial practice.
- Increasing rates of ground water abstraction which have depleted aquifers.
- Increasing public opposition to large dams.
- The need for environmental flows.

Two obvious targets for reduced consumption are the *one use urban water cycle* and agricultural practices. We consider these separately.

Reducing Urban Water Consumption

Demand management to reduce the consumption of potable water is the most easily achieved water policy initiative required in Australia. It makes both economic and environmental sense. Indeed a report[70] commissioned by the Mary Valley local governments (those affected by the aforementioned Traveston Dam), calculates that realistic demand management plus water recycling would obviate the need for a new dam over the next 50 years. The report calculates that demand management options are cheaper than attempting to increase water supply – $1.15 per kL of water saved versus $3.00 per kL to supply water from the proposed Traveston Dam. The main savings come from reduced pumping of water which is energy expensive. If one also factors in greenhouse costs, then demand management is even more cost effective. Demand management buys time for governments, delays the need for expensive infrastructure and reduces operational costs. Demand management options typically include:

- Retrofitting more efficient infrastructure – by far the most costly option.
- Rebates for water efficient equipment and water tanks.
- Restrictions on use of water for non-essential purposes, such as car washing.

- Advertising campaigns to change consumer behaviour.
- Repairing leakages from the public reticulation system – reported to account for up to 20% (even 50%) of public consumption.
- Incentives to change industry practice.

An essential component of demand management is to fund research into small-scale water technologies so as to promote *economies of decentralization*. Three quite simple measures are:

- Quality management: Water of drinking quality is required for very few uses – for drinking, cooking, bathing and washing dishes. Lesser quality water is required for gardening, washing the car and flushing toilets. An efficient water system would supply water of a quality appropriate for its intended use. This could be achieved, for example, by supplying each urban house with dual reticulation, one for drinking quality water, the other for lesser quality water. Clearly the costs of dual reticulation would have to be justified by savings elsewhere.
- Dual water supply: One step in this direction is the increasingly popular dual water supply, where houses install rainwater tanks. By appropriate plumbing, rainwater becomes the preferred source for selected uses. In order to guarantee drinking quality water from urban house tanks, kitchen bench water treatment plants are now available that remove impurities by reverse osmosis – an impressive example of scientific research promoting *economies of decentralization*.
- Household recycling: Wastewater from showers and hand basins could be given basic treatment and then used for gardening purposes.

Reducing Agricultural Water Consumption

There are three major policy initiatives: 1) the introduction of water efficient, drought tolerant crops and animals, 2) the introduction of efficient irrigation technology, and 3) efficient farming practice.

Water efficient plants and animals

Farm products vary greatly in the water consumed. The figures in Table 1 suggest that Australia should not use irrigation water for livestock. Not only is meat production profligate in its consumption of water, but the economic return per litre of water consumed is the lowest of all farm commodities (see Table 2). However it is dairy, cotton and rice that are the biggest actual users of irrigation water in Australia. 25% of the Murray-Darling irrigation water is used to grow just one crop – cotton. In times of drought questions are rightly asked about the justification of growing such crops in an arid continent. Other crops, especially fruit and vegetables, offer higher returns for less water.

Table 1: Water use by crops

Among the cereals, rice uses twice the water of wheat and maize. Millet is the least thirsty. For the same amount of water as rice, sorghum produces 4 to 5 times more protein and yields three times more food than rice.[71] Figures in table are from Leaman.[72]

Product 1kg or 1 litre of produce	Litres of water required per kilo of product
Fine wool for suit	685,000
Wool	171,000
Steak	50,000
Butter	18,070
Cotton	5,300
Rice (white)	2,385
Rice (paddy)	1,550
Wheat	1,010
Citrus juice	780
Milk	600
Maize	576
Wine	360

Table 2: Economic returns of water used

The figures in this table are derived from a table in Leaman.[73]

Commodity	Return $/Megalitre	ML/hectare	% of all irrigated lands
Vegetables	1,295	3	2.6
Fruit	1,276	7	4.4
Grapes	600	8	5.2
Cotton	452	7	15.5
Coarse grains	116	3	3.5
Dairy	94	7	39.5
Rice	31	11	11.3
Sugar cane	21	7	8.0
Beef	14	4	7.2

Rice growers are understandably defensive about their huge infrastructure investments. They point to scientific research which promises to grow rice with 30% less water using a combination of no-till technology and drought tolerant rice varieties.[74] Inefficient water practices persist because water is not properly costed. A combination of triple bottom line accounting and government regulation to prevent old world approaches (rice/flood irrigation) would accelerate the introduction of efficient farming practices.

Irrigation technology

In many parts of the world irrigation is essential for agriculture but unwise irrigation has incurred great costs. Somewhat belatedly the Australian government has initiated a $10 billion National Plan for Water Security, much of which will fund the following programs to increase irrigation efficiency.

Losses: In the Goulburn-Murray irrigation system alone, evaporation, leaky irrigation pipes and seepage from channels are estimated to lose 900 GL each year.[75] That is enough water to supply the entire city of Melbourne for four years. A major component of the Commonwealth government's water spending is to repair leaks, move water through pipes rather than open channels and to build enclosed reservoirs.

Trickle irrigation: Irrigation water sprayed into the air results in about 70% loss due to evaporation. By contrast flood irrigation (for rice) raises water tables and mobilizes salt. The expensive alternative is to deliver water directly where it is needed, by trickle underground.

Dry root irrigation technology: Developed by Australian scientists, dry root irrigation is used in grape crops around the world as a precise tool for root watering. It reduces evapo-transpiration and water needs by up to 50%.[76] The technology also appears to work for citrus and pear. The trick is to supply trickle irrigation underground on two sides of a plant. The water is delivered alternately through one side and then the other. The roots not receiving water send a signal to the leaves to use water more frugally, while water supplied on the other side maintains yield. The downside is that the technique requires highly skilled management and is not easily transported to Third World agriculture.

Precise long-range weather forecasts: The Australian Government is funding satellite receiving stations, a radar rainfall network and upgrades to computer infrastructure. The goal is to improve long-range forecasting which will enable farmers to plant crops appropriate for the season's expected rainfall, so reducing demand for irrigation water.

Something to think about

Should we use water like this?

• Cubbie Station is an 80,000 hectare property in Southeast Queensland on the headwaters of the Darling River. It produces cotton. To irrigate a very thirsty crop, the property has the largest private dam in Australia. It is only five metres deep but more than 30 kilometres on a side, so that it stores more water than Sydney Harbour.[77] Located in a hot climate, the dam loses an equivalent of two metres of water each year to evaporation.

> As drought hits harder, there are demands for the government to buy the station and shut it down.[78]
>
> • BHP Billiton extracts 34 Mega litres per day of water from the Great Artesian Basin to feed its copper and uranium mine at Olympic Dam in South Australia. The State government allows the company to take the water for nothing. In fact, the government has approved tripling the size of the mine and the company is seeking approval to increase its take of water to 150 Mega litres per day every day for the next 70 years. That's 60 Olympic swimming pools of water a day, for the lifetime of the mine, for free. It amounts to about one third of the artesian water flowing into South Australia.[79]

Efficient farming practice

There are three major issues concerning water use in modern agriculture: 1) reduced water retention on farms caused by land clearing and the mismanagement of wetlands, 2) pollution of waterways due to excessive use of fertilizers, and 3) soil erosion. Here we focus on fertilizers and pollution.

Worldwide, agriculture is the biggest polluter of water, more so than domestic sewage and industry. Nitrogen fertilizers are the chief culprit because they are readily soluble in water and rapidly find their way into the relatively still waters of lakes and ponds where they cause eutrophication.

Much of the nitrogen applied using conventional farming methods is not absorbed by the plants it is intended to feed – hence the water pollution problems. Less could be used if it were judiciously applied. Organic farming practice makes much more efficient use of applied nutrients. For example, experimental work by the little known Brazilian agronomist Ana Primavesi[80] (brought to the attention of the English speaking world by Bunch[81]) indicates that common agricultural crops can be grown with much lower applications of nutrient with little reduction of yield. The science behind this is interesting.

Orthodox plant nutrition adopts the Nutrient Quantity Concept (NQC) – that is, apply all nutrients in sufficient quantity so that no one nutrient is limiting yield. As an alternative to NQC, Bunch uses the results of Ana Primavesi to advocate the Nutrient Access Concept. NAC is a more appropriate soil fertility model for ecologically managed soils.

> That is, crop growth above a certain extremely low concentration, does not depend on the concentration of nutrients. It depends, rather, on the constant access of plant roots to the nutrients, even when these nutrients exist in very low concentrations. The Nutrient Quantity Concept's remedy of increasing the concentration of nutrients by applying large amounts of chemical fertilizer misses the point almost entirely. What is needed is a constant supply of even a very small but well-balanced

amount of nutrients over time, and the unobstructed access of plant roots to these nutrients.[82]

Plants compensate for the low nutrient levels by a flourish of root growth. As long as water and low level nutrients stay available, plant yield does not suffer. Fertilizer, applied in high doses at one or two points during a plant's life cycle, has the effect of suppressing root growth. Furthermore, rain washes away idle nutrients leaving the plant late in life with both a deficient root system and diminished availability. Interestingly, the examples that Bunch provides in support of NAC include practices that are familiar to sustainable farmers; that is, maximize organic matter production, keep the soil covered with green manures and cover crop mulches, reduce tillage, maximize soil biodiversity, and feed crops largely through mulches.[83]

The NAC approach to farming recognizes that the soil is a complex ecosystem, not just an inert matrix to anchor plants in the ground. A well-managed soil displays tightly coupled cycling of nutrients between soil organisms and plants. Nutrient levels in the soil may not be overtly high but the rhizosphere metabolism ensures that plants have access to a constant supply. Furthermore, organic matter in the soil retains the moisture necessary to support ecosystem cycling of nutrients.

Something to think about

How the Israelis do it

Australian irrigators visiting Israel are in awe. Israel has an arid climate like Australia but the average annual per capita water consumption of Israelis is about one-quarter that of Australians. (See Appendix 1.) Two thirds of Israel's water originates in the River Jordan in the Golan Heights – hence the strategic importance of the area. The Sea of Galilee is the main storage. According to Fullerton, "Dams on the farm are the norm, using artificial liners to prevent seepage. And whereas almost all water in Australia is used just once, in Israel… the average bucket of water is used between five and seven times! For example, water which may have been pumped from 800 metres underground is used first for tourist spas… then to warm hothouses, and then on to different species of fish (eels, then catfish). This now enriched water is then taken for hydroponic tomatoes and herbs, with the rest going to drip irrigate field crops of olives, melons and alfalfa. Since 1984, the use of freshwater on farms has halved while the value of production is still rising."[84]

Land Use

Sustainability

Defining sustainability

Acknowledging the requirement for *sustainability* sets fundamental constraints on human activity, whether in the economic, social or ecological arenas. The context, of course, is the addiction of modern capitalism to growth in a world where the limitations to growth are increasingly apparent. Little surprise then, that there are over 100 definitions of *sustainability*! The definitions may be scientific but the battleground is ideological. In the realm of intellectual and political discourse, sustainability ranks as one of the 'big ideas'. It has a global reach that transcends national and cultural boundaries. It is, for example, one of four Core Concepts discussed at the 2007 Universal Forum of Cultures sponsored by UNESCO, the others being *cultural diversity*, *knowledge* and *peace*. These four themes were chosen because they encompass the vast majority of issues and problems confronting humanity today.

One of the most cited definitions of sustainability is that proposed by the Brundtland Commission[85] – sustainable development is that which "meets the needs of the present without compromising the ability of future generations to meet their own needs". A process is sustainable when it can be carried out over and over without negative environmental effects or unacceptable costs to any of the stakeholders involved.

While sustainability sets constraints on human activity, we can also approach it as a liberating concept – as about design.

> It is a concept that recognizes that human civilization is an integral part of the natural world and that nature must be preserved and perpetuated if the human community is to sustain itself indefinitely. Sustainable design is the philosophy that human development should exemplify the principles of conservation and encourage the application of those principles in our daily lives.
>
> "In order to integrate ecology and design, we must mirror nature's deep interconnections with our own way of thinking about design. The concept of sustainable design holds that future technologies must function with the way nature works.[86]

Dimensions of sustainability

Sustainability has economic, social and ecological dimensions. Probably all human activities have consequences in each of these three dimensions, so we are confronted with competing assessments of sustainability. We have already come across this in the debate about environmental flows for the Murray-Darling Basin. While environmentalists argue for the importance of *river*

health, farmers argue for the necessity of *farm profitability*. This debate exposes a fundamental divide between views of the world which place ecological sustainability as the absolute long-term constraint versus those which place economic sustainability as the absolute constraint. According to the economist's worldview, healthy businesses are necessary to motivate entrepreneurial adoption of resource efficient technologies. Consider this excerpt from an editorial of *The Australian* newspaper (9th February 2007), commenting on Dr. Tim Flannery's award as 2007 Australian of the Year:

> Professor Flannery is a well-documented global warming extremist… [He] predicts sea-level changes of many metres. Such hyperbole is in line with his deep-green anti-development, anti-immigration credentials… [He] should be asked to justify the immediate social costs of stopping coal exports, both here and in the countries that rely on Australian coal for their electricity and jobs… *The Australian* supports the position … to seek a technological solution that can be exported to assist the world in meeting the climate change challenge.[87]

But the reality is that environmental degradation is proceeding at a pace much faster than the adoption of ameliorating technology. As the president of the Australian Conservation Foundation warns:

> The economy is, of course, crucially important, as is the social well-being of our citizens. Both now depend on urgent action to deal with our environmental problems. Unless these problems are recognized, the well-intentioned attempts to improve economic and social indicators are doomed to fail.[88]

A matter of scale

Definitions of sustainability vary according to the scale of one's immediate concern – and this is a serious problem when it comes to adopting sustainable practice. Farming offers a good example. Typically at the paddock level, the dominant constraints to sustainability are agronomic and the goal is to maximize yield over several seasons. At the farm level, the dominant constraints to sustainability are economic – to keep the farm going as a viable business over the farmer's lifetime.

At the landscape or catchment level, the dominant constraints to sustainability are ecological – for example, it is necessary to maintain adequate water and nutrient cycling to sustain life in the catchment. At the regional or national level, the main sustainability constraints are macroeconomic – that is, to export sufficient produce in order to maintain employment, to import machinery, to sustain rural community life. At the global level, the constraints are once again environmental, with the current focus on climate change (Figure 3).

This, at least, is how the economically developed world currently constructs sustainability. But in reality, ecosystem dynamics recognize neither political boundaries nor abstract human constructs. Rather they operate on all scales,

from the paddock to the planet. Which brings us to a fundamental principle: *In order to achieve ecological sustainability on multiple scales, it is essential to adopt land use planning*. Land use planning begins initially at the landscape or catchment level but the results of it filter down to the farm and paddock level and they filter up to the regional and global levels. The Western world has evolved social and economic systems where no one person or group takes direct responsibility for what happens in a catchment. Individual farmers answer to their farm and politicians answer to macroeconomic indices. Landscape or catchment management falls through the cracks, as it were, inadequately cared for.

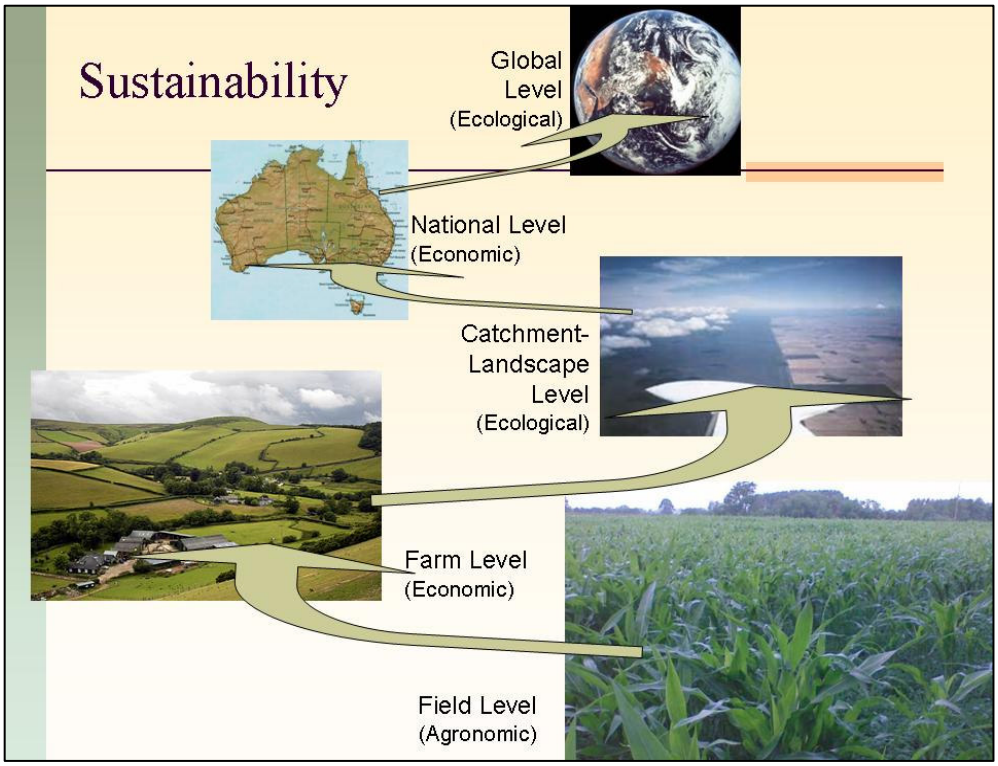


Figure 3: The sustainability of agriculture is defined differently at different temporal and spatial scales.

Measuring sustainability

How do we know in practice whether a particular human activity is sustainable? Can we measure it? Economic sustainability, as narrowly defined in modern economics, is easy to measure – it depends on continued

profitability under competition. Social sustainability revolves around the concept of social capital and sociologists have even developed measures of it. But how do we determine ecological sustainability? It is now generally accepted that ecological sustainability has four components reflecting the status of four fundamental ecosystem processes:

- The cycling of water.
- The cycling of nutrients.
- Flow of energy.
- Biodiversity and the relationships between species.

These processes operate only within certain limits and they are intimately interconnected with one another. Since human society can exist only within nature, all human economic, social and political activities must ultimately operate within the limitations of these four fundamental processes. In *modernity* (that view of the world, espoused in the *The Australian* editorial above, which expects technological ingenuity to overcome all obstacles), progress is about conquering the limitations posed by nature. In the ecological worldview, progress is about working with them, leveraging them.

Something to think about

Sustainability is finely tuned

Ecosystem dynamics depend on four fundamental processes: the cycling of water, cycling of nutrients, flow of energy and species interactions. These four processes are intimately intertwined. As an example, consider the following relationship between ocean bacteria and climate change.

Algae living in the oceans produce large amounts of the substance *dimethyl-sulpfonio-propionate* (DMSP). DMSP is broken down by marine bacteria to a volatile compound known as *dimethyl-sulphide* (DMS). DMS enters the atmosphere and contributes to the condensation of water and the seeding of clouds. On a global scale, cloud cover regulates surface temperatures. Note the conjunction of nutrient cycling (marine bacteria contributing to global cycling of sulphur), water cycling (sulphur compounds affect cloud formation), energy (cloud cover affects the proportion of the sun's energy retained in the atmosphere) and species diversity (the cooperation of diverse species to process sulphur-containing compounds and cycle it around the planet).

It is well within today's technology to genetically modify bacteria to produce DMS at a faster rate. One can imagine seeding the oceans with the modified bacteria in an attempt to modify the balance of cloud formation – the use of DNA technology to manage climate change.

Agro-forestry

This section proposes that *agro-forestry* must become the dominant form of agriculture in Australia and indeed in all parts of the word where trees can grow. According to Colin Tudge, author of the widely appreciated *The Secret Life of Trees*,[89] agro-forestry "offers one of the principle hopes for a sustainable world" – it is "one of the great hopes for the future". The logic is simple – we have to maintain a large portion of our continent covered in trees but we must also farm the land. The two activities in Australia have for the past 200 years been considered antagonistic concerns – land-clearing still tends to be viewed as a necessary pre-condition for profitable farming. In Queensland, land clearing is a potent political issue with farmers resolutely opposed to attempts by the Queensland government to restrict clearing. A land management revolution would integrate forestry and farming into a single enterprise. The psychology which places farming in opposition to forestry appears strongly associated with the Anglo-Saxon tradition. Britain long ago felled its forests while Germany and other central European countries retained them as an integral part of their culture and economies. Even today, the German landscape is a patchwork quilt of crops, forest and villages.

There are many advantages to maintaining land under trees:

- Tree cover encourages rain to fall as already described.
- Trees and plant cover in general allow organic matter and micro-organisms to build up the soil encouraging the bio-storage of water.
- Trees plus healthy soil purify passing water.
- Trees bind the soil and prevent erosion.
- Trees are a carbon sink and now considered an essential part of the strategy to combat global warming – biosequestration. Indeed, after burning of fossil fuels, tree clearing is the second largest contributor to greenhouse gases. It is not just the burning of trees, or the loss of a carbon sink. Sub-soil processes particularly in peat forests release huge amounts of carbon when the trees are cut.
- Forest trees provide food for honey bees in the off-season when human annual crops are dormant. In Australia, honey bees are responsible for pollinating one third of the food we eat and they pollinate $2 billion worth of agricultural product. The pollinating service provided by bees is far more important than their honey. The rapidly growing almond industry is just one example of a crop totally dependent on pollination by bees.
- Forests provide homes for birds – birds that eat insect pests that might otherwise be sprayed with insecticide – birds that eat seeds which get transferred around the landscape.

In short, trees are at the heart of terrestrial ecology and play a vital role in both the local and global circulation of water. How can trees also become a vital component of feeding the world?

Colin Tudge considers the overwhelming predominance of cereals in the world's food basket to be partly an accident of pre-history. It might have been different. Tree crops, such as olive, coconut, macadamia, avocado, pistachio, walnut, cashew and almond to mention just a few, offer highly concentrated calories and nutrients. If cereals had not existed, says Tudge, human civilization would have flourished nonetheless on tree crops. And imagine the possibilities if as much effort had been applied to maximizing tree yields as has been devoted to cereal yields. In addition to the above advantages, tree prunings have multiple uses. And once trees stop producing, their wood can be used for construction and furniture. The trunks of old rubber trees provide an excellent cabinet timber and earn Malaysia and Thailand billions of dollars in export earnings.

Something to think about

Can planting trees halt the spread of dry land salinity?

Dry land salinity threatens to become Australia's worst environmental disaster. Clearing trees over large swathes of land has upset the finely tuned balance between water, trees, soil and salt. In May 2000, Peter Garrett (then president of the Australian Conservation Foundation and now Minister for the Environment) announced that it would take the planting of 40 billion trees over the coming decade at a cost of $65 billion to remedy the problem. Seven years later, nothing like that target has been reached. One of the problems is the traditional antagonism of broad acre farmers to trees. And not all scientists agree that replanting trees can solve the problems caused by clearing them. Fullerton[90] quotes a top CSIRO scientist as saying, "Trees [as a remedy for dry land salinity] are a waste of time for most of Australia."

So what are the problems? First, some 50% of a salt affected catchment would have to be treed, which, Australia wide, would be a huge cost. Second, trees transpire a lot of water, thus reducing available water for irrigation. Planting trees may be good for the environment but it is bad for irrigators – at least that is the claim.

The response of environmentalists is that much of the water lost by transpiration is returned to the land as rain. Furthermore, the shade provided by trees reduces pond evaporation and their roots hold a lot of water which is released in times of drought.

Clearly more research has to be done. But one difficult truth remains. There may be large areas of Australia that should never have been put under agriculture. This dilemma brings us to a contention of Sarkar in

Ideal Farming[91] that it is better to attempt to increase the productivity of existing fertile land rather than to bring marginal land into production. On the other hand, Sarkar clearly supports irrigation farming and he points to the Israelis as a model.

The challenge is to find ways to integrate trees with farming. Trees provide many services to farm animals. Well spaced, they act as wind breaks. They ameliorate diurnal fluctuations in temperature and of course provide shade and shelter. Leaves, twigs and other prunings in many parts of the world are used for animal feed. Pigs and poultry scavenge the forest floor removing weeds, seeds and insect pests.

Tropical forests offer many opportunities for agro-forestry because of the diversity of animals and plants that they support. Coffee and tea do best under the shade of taller trees. But the buttresses and shallow roots of tropical trees are easily damaged by hard hoofs and indeed it is now well established that trampling cattle and sheep have done irreparable damage to Australian wetlands. In this regard, the soft padded alpaca from South America holds great promise. The number of alpacas in Australia is now well over 20,000 and although the industry is small in comparison to the sheep industry, the fine fibre produced by Alpacas earns a premium. In an agro-forestry combination, the Alpaca could do well in Australia.[92]

Australia is home to many plants having nitrogen-fixing nodules – most famously the Acacia (Wattle). Nitrogen-fixing nodules not only enable trees to grow in the most infertile of soils, they also leak nitrogen, thereby enriching the soil and benefiting companion crops. Consequently leguminous trees are of special importance in agro-forestry.

Tree crops often take 20 to 30 years before they deliver maximum yield. Therefore mixed farming, using the spaces between trees for other crops and animals, ensures that farms become productive earlier.

Australian governments are promoting tree plantations for both good and bad reasons. A South Australian government scheme is in the good category. It aims to plant 2.5 million trees on private and public land along the Murray River corridor to promote bio-diversity and carbon sequestration.[93] In the bad category are plantation forests financed by Commonwealth government sponsored Managed Investment Schemes (MIS). These attract cashed-up city investors because they offer tax breaks but it is not at all clear whether these *get-rich-quick* plantations can survive in the absence of generous tax concessions.[94] The disastrous effects of MIS plantations are felt in Tasmania where water hungry eucalypt forests are drying up neighbouring farms.[95] As Tudge warns:

> Eucalypts are famously desiccating, with long tap roots reaching down to the ground water, transpiring long after other trees have given up. They may create drought around them and kill surrounding trees if planted in the wrong places.[96]

Planting the wrong tree in the wrong place for the wrong reasons cannot be justified on environmental grounds and ultimately it will also fail economically.

There are a multitude of possibilities for agro-forestry in Australia because the country has a diversity of climates. The challenge is to get it right in each location. Here are two possibilities, but there are many others:

Guayule rubber

Over 2,000 rubber producing species are known worldwide, but only two, *Hevea brasiliensis* and guayule (*Parthenium argentatum*), have been commercially exploited for natural rubber. Today, *Hevea* is essentially the sole source of natural rubber grown in tropical parts of the world. Guayule on the other hand tolerates arid and semi-arid conditions and would do well in Australia and many other parts of the world. Rubber plantation work is tedious but could be made more interesting if trees were grown in a mixed agro-forestry plantation with other crops and animals. Guayule rubber has the potential for commercialization as a non-allergenic natural rubber. The marked increase in use of protective coverings following the HIV epidemic has resulted in an explosion in the number of people sensitive to rubber. Once sensitized, a person is unable to undergo surgery unless non-allergenic surgical equipment is available. Guayule is the only plant which can produce this product.[97]

Diesel trees

This incredible tree from Brazil (botanical name *Copaifera langsdorfii*) produces a biofuel that can be tapped directly to power tractors and other machinery. A one hectare plantation could feasibly produce 12,000 litres of fuel a year, enough to make a small farm completely self-sufficient. A Mackay nursery (in Queensland) is growing trial seedlings which thrive in tropical conditions. Many other species of tree can produce oil but the advantage of the diesel tree is that its sap can be placed directly in a diesel tank without expensive processing. When the trees reach a 30cm diameter, a hole is drilled into the centre and a tight-fitting pipe installed and plugged. The first fuel can be tapped after seven to nine years, but it takes 15 to 20 years for trees to reach maturity.[98]

To Burn or Not to Burn

Knowledge of fire – how to make it, preserve it and use it – was part of the toolkit that the first Aborigines brought to Australia. As they moved inland into

increasingly unfamiliar landscape, they learned how to put fire to it and make a good living from both plants and animals. In considering the purpose of Aboriginal burning, most have assumed that it was to drive animals into traps where they could be slaughtered, but Gott[99] argues that it was more likely to have been an agricultural practice. Periodic firing every three years or so prevented tree cover from becoming dense and encouraged the growth of herbaceous and tuberous species, which were a major staple food. Clearly, the use of fire in this way was a skilful practice perfected over centuries and entirely sustainable.

There has been much debate among ecologists over the status of the savannah ecosystem. Is it a natural climax vegetation or is it an artefact of human occupation and, in particular, of the use of fire? The question is difficult because the landscape type has been so stable for many thousands of years. According to Flood,[100] the current consensus is that both in Africa and in Australia savannah is a human creation. Indeed Tim Flannery[101] has described the Australian landscape as an *Aboriginal artefact*. Left to its own devices savannah eventually returns to a dense cover of trees. For example, in southern Victoria land which in the 1800s had a cover of 20 trees per hectare today has 3,000 trees per hectare. Fire has been used for so long by Aborigines as a resource management tool that Australian ecosystems, its plants and even animals have adapted to it.

In a review of Aboriginal land management, Bowman[102] concludes that "fire was a powerful tool that Aborigines used systematically and purposefully over the landscape".[103] The use of fire was skilful and central to the maintenance of the landscapes subsequently colonized by Europeans in the 19th century.[104] Bowman also recognizes that the impact of Aboriginal burning is "one of the most complex and contentious issues in Australian ecology", adding:

> This issue is not only important for the development of a comprehensive understanding of the dynamics and evolution of the Australian biota, but is central to the formulation of appropriate strategies for the conservation of the nation's biota.

Catastrophic bushfires in Victoria in March 2009, in which more than 200 people were burned to death, have greatly added to the political intensity of the debate about using fire to manage the Australian landscape. Ecologists had been winning the argument that regular burning is destroying Australia's biodiversity and local councils had placed limits on the amount of burning and land clearing. But after the bushfires of March 2009 which were all the more intense due to a build up of combustible biomass, political sentiment has inevitably swung the other way.

Landscape Design for Farming

Natural sequence farming

If much of Australia's arable land is to be covered with trees, how do we grow our broad acre wheat, barley, oats and other annual crops? According to Peter Andrews,[105] we have to make more efficient use of the land under annual crops. Andrews has developed a land management system called *natural sequence farming* based on more than 30 years investigation of the Australian landscape. *Natural sequence farming* is based on a theory of how nutrients and water move through the Australian landscape. Andrews believes that by careful management of water and nutrients it is possible to recreate the *swampy meadows* and *chains of ponds* that were a feature of a healthy Australian landscape before it was destroyed by European farming methods. *Natural sequence farming* reconnects streams and rivers to subsurface waters. This is important because Australian ecosystems function by allowing water to stay underground for longer rather than remain on the surface where it evaporates or runs to the sea. *Natural sequence farming* attempts to slow the passage of water through the landscape and to retain nutrients within a catchment.

According to *natural sequence farming*, the ideal farm layout divides the land into thirds (Figure 4):

- One third forest on the high ground and ridges accumulating fertility under trees.
- One-third cropping on the mid-slopes exploiting fertility carried down by water from the high ground.
- One-third recovery area where trees, grasses, etc., capture passing nutrients before they wash into water ways and are lost from the local landscape.

Tree prunings and hay harvested from the valley can be returned to the high ground for mulching so completing the cycle. These figures are not hard and fast, rather they attempt to exploit the way that nutrients are cycled in the Australian landscape. According to Andrews, *natural sequence farming* methods allow farmers to achieve five times more productivity on the cropped third of their land, so compensating for the two-thirds under trees.[106] Essentially, trees create the fertility used by crops, and that fertility is transported naturally through the landscape by water.

Andrews claims that *natural sequence farming* methods can rectify a range of environmental problems, such as salinity, erosion, eutrophication and rising water tables. Proponents of *natural sequence farming* point to Andrews' own property in NSW, which retained a covering of green feed during a recent drought that browned off neighbouring properties.

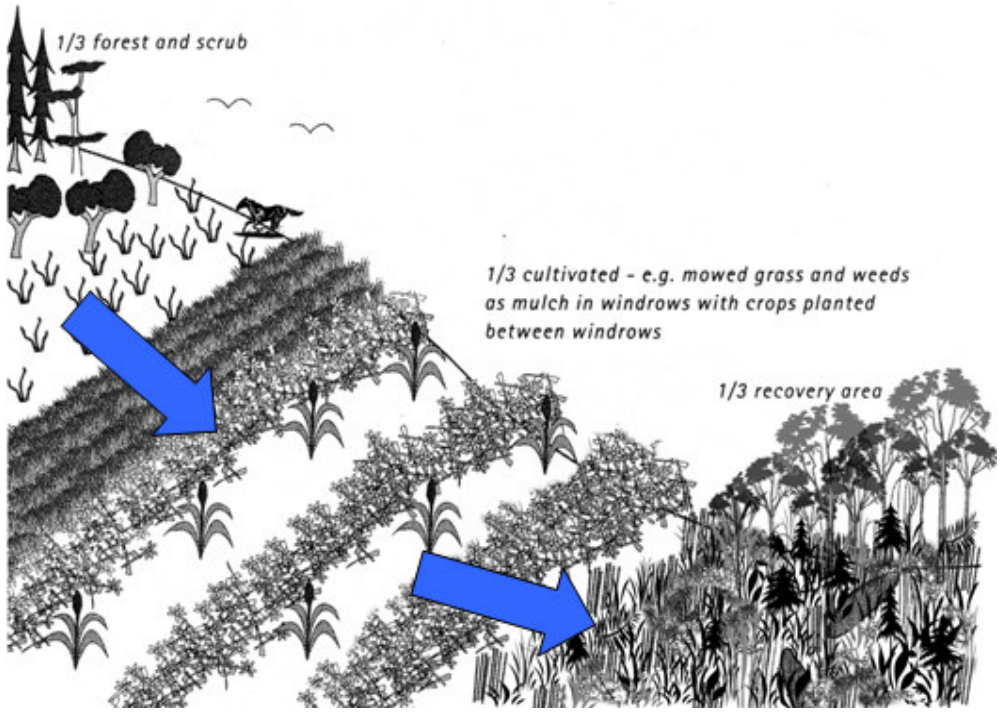


Figure 4: In natural sequence farming, individual paddocks, slopes or landscapes, as appropriate, are divided into thirds. Fertility is generated on the high ground. Water carries nutrients downhill which feed mid-ground crops and are then recaptured in the low ground. Hay and shrubs etc are harvested from the low ground and transported back up hill. This figure has been adapted from Diagram 4 in (Andrews 2006) and reworked by Sahitya Graphics.

Natural sequence farming links to the work of Ana Primavesi described above,[107] because the system retains moisture and nutrients in the soil, and ecological soil management ensures that plants yield well. Note that Andrews and other proponents of organic agriculture are not necessarily opposed to the use of slow release fertilizers to offset real losses from the land. However, they argue that nutrient losses should be minimized and soil fertility can be generated locally.

Permaculture

Permaculture was developed in the mid 1970s by two Australians, Dr. Bill Mollison[108] and David Holmgren,[109] as a set of design principles that could be used to create stable agricultural systems. The term is a synthesis of *permanent agriculture* and the design principles are a response to modern methods of industrial agriculture which pollute land and water, reduce biodiversity and

encourage soil erosion. At the heart of permaculture is the attempt to design landscapes which produce food by mimicking the structure and processes of natural ecosystems.

Although principally an agro-ecological design theory, permaculture has developed a large international following of individuals who have subsequently incorporated a range of alternative cultural ideas. One of the core values is *self-sufficiency* or *self-reliance* – to reduce reliance on industrial systems of production and distribution, which permaculture advocates believe are destroying the Earth's ecosystems. To quote Mollison himself, "I teach self-reliance, the world's most subversive practice! I teach people how to grow their own food, which is shockingly subversive. So, yes, it [permaculture] is seditious. But it's peaceful sedition."[110]

Permaculture design principles draw heavily on the practical application of ecological theory. Each component of a farm design is analyzed in terms of its needs, outputs and properties. For example, a chicken needs water, moderated microclimate, food and other chickens, and produces meat, eggs, feathers and manure while doing a lot of scratching. Design elements are then assembled in relation to one another so that the products of one element feed the needs of adjacent elements. Chickens will eat waste from other parts of the farm and remove weeds. A successful design minimizes waste, fossil fuel consumption and human labour.

Permaculture focuses on maximizing the use of trees (agro-forestry) and perennial food crops because these make more efficient use of energy than traditional annual crops. Permaculture borrows freely from organic agriculture, sustainable forestry, horticulture, agro-forestry and indigenous systems of land management, but its fundamental contribution to the field of ecological design is the development of a concise set of organizing principles that can be transferred through a brief course of intensive training. This helped to spread the ideas more rapidly than would have occurred through a system of university based education.

Perhaps because permaculture became associated with the alternative lifestyle movement, it has not received the attention it deserves from mainstream agricultural scientists. Agri-business will not promote research into farming methods that avoid their products. There have been criticisms, on theoretical grounds, that permanent and therefore mature wooded landscapes cannot be as productive as traditional farmland because, according to the theory of ecological succession, net productivity declines as ecosystems mature. Critics also claim that existing permaculture projects are insufficiently documented to determine how successful they really are. One country where permaculture is claimed to have had much success is Cuba.

Something to think about

Can organic agriculture feed the world?

Much of the debate about the sustainability of orthodox farming practices and the ability of organic methods to replace them hinges on nitrogen (N). The main limiting nutrient for plant production in most parts of the world is nitrogen. So for some the key question is said to be – can organic methods supply N in the same amounts as supplied by artificial fertilizers? It is not just an academic question. At stake is the ability to feed our planet's six billion people. Also at stake are the profits agri-business derives from the production of artificial fertilizers.

The numbers read something like this. Agriculture consumes some 175 to 200 million tonnes of nitrogen fertilizer globally per year. 40% of it is manufactured artificially by the Haber process, while the remainder comes from nitrogen fixation of cover crops and recycled organic matter. Consequently about one third of the world's population, two billion people, depend upon food produced with artificial nitrogen.

Modern agriculture has a "nitrogen addiction", says Mary White. She argues[111] that organic methods (green manures and cover crops typical of the European Middle Ages) could not sustain six billion people. At best, she says, organic methods can produce about 200 kg of nitrogen per hectare which will make 200-250 kg of plant protein, sufficient to support about 15 people. In reality, farming in the Middles Ages, whether in Europe or China, supported only about 5 persons per hectare. On the other hand, White recognizes the environmental damage caused by artificial nitrogen fertilizers and admits that ultimately our current farming methods are not sustainable. All of which leads to a rather pessimistic conclusion (which is not actually stated in her piece on the subject).

Proponents of organic agriculture draw a more optimistic conclusion. First, organic agriculture has come a long way since the Middle Ages. We have already referred to the work of Primavesi and Bunch which demonstrates how plants can be grown with smaller applications of organic N. Second, organic N currently provides about 60% of the world's agricultural N, more than provided by artificial means. This could and would certainly increase if the artificial N addiction were not officially condoned by governments and departments of agriculture.

However the best evidence for the ability of organic methods to feed the world comes from actual comparisons of production by the two systems. A recent meta-study done by scientists at the University of Michigan, Ann Arbor, USA, analyzed the data of 293 independent comparisons of organic and non-organic plant and animal production around the world

and showed that organic methods perform as well as, and sometimes better than, non-organic.[112]

The report makes two significant assertions. The first is that organic methods can provide enough calories to support the whole human population eating as it does today. The second assertion is that nitrogen-fixing legumes used as green manures can provide enough biologically fixed nitrogen to replace the entire amount of synthetic nitrogen fertilizer currently in use. The authors also note that theirs is not the first report to draw such conclusions, and that the scientific case for organics agriculture is now proven.

Integrated farming

Sarkar's contribution to farming and landscape design is known as *integrated farming*. It is, in many ways, similar to permaculture, but the motivation is subtly different. His primary concern is to address poverty and malnutrition, a reality of life for most people in most parts of the world. However the principles of *integrated farming* are also applicable to agriculture in the developed world.

Integrated farming is better understood within the context of Sarkar's socio-economic program known as Prout (the *Progressive Utilization Theory*). An important sector of a Proutist economy is what Sarkar calls *people's economy*, the purpose of which is to ensure the production and distribution of the minimum requirements of life, that is, basic foods, health care, housing, clothing and education. The Proutist approach is to produce these minimum requirements at the local level, that is, to decentralize economic activity so that local people are empowered to produce their own basic needs and not to depend on outside companies. In the case of food, Sarkar's strategy is to create an *edible landscape* using the principles of integrated farming.

The main objective of integrated farming is self-sufficiency and in this respect it is similar to permaculture. Communities should not be dependent on outside resources for their basic requirements. "An integrated approach to farming should include cottage industries, energy production, research centres, water conservation, etc. This approach will help make the farming projects self-sufficient."[113]

Sarkar's farming system promotes massive reafforestation programs which he says are required both to manage the water cycle and to deal with climate change. It should be noted that he was concerned with these issues long before they rose to prominence in public consciousness. In Sarkar's vision, tree plantations are very much part of the village and city landscapes where people live. He prescribes a systematic approach to the planting of trees and associated herbaceous plants (that is, 'filler' plants or intercrops) in the boundary areas of

all schools, farms, orchards, homes and roadsides. He details combinations of trees that can be planted for food, for timber, for shade, for fuel and so on.[114] Like agro-forestry and permaculture, integrated farming is based on a mixture of perennial and annual crops arranged spatially and sequentially to gain multiple ecological and economic benefits.[115]

One notable aspect of Sarkar's farming system is the importance given to companion planting. Indeed, most of his writing on agriculture is devoted to different systems of crop blending and the complementary interactions between plants. In addition to increased productivity, there are ecological benefits that arise from maintaining biodiversity and vegetation cover.[116] Sarkar distinguishes three cropping regimes: mixed cropping, supplementary cropping and crop rotation. Under each category, he lists crop combinations and the months in which they should be sown and transplanted. The detail applies to India, but the principles can be adopted anywhere. "Our system of integrated farming is designed to utilize every inch of land. Not only should the surface land be fully utilized, but the space under the surface and even the space above the surface should be used to the maximum.[117] Here Sarkar is alluding to the layered production systems that are also a part of permaculture design.

On the issue of chemical versus organic fertilizers, Sarkar is pragmatic. He observes that the current system of intensive chemical agriculture kills the soil: "…it is noticeable that whenever chemical fertilizers are used intensively, the land becomes infertile and useless after some time. This is because chemical fertilizers destroy the vital energy of the land so that it becomes lifeless, just like cement."[118] However he also accepts that to achieve maximum productivity, soils may require supplements of chemical fertilizers and research will be necessary to do this without destroying the living components of a fertile soil.

Finally, returning to the economic domain, Sarkar recognizes that modern farming requires economies of scale that cannot be achieved by individual farmers alone. He argues that many agricultural problems, such as conserving water and maintaining soil fertility, require a cooperative approach.[119]

> In the cooperative system there is great scope for agricultural research and development to discover new ways to better utilize and prolong the vitality of land. The benefit of cooperatives is that they combine the wealth and resources of many individuals and harness them in a united way.[120]
>
> Only cooperatives can support the expanding economic requirements of agriculture, like creating ponds, purchasing machinery, uniting local people to pressurize the government for irrigation facilities, etc.[121]

Something to think about

The declining importance of agriculture in Australia

In 1836 Charles Darwin concluded that Australia would never be a great agricultural nation like the USA because of poor soils and unpredictable climate. Whether he was right or wrong depends on whether the bounty of wheat, wool and meat over the past 170 years proves to be sustainable or not.

In Australia, as in most other developed countries, the manufacturing and service sectors are growing so fast that agriculture contributes a diminishing share to wealth. Furthermore, only about 5% of the population is directly engaged in agriculture. Historically, the agricultural lobby in Australia has been powerful and exerted an influence in excess of its economic contribution. The demise of rural communities in Australia today is a reflection of their diminishing economic and political power.

But there are tremendous dangers for Australia in allowing agriculture and, just as importantly, agricultural communities, to decline. First is the loss of food security, that is, our independence and self-sufficiency in producing staple foods. Second is the real danger of losing agricultural skills and even the willingness of people to engage in agriculture. Very few Australians have a realistic understanding of the landscapes on which their food depends and consequently governments are unable to muster the political will to repair the existing damage and to introduce sustainable practices.

Sarkar argues that a healthy developed economy must have a healthy agricultural sector and this requires about 25% of the workforce to be connected in some way with food production.[122] He considers undeveloped countries to have too many people engaged in agriculture and developed countries to have too few. Both are unhealthy, both economically and socially.

A second agrarian revolution

The first agrarian revolution took place in the Neolithic (New Stone Age), about 10,000 years ago, when the world was warming with the passing of the last ice age. The development of agriculture brought about entirely new ways of living because it enabled large groups of people to remain together in one place and to accumulate more tools and implements than could be carried in a nomadic lifestyle. This paved the way for new technologies, new forms of social interaction and trading. While the Neolithic agrarian revolution triggered the flowering of human civilization, some argue that it also brought us inexorably to our modern predicament – ecological and social breakdown. For

example, Richard Leakey[123] argues that the transition from hunter-gathering to farming "involved a dramatic alteration in the relationship people had both with the world around them and among themselves. The hunter-gatherer is part of the natural order – a farmer necessarily distorts that order."

The claim here is that a second agrarian revolution is upon us. The challenge it presents is to re-integrate productive farming within "the natural order". The existing system is breaking down. Farmer suicides and farm debt are running high in Australia. The latest indication of breakdown is a civil disobedience campaign by hundreds of Australian farmers felling protected trees on their properties to protest against strict land-clearing laws.[124] Some way must be found to make farming both an economically viable occupation and an ecologically sustainable one. Colin Tudge argues that *agro-forestry* is that way:

> …societies can build their entire economies around trees: economies that are much better for people at large, and infinitely more sustainable, than anything we have at present. Trees could indeed stand at the heart of all the world's economics and politics, just as they are at the centre of all terrestrial ecology.
>
> The future endeavours of humanity must be geared to biological realities. The world's economies (and the endeavours of scientists and technologists) must serve those realities. Most obviously – once we start to think seriously about the fate of cities, and environmental stress in general, and human employment and dignity – we see that for the foreseeable future, and probably for ever, the economies and physical structure of the world must be primarily agrarian. In the current, crude, unexamined dogma, 'development' and 'progress' mean urbanization. The prime requirement, in absolute contrast, is to make agrarian living agreeable. It can be. It's just that at present, all the world's most powerful forces are against it. Trees are right at the heart of all the necessary debates: ecological, social, economic, political, moral, religious.

The Administration of Water and Land

The Administration of Land

Land use planning has little prominence in Western societies because private property rights make it difficult to place limits on what land owners can or cannot do with their land. One of the positive outcomes of global warming, drought and environmental degradation is the attention they have focused on land use and environmental management. In this section we explore the administrative systems required to ensure that humans can survive without destroying the integrity of the ecosystems on which they depend. There are two dimensions to the management system we require, described somewhat abstractly as the *horizontal* and *vertical* dimensions. The horizontal dimension

refers to the way we divide the landscape into administrative units and the vertical dimension refers to the multiple layers of governance required to manage the complexity of human systems interacting with ecosystems.

Dividing the land into administrative units

Ecosystem dynamics operate on multiple scales from local to global. Therefore in order to administer human activities *and* to ensure their sustainability on all scales, it is necessary to implement a hierarchical subdivision of land. With such a framework in place, it becomes possible to plan resource use and to integrate human activity with the four fundamental ecosystem processes.

There are many ways to approach a hierarchical subdivision of land: using physical criteria, such as topography; biological criteria, such as vegetation type; or human criteria such as political and cultural boundaries. The approach advocated in this essay is to give primary importance to a system based on surface water drainage and furthermore, to make political boundaries consistent with catchment boundaries. Why? Because surface water is the primary determinant of economic and social development.[125] Australia provides ample proof. Too much water (as in the far north), too little water (as in the arid centre) and too unreliable water (as west of the Great Dividing Range) have constrained the spread of human settlement across the continent. Only in the southeast, where the prevailing water cycle was familiar to European settlers, did population and commerce grow rapidly.

Here we state a fundamental principle of economic development: *economic planning begins with land use planning and land use planning begins with water planning*. To give expression to this principle, we propose, for the purposes of political and economic administration, the hierarchical division of land into local catchments, regional catchments, river basins and drainage divisions.

Bioregions

The administration of land based on surface water drainage does not satisfy all the requirements of environmental management. Some ecosystems, for example, alpine regions, span the headwaters of several catchments, and therefore cannot be well managed from a catchment perspective. Recall the four key components of ecosystem dynamics: water cycling, nutrient cycling, energy flows and species interactions. These four cannot be managed in the same way, even though their management must obviously be coordinated. It is now the accepted practice in Australia that conservation of biodiversity be managed on the scale of whole *bioregions*.

Bioregions are relatively large areas of land having a characteristic set of climatic, geological and biological features. To the trained eye of an ecologist, bioregions are characterized by a particular assemblage of fauna and flora whose patterns of interconnectivity depend on local climate, soil, landform,

vegetation and land use. Consequently bioregions provide a useful level of generality for managing some aspects of landscapes, especially biodiversity.[126]

There are currently 85 bioregions recognized across Australia and their boundaries do not follow the constraints of land drainage. So the question arises – why should we adopt a water catchment approach to political and economic administration rather than the bioregional approach? Of course both catchments and bioregions must be managed in parallel, but for the purposes of administering human settlement and economic activity, water is the critical factor. Furthermore, nutrient cycling tends to be associated with water cycling, so catchment by catchment management is appropriate for two of the four ecosystem processes. Separate administrative bodies will be required to manage bioregions. Incidentally, energy flows in ecosystems interact with the dynamics of climate change, requiring yet another kind of administrative apparatus.

Levels of governance

The vertical dimension of managing social and environmental systems refers to the several layers of governance required to manage their complexity. Different forms of management are required depending on the process to be managed, its scale and its strategic importance. Here we consider five levels of management that are distinguished by both scale (local to regional) and function:

- Farmers and land care groups (consisting of actual farmers and primary producers).
- Water, sewage and irrigation companies, etc. (constituted as public utilities or cooperatives as appropriate).
- Regulatory authorities (established by both local and federal levels of government).
- Local and regional governments (to coordinate the management of regional catchments).
- Higher levels of government (to manage large aquifers, river basins and water trading).

The next section introduces a system of land division based on water drainage and formalizes the concept of a local government area. Subsequent sections discuss the various levels of governance.

Local Government Areas

The smallest unit of formal governance and economic planning in Australia, as in most countries, is the *shire*, *town* or *city council*, collectively known as *local government*. In Australia, the boundaries of local government areas (LGAs) are, for the most part, accidents of history. They are typically focused on rivers,

because these were the main means of communication during the era of early settlement.

Principle: As far as possible, *LGA boundaries should be aligned to the ridgelines of major river catchments*.

In those cases where a river basin is too large to accommodate a single LGA, the determination of boundaries would start at the catchment source and work its way to the river mouth. For management purposes, it is useful to distinguish between the upper, mid and lower river basin, the upper basin typically being high, hilly country, the mid-basin being flat plains and the lower basin being coastal delta. So for a river basin that embraces several LGAs, it is preferable that the LGA boundaries delineate the upper, mid and coastal regions. LGAs sharing a common basin can be regionally associated. Actual LGA boundaries will be additionally determined by a combination of other factors, most obviously population distribution (discussed below).

The advantages of this local government structuring scheme are:

- It facilitates the monitoring and management of water resources at the local level.
- Local councils can assume full responsibility for a catchment because it lies completely within their jurisdiction.
- It facilitates the management of whole river basins and the work of national water authorities.

As Alexandra[127] cleverly puts it, local government will no longer be about the 3R's (roads, rates and rubbish) but about the 7R's: "roads, rates, recycling, revegetation, riparian restoration, regional reinvestment and resilient regional communities".

What is the optimum population for an LGA?

At the time of writing this paragraph, the Queensland State government intends to amalgamate many LGAs into larger regional entities. The motivation is purely economic – small councils are said to be inefficient. In contrast to the focus on economics, electoral boundaries for State and Federal governments are established with an eye to population distribution and the requirement to have similar numbers of voters in each electorate. Catchment boundaries have nothing to do with it. State and Federal electoral boundaries change frequently, so that voters find themselves in different communities with different demographics from election to election. As a consequence of such fluidity, the sense of community at local level is not carried to the State and Federal levels and there is little correspondence between local communities and the larger political jurisdictions.

There is clearly a tension between the need to build local community and the need for economic and administrative efficiency. When city councils become too big there is loss of community identity but conversely small councils lose economies of scale. This begs the question: what is the optimum population for an LGA? We propose an average of 100,000 people as an appropriate compromise. We note that, at the time of writing this paragraph, prior to council amalgamations, each of the three councils on the Sunshine Coast north of Brisbane has a population of about 100,000. Each includes a mix of both rural and urban development and each could be considered a 'good average shire'. However some flexibility is required. It is clear that the largely empty parts of rural Australia, with huge areas of land to administer, should be allowed smaller population, while metropolitan councils will have a larger population. Subject to catchment constraints, boundaries would need to be revised periodically to accommodate movements in population.

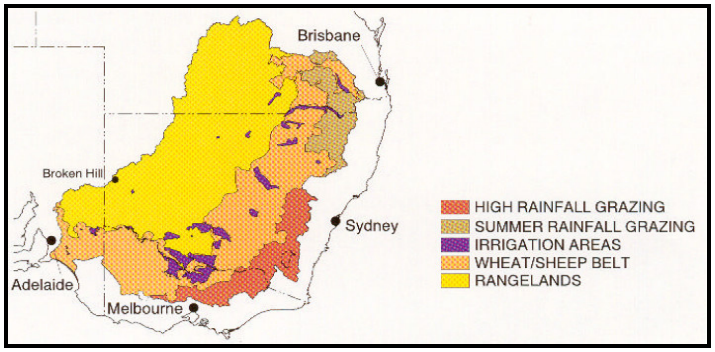
Something to think about

Have the States of Australia passed their use by date?

Although environmental management in Australia is supposedly under the jurisdiction of the State governments, local governments are in a better position to oversee enactment of natural resource policies. They are also in a position to respond more rapidly to environmental problems as they arise, assuming of course that they are adequately resourced.

The State level of government in Australia should be abolished because it no longer serves any important strategic function. The States could be substituted by regional groupings of local governments. These regional groupings would, of course, correspond to regional catchments or river basins. Here are two reasons why the States have passed their use-by date:

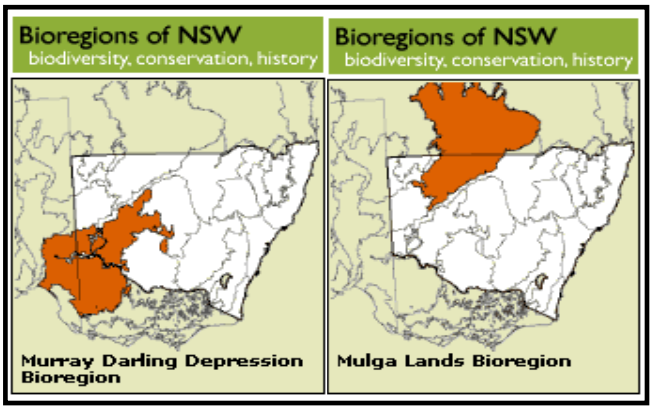
1) Failure to manage the Murray-Darling Basin



In July 2007, the Commonwealth government introduced legislation to bring the Murray-Darling Basin under its control. (Note in the figure how

the basin straddles four States.) Despite objections from Victoria and concerns about concentration of power, whole basin management is the only solution to the inability of the four concerned States, Queensland, NSW, Victoria and South Australia, to do the job.

2) Failure to manage bioregions that cross several State boundaries.



Managing biodiversity requires a whole bioregion approach. It became apparent in the early 1990s that conservation goals could not be achieved if administrative regions were constrained by State borders. Consequently, the States asked the Federal government to coordinate the determination of bioregion boundaries. Today there are 85 recognized bioregions. 17 are found in NSW, but of these only two lie wholly within the borders of the State. In the system proposed in this essay, where LGAs and regional boundaries would be determined by catchments, many bioregions would also cross administrative boundaries. Hence there is a need for a separate administrative apparatus for bioregions.

Land-care and Farmers Organizations

The best persons to care for an area of land are those who actually live or work on it. Their everyday presence ensures that they will recognize small deviations from the natural order of the previous decades. In the case of rural land, the growers, cultivators and graziers themselves are the best caretakers. Unfortunately there are two all too common obstacles to the realization of this truth. First, in most parts of the world, both developed and undeveloped, farming is a marginal or uneconomic enterprise. In such circumstances, land care is low down the list of priorities. Second, much land, both rural and urban, is owned by absentee landlords. The people actual working or living on the land have no incentive to care for it because they could be gone tomorrow.

Rural communities in Australia are in decline. The average age of an Australian farmer is now 61 – young people are turning away from the land.[128]

Farmer suicides and farm debt are running high. We have already noted the farmer civil disobedience campaign to fell protected trees on their properties. The government introduced land-clearing restrictions in order that the tree growth can be used to offset carbon pollution from the country's vast coal mining industry. Farmers argue that they are the scapegoats for climate change and that the ban on tree clearing is yet another impost making it difficult for farmers to earn a living.

Farmers have a legitimate grievance. Two decades of rural policy dominated by economic rationalism and free trade have ripped the heart out of Australia's rural communities. Some way must be found to make farming an economically viable occupation, if it is also to become ecologically sustainable.

Part of the solution is the gradual development of a cooperative rural economy.[129] But another ingredient will be agreements between representative organizations, which in developed countries means both farmer and environmental organizations. An historic agreement has just been signed in Queensland and may be a positive sign of things to come. After many years of fighting between farmers and environmentalists over the rapid rate of tree clearing, the Queensland Premier has brokered an agreement between the Queensland government, Agforce (Queensland's powerful farmers organization) and the Australian Rainforest Conservation Society. Under the agreement, farmers who adopt green land care practices will be rewarded with longer leases. (In Queensland, much rural land is government owned and leased to pastoralists. In fact, the Queensland State government is the largest landholder in the world after China and Russia.) AgForce cites the main issues facing growers in Australia as resource management, land tenure, environmental issues, international competitiveness and withdrawal of rural community services. The above agreement attempts to address the first three of these. Unfortunately, unless the economic viability of farming is addressed, such agreements are unlikely to be effective.

Something to think about

A letter to The Mercury newspaper, Hobart.

"While the State government's recent announcement of $420,000 to help 45 vegetable farmers develop business skills and $4 million for marketing initiatives for Tasmanian produce is laudable (see *The Mercury*, 21st September) it is not addressing the crux of the problem.

"Unfortunately for a number of reasons we are not competitive with the rest of the world because our costs of production are too

high. Forget about all the level playing field talk. It will never happen.

"Many of these costs are outside the farmer's control, such as government charges at all levels and excessive red tape.

"However, many are within our control. Most of our Tasmanian vegetable farms are over-capitalized and too small to be viable in the long term.

"What the government should be doing through the Department of Primary Industries, Water and Environment is examine new business models by which groups of willing farmers could farm cooperatively together as districts, ensuring greater economies of scale.

"The natural resources of the regions, such as water, drainage and topography, could be used more effectively.

"Build infrastructure, such as roads, fences and buildings, that would eventually be located more strategically.

"The savings on machinery costs and the ability to purchase in bulk would also be considerable. The opportunities to build a viable future are exciting, challenging and numerous.

"I know lots of sacred cows will have to be buried but let's have the debate before it's too late.

"This is not about destroying rural communities. It is about saving them while we still have a say in our future."

Rick Rockliff,
Sassafras
24th September 2005

Regulatory Bodies

Principles

Leaman[130] promotes the following principles of water management and water legislation:

- The water cycle is essential for a healthy ecosystem. Water is essential for economic development. Clean water is essential for human health. All three are interconnected. It is not possible to have one without the others.
- Water in all parts of the world in whatever form is linked via the water cycle. It is not possible to divide water into isolated categories, for example,

surface water and ground water, and to have different legislation for each. The water cycle must be managed in its totality.

- There should be no waste – water must be maximally utilized.
- Water should not be unnecessarily degraded because water is recycled to others through the water cycle.
- Water is part of the commons, not given to any one person to squander. Water should be shared equitably and there must be a transparent allocation system subject to appeal.
- Codes of water practice should adopt the *precautionary principle* – when in doubt protect the resource. Water is too valuable to risk.

Water management requires an understanding of all parts of the water cycle within all catchments from local level to drainage division. It requires measurements of precipitation, water flow, ground water levels, evapo-transpiration, water quality and human abstractions and discharges. Water resources are managed for many uses other than abstraction. Consider the following list of competing management demands:

- Flood defence and land drainage.
- Development of water resources, especially storage facilities.
- Control of abstractions by individuals, irrigators, private companies and public utilities.
- Control of water pollution and salinity.
- Control of effluent discharge.
- Control of catchment erosion.
- Maintenance of freshwater fisheries.
- Conservation of the water environment, biodiversity and environmental flows.
- Provision of water based recreation, including fishing.
- Navigation.
- Environmental flows (last in the list because that is where it has traditionally been placed).

Some history – water administration in the UK

The formation of multi-purpose river basin authorities was debated in the UK for more than 100 years before it actually happened. As far back as 1870, Lord Robert Montague, a commissioner in the Royal Sanitary Commission, argued

that "the various interests of land and river, navigation and mills, drainage and water supply, fishing and manufacturers, can be adjusted and developed only by the one management over the whole river".[131] His advice was rejected.

Disastrous flooding events over subsequent decades, primarily due to extensive deforestation of the English landscape, led to the formation of numerous land drainage boards and ultimately to the Land Drainage Act of 1930 which established the notion of *catchment management*. The next advance was the formation of River Boards under the River Boards Act of 1948. But this Act failed to provide the Boards with the power to conserve water. They were purely a data collecting service.

The introduction of spray irrigation after World War Two, with consequent tension between town and country over rights to water, set the scene for the next milestone in Britain's water legislation – licensing. For hundreds of years, water allocation had been determined by a system of water rights based on common law. This system was changed overnight by the Water Act of 1963 which introduced a system of government licensing. No one had individual ownership of the water, rather access was obtained by government license.

Further functions were integrated into the River Boards over the next decade until finally the 1973 Water Act established 29 truly multi-function Regional Water Authorities. However it can be argued that the 1973 Act went too far, because it also merged the regulatory role with the service utility role. Conflicts of interest arose as increasing economic pressures compromised water quality and conservation goals. The defects of this arrangement were used to push through the privatization of water utilities in the Water Act of 1989. A UK National Rivers Authority was established to coordinate the activities of 10 regional units, but of particular importance, the Act separated the regulatory function of the Authority from the private companies providing water services. Today there are 22 water companies whose jurisdiction is mostly catchment based. They are regulated by the Office of Water Services (the economic regulator), the Environment Agency (the environmental regulator) and the Drinking Water Inspectorate (the regulator for drinking water quality). A committee of Secretaries of State has a wider role in developing policy and the legislative framework.

Australian regulatory bodies

Effective water management depends on sound institutional arrangements supported by Acts of Parliament. Australia has three levels of government, local, State and Federal, and at present it is the States that have primary responsibility for water management. In Queensland, for example, the Water Act 2000 vests all rights to the use, flow and control of Queensland's water with the State government. The legislation is implemented by the Department of Natural Resources, Mines and Water (NRWM) and requires that the NRWM

prepare a Water Resources Plan (WRP) for every river basin followed by a Resource Operations Plan which determines how the objectives of the WRP are to be achieved.[132] The plan must have a number of features which would satisfy some of Leaman's principles and which, according to the NRMW, are Australian best practice:

- The plan must specify the long-term consequences of the proposed water allocations so that all users have certainty and security.
- Water resources must be managed to maintain river basin health and to provide for the long-term sustainability of its ecosystems.
- The plan must specify a range of environmental flow objectives to achieve river health and these must be supported by good science.
- Future increases in water allocations must be compatible with the security and environmental flow objectives.
- The planning process should include community consultation.
- Planning must adopt the precautionary principle.
- More controversially, the Water Act 2000 also introduced a system whereby water entitlements can be traded independently of the land to which they were previously attached. Trading is seen as a means of increasing productivity and efficiency because water moves to the highest value uses. However the Water Operations Plan must contain trading rules to ensure that the movement of water does not compromise security and environmental flow objectives.
- The plan must also include demand management, ground water management, etc.

The end result should be a plan that allocates water for domestic, agricultural, irrigation, industrial and recreational users subject to the constraints of environmental health and allocation security.

The whole process looks good on paper and is probably the best that can be achieved in today's social and economic climate, but given the fact that so many of Australia's rivers are in crisis, the regulatory regime is clearly inadequate. Here we address just a few of the problems. They are not unique to Australia and they provide valuable lessons for the future.

Divided responsibility: Many of the important river basins in Australia, most notably the Murray-Darling, do not correspond to State boundaries. The effect is that each State attempts to maximize its take of water and blame the others for mismanagement. A second problem is that there are multiple regulatory bodies even at the same level of government, with overlapping areas of responsibility but with different goals and time-lines. For example, there are

currently five overlapping Australian Commonwealth bodies responsible for water.[133] The net result is that even though everyone accepts the principle of whole river basin management in theory, the reality is nothing like it.

Nepotism: In 2008, the Queensland Labor government announced that it intends to issue a tradable water allocation to Cubbie Station, a huge cotton grower high in the headwaters of the Murray-Darling Basin.[134] Due to water shortages in the basin, the licence is effectively a gift worth about $100 million AUD. Cubbie Station is already the biggest irrigator in Australia and much controversy surrounds its profligate use of water. Of particular concern is that the head of the company was a previous treasurer in the same Queensland Labor Party. It is also of interest that at the time of the announcement, Cubbie Station was deeply in debt due to the Global Financial Crisis. It is easy to agree with a downstream grazier that the issuing of this license is "morally outrageous".

Transparency: Catchment water accounting should be transparent, that is, the accounts should be public documents. However this is not always the case. In places like Tasmania, where water is highly politicized due to large amounts of water consumed by the woodchip forestry, catchment water accounts are kept secret.

Politicization: The author has spoken to person's who participated in the community consultation process that was an integral part of the preparation of the Mary River Basin Water Resource Plan in Queensland. It was quite clear that those pushing for more environmental flows were up against powerful established lobby groups. In the Condamine-Balonne Basin, established users mounted a legal challenge against the science used to determine environmental flows.

Enough of the problems – what are the solutions? There has been much discussion in the Australian media over the past few years concerning an effective regulatory apparatus for water. A key issue is how to deal with the extreme politicization of water which makes it impossible to take timely and effective action. The politicization of water is perhaps inevitable, but some steps could be taken to minimize the problem. One suggestion has been to constitute water boards in a manner not dissimilar to the board of the Reserve Bank. The Reserve Bank has an economic regulatory function, established by statute, with which politicians can not directly interfere. Catchment and River Basin boards would be appointed as appropriate by local and national governments consisting of properly qualified people. To prevent nepotism, selection to such boards should be limited to members of an Australian College of Water Scientists and Engineers. In Sarkar's view, water boards must be given all the power they need to manage catchments according to the best science.

The goal of such a mechanism is to allow politicians to have some control over the general direction of water policy but to prevent them from having any influence over its administration. Decisions concerning water should be made on the basis of the best science available, not the strongest lobby group. Just as the statutory duty of the Reserve Bank is to maintain stable prices within certain limits, so too the statutory duty of a River Basin board might be to allocate water subject to keeping the total catchment's water balance within certain limits.

Catchment accounts and budgeting

Australia's National Water Initiative (a Federal program) is designed to implement total accounting for Australia's water use. One of its objectives is to return over-allocated catchments to balance by 2020. But the presumption is that we know what that balance might be. Much research is needed.

Every catchment and river basin requires a set of water accounts and an annual budget. In theory this is little different from a set of financial accounts – one set of books to keep track of income and expenditure (inflows and outflows) and another set of books to keep track of assets and liabilities (changes in the volume of reservoirs). For any catchment the difference between inflow and outflow should equal net change in the volume of stored water.

Quite apart from the fact that much research is needed in order to establish a set of water accounts, even knowing the figures it is debatable whether it is politically possible to return catchments to balance by 2020. State governments have over-allocated water rights and because these are tradable much of Australia's water is now owned by foreign companies.

Water accounting constitutes just one component of environmental accounting. Environmental accounting is in its infancy and many issues are yet to be resolved. The Wentworth Group of Concerned Scientists has recently put forward a proposal for a set of National Environmental accounts.[135] Data for the accounts would be collected on a regional basis and would monitor the health of five classes of environmental assets: land, water, atmosphere, marine and urban. The accounts would be published each year and would become the basis for determining the effectivness of all environmental restoration programs. The hoped for benefit from a set of water accounts would be, for example, a sustainable allocation of irrigation water in the Murray-Darling Basin.

The Habitat Hectares program[136] in the State of Victoria offers another example of environmental accounting, in this case accounting for land quality and its biodiversity. However the Habitat Hectares program goes a step further and sets up a market that allows land developers to trade in biodiversity. The idea is that the environment provides ecosystem services, that is, it performs

important functions that improve human life. Trees, for example, purify water, prevent erosion and so on. If a dollar value can be put on those services then market mechanisms can be put in place to retain or even increase that value.[137] As an example of this approach, New York's water supply comes from a large natural watershed and it is estimated that it would cost $9 billion to purify the city's water supply to the same extent if nature were not doing it for free.[138] If water is priced with this cost in mind, the revenue can be used to further improve environmental quality.

Politicians like putting a dollar value on ecosystem services because it makes it easier to weigh up conservation costs against competing budget items. But the approach is fraught with difficulty. Most obviously it assumes that all the services provided by a particular ecosystem can be known. But most ecosystems are incredibly complex and all their services cannot possibly be known. Furthermore, how does one put a price tag on the aesthetic, cultural or spiritual value of a particular lake or forest? There is, however, a more fundamental objection – the notion of ecosystem services is entirely focused on benefit to humans. But an ecosystem is really a living entity in itself, not an abstract concept, and therefore has its own moral right to be healthy, quite independent of its value to humans.[139]

Water Companies and Water Trading

Private versus public?

We now turn from the higher levels of water administration to the lower levels, the individuals and companies that get the licences and the rights those licences endow. It is here that the ideological struggles concerning water are the most intense, for it is here that water exposes an ideological faultline between two opposing views of the world. The one view says that resources are most efficiently managed when all of nature, including water, is owned by individuals who chase profit by trading in free markets. In the case of water, this means establishing a water market in which government allocations become a private asset that may be traded like any other asset. The other view says that natural resources, including water, are a gift of nature, part of the common wealth and not, in the first instance, the property of any individual. The common good is best achieved, not by chasing profit, but by public management in the public interest. It is fair to say that progressive thinkers around the world support water remaining in the public arena and certainly this is the Proutist perspective. Only where powerful corporations have captured the political process has water been privatized.

Nevertheless privatization of water remains a keenly fought battle and it is worthwhile to summarize the arguments for and against. There are primarily three modes of management for large water companies in various parts of the world: the private corporation, the traditional public utility and a hybrid, the

government corporation. The hybrid is essentially a business corporation trading for profit with the (majority) shareholding in government hands. It is a half way house, often used by governments as an intermediary step from public utility to full privatization.[140]

Although this essay supports the role of public utilities in a modern economy, their potential disadvantages must be recognized.

> Public ownership has traditionally suffered from a 'cost-plus' mentality, where frequently decisions are not properly costed. Bureaucracies can often be sleepy and over-staffed, with little incentives for innovation among employees. Public ownership can be expensive and inefficient *in economic terms*. Public authorities are also treasury-dominated, and suffer from the myopic nature of this department, which is always reticent to commit long-term investment capital (an attitude otherwise known as NIMTOO – not in my term of office).[141]

The main arguments in favour of public utilities are precisely those where private enterprise is weak.

> [Public utilities] tend to be safety conscious, consumer conscious and environmentally conscious. They do, after all, represent the public interest, and the public generally likes the idea and feels safe. Corners are less likely to be cut and the public authority is accountable to the Minister and Parliament and to the Treasury… Private ownership is supposed to offer efficiency and a cost consciousness, but with more focus on profit comes less focus on safety and the environment.[142]

The inefficiency of public enterprises is part of the dogma of modern capitalism. But the dogma should be challenged. It assumes that chasing profit for shareholders must necessarily generate efficiency. But we have seen in the past two decades that water and power utilities, once privatized, engage in mergers and speculative activities that have nothing to do with their intended community service. The Enron debacle is just one of many examples.[143] More recently we note the exorbitant salaries that the executives of large companies are awarding themselves. None of this is efficient in any sense of the term. By contrast, protocols are emerging whereby publically owned utilities can pursue real efficiency – benchmarking, comparisons with other utilities and comparison with world best practice, etc.[144]

In truth, the major motivation to privatize is ideological rather than to implement good policy. In an era of economic rationalism, governments are reluctant to engage in large infrastructure projects that make a significant impact on their budgets. Private companies, on the other hand, have access to large investment funds and claim to be better at managing the risk involved in large infrastructure projects. Such arguments are self-fulfilling prophesies. Reluctance to spend means that governments have run down existing infrastructure to the point where major investment is now required. Second,

governments have lost the skills which they once had to undertake large infrastructure projects. This is evidenced by the ability of private corporations to outmanoeuvre government bureaucracy (to the disadvantage of the consumer) in negotiations for privatizing the Sydney water system.[145] Australian governments once had the ability to undertake huge infrastructure projects, such as the Snowy Hydro Scheme, and there is no inherent reason why they cannot do so again, given the ideological will.

Not all water projects need be large scale. Indeed, another argument in favour of the decentralization of water harvesting is the consequent downscaling of the investment risk associated with smaller projects. Small- and medium-scale irrigation companies, organized either cooperatively or as trusts, are becoming more frequent in Australia. The motivation for farmers is to secure their water supply and remain independent of large corporations.

Water trading

According to free marketeers, water is just another commodity and its distribution is best achieved through trading in a water market. The implicit assumption is that water must therefore be in private hands. However water *ownership* and water *trading* are two separate issues. Likewise there is no inherent reason why water managed in the public sphere requires that all allocation decisions must be made by government authorities.

The wisest approach appears to be water markets where the dominant traders are public utilities and farmers cooperatives operating within of regime of strict regulatory oversight. Utilities and cooperatives have social and environmental objectives as well as economic, so they are not purely driven by profit. Such an approach allows water to move to higher value uses while ensuring that essential community and environmental needs are met. In other words, when the issue of ownership is separated from the issue of trading, the price of water can be allowed to reflect not just its true economic cost but also its true environmental and social cost.

Leaman argues that water trading can only take place against a background of a well-managed catchment for which all water inputs and outputs are accounted. His scheme has two principle features: 1) water trading should not be denominated in dollars but rather in litres, and 2) allocations to individuals should have transparent equity. He argues against a system that declares or implies that all the water falling in a catchment is owned by the State which then allocates that water as it sees fit. Such a system is against natural justice and will lead to theft and disputes between neighbours.

Once the total allocation in a catchment has been calculated, Leaman argues that every property owner in a catchment has a right to some of the water according to some formula that depends on the area of one's property and the rainfall.

> If you need more, or can make do with less, then a part of your share can be traded by agreement. This is a way of ensuring that everyone values the water they have and wastes none of it. It does not need a price. Any infrastructure installed to supply water can be subject to fees and management charges. The water must not be for sale, but managed.[146]

Note that in Leaman's scheme growers and irrigators might be doing their calculations in dollars but the regulator keeping track of trades would calculate only in litres. The regulator's statutory task is to ensure a balanced water budget for the catchment. Another feature of Leaman's scheme is the abolition of the government sale of water licenses, which has been abused for raising revenue, even when the available water is already over-allocated. In 2006, the average Australian water allocation was just 21% of the entitlement and in some cases the allocations have dropped to zero.[147]

Leaman leaves undiscussed the geographical limits to trading. Should water be traded outside the catchment and what are the limits to a catchment? The difficulty is that selling water from one property has consequences for neighbouring properties. As an example, water licenses in Sunraysia (an irrigation dependent fruit growing district in South Australia) can be sold for $2,500 per ML. Some 18% of Sunraysia's allocations have been sold outside the region, usually by growers attempting to stave off bankruptcy. The subsequent deterioration of the land affects even those who have retained their allocations.[148]

Barber[149] goes beyond the more obvious water trading scenario and proposes that we should also consider the water embodied in traded foods, woodchip, etc. He advocates a 0.02% tax collected on the freshwater embodied in all international trades. The motivation is to encourage countries with high levels of freshwater to retain forests and glaciers. Barber also advocates the adoption of an international protocol for water similar to the Forest Stewardship protocol. Signatories to the protocol would, for example, ban trade with groups that do not practise high water management standards. Of course, levying a tax on embodied water requires one to calculate such quantities in the first place. One approach is water *footprinting*. The *water footprint* of an individual or community is defined as the total volume of freshwater consumed by that individual or community per unit of time or, in the case of a business, it is the water consumed to produce a unit of output.[150]

Community and Culture

Rhetoric versus Reality

The first Earth Summit of June 1992 came to an agreement on best practice water management. The catch phrase was *Integrated Water Resources*

Management and, in theory, the resolutions to emerge out of the summit were all laudable: a commitment to equity and sustainability as the basis for service delivery; water administration on a whole river basin or catchment basis; commitment to consultation with stakeholders; decision making at the lowest possible appropriate level; need for community and women's participation; social mobilization, accountability and transparency. All were explicitly emphasized. So where is the problem?

As spelled out by Black,[151] integrated water resources management and sound water governance do not exist in the ether – they exist only on the ground within specific economic, cultural and political circumstances.

> The context in which policy principles have to be applied – in every case a unique mix of economic, social, cultural, hydro-geological, political, administrative and other environmental factors – determines which policies are suitable and whether they can be made to work. 'Good governance' cannot be invented as if it were a module or imported from outside; it needs its own roots and organic growth to flourish. Very little governance in poor societies is good or effective; it is usually under-resourced, inefficient, undemocratic and corrupt. There is no mystery about this, although the degree to which it is ignored implies that there is. It is simply a corollary of a country or areas within it being seriously 'underdeveloped'.
>
> The water policy principles so painstakingly thrashed out in Agendas and Guidelines may be excellent on paper. But practice on the ground falls desperately short.[152]

Black is particularly critical of big water and irrigation projects funded by international agencies, such as the World Bank, that inevitably centralize the control of water. Such projects establish the very opposite of what is apparently supported on paper. Governments, corporations and banks are reluctant to fund low-tech projects that harvest rainwater locally, that install non-energized irrigation or 'dry' sanitation. Instead they fund large projects that encourage centralized control, national growth against sustainable livelihoods and privatization over public ownership. The ideological commitment to large centralized projects is all the more damaging in societies which are already decentralized and have fragile national administrative systems.

According to Black, the international consensus of the world's leading water warriors (she cites people such as Vandana Shiva and Riccardo Petrella) is clear:

- Water is a vital natural resource and should remain in common ownership.
- Both the water and the pipes which carry it about must be controlled by local democratic power.

- Water must not be controlled by distant corporations having government bureaucracies in their pockets.
- The democratization of water begins by capturing rain locally.

The lesson: *One cannot import first world technology into a Third World culture*. But even in economically developed Western countries, Sarkar would promote a decentralized approach to the harvesting and management of water (See Appendix 3).

Community Supported Agriculture

Community-supported agriculture (CSA) is an approach to food growing and distribution, where a community of individuals pledges support to one or more farms and the growers and consumers share the risks and benefits of food production. A CSA usually arranges for weekly collections of fruit and vegetables from growers, packages them into boxes sufficient for one family over a week and distributes to member families.

CSA began in the early 1960s in Germany and Switzerland and independently in Japan. Responding to concerns about food safety and the urbanization of agricultural land, groups of consumers and farmers formed cooperative partnerships to fund farming and pay the full costs of ecologically sound and socially equitable agriculture. In Europe many of the CSA style farms were inspired by the economic ideas of Rudolf Steiner. The idea spread to the USA in the 1980s and today North America has at least 13,000 CSA farms.[153]

There are many variants of CSA but the basic design is to form a committed group of consumers who are willing to fund a whole season's budget in order to get quality foods. A family does not pay per kilogram of produce, but rather supports the budget of the whole farm and receives weekly what is seasonally ripe. A significant advantage of this approach is that it spreads the financial risk while allowing the grower to focus on what he/she does best – care of soils, crops, animals and co-workers.

Some CSAs have evolved into social enterprises employing local staff, improving the lot of local farmers and educating the local community about organic/ecologically responsible farming. The Food Connect Foundation is a highly successful model of this approach in Southeast Queensland.[154]

Recombinant Ecology

Human beings have settled virtually everywhere on planet Earth and, for better or worse, made their mark on its landscape. It is no longer useful to think of nature as some pristine state, independent of human activity. Rather individual *landscapes have co-evolved with local human culture* and they continue to do so. Just as *fusion music* is an innovative mix of international styles, so in most

parts of the world agriculture is a hybrid of indigenous and introduced species and practices. Landscapes everywhere are in rapid state of flux, demanding new theoretical concepts, such as *recombinant ecology*.[155]

This is particularly true in Australia, where migrants or the descendants of migrants make up an overwhelming majority of the population and own or manage most of the country. Each wave of newcomers has brought not only diverse cultural resources to enrich civil and economic life but also diverse genetic resources to create hybrid agricultural systems.

> In northern Australia, for example, tamarind trees were introduced by Macassans who arrived each year in large fleets of fishing boats. The trees seeded prolifically and now the seasonal fishing camps can be identified from their tamarind trees. In central Australia, a 'hybrid agriculture' has evolved from the introduction of date palms and camels from Southwest Asia; rabbits and beef cattle from Europe; citrus from China; grapes, mulberries and figs from the Mediterranean; store food that is trucked in from the coastal cities; and bush tucker which has co-evolved on this continent for millions of years. Given this diverse agricultural heritage, Australian 'farming' systems of the future will be mixes of indigenous, exotic and colonial components, just as current systems are 'hybrids' of indigenous and exotic species brought together by the 'historical accident' of British colonization.[156]

Learning to Care

"*Getting people to give a damn is the issue*."[157] Caring for a landscape requires *land literacy*. There are two parts to it, a subjective cultural component and an objective or scientific component. Fortunately, both of these can be learned, but the cultural component has been left to chance. It has taken a long time for we Australians to be deeply moved by the landscape which we inhabit, mostly because the majority of us are recent arrivals. The landscape looks and works differently from other parts of the world. It takes time to understand it – time to love it.

Education can help, but not just an education of knowledge. Something more is required – to encourage an ethic that goes beyond purely human concerns, an ethic of respect and love for the natural world. Neohumanist education does just this.

> To walk the earth lightly, internalizing the principle of non-harm, to live gratitude and to work always in the knowledge of our relationship to the physical, organic and human worlds is the heart of Neohumanist ethics and underpins all futures work. Such an ethic is based on the recognition that the human condition is no longer simply the province of human beings. It is, in the strict sense, a Neohumanist condition that incorporates the past, present and future, and also the planetary context. It opens up educational contexts in which speciesism can be addressed along with

> other cultural habits arising from the tendency to view the world as a resource. In sum, the human condition is a spiritual Gaian phenomenon.[158]

Ultimately, caring for water, for landscape, for the world around us, is about love.

> Neohumanism includes within its scope not only human beings and animate creatures, such as plants and animals, but also all inanimate entities as well, for the scope of Neohumanism extends down to the smallest particles of sub-atomic matter… Why should the love and affection of developed human minds be restricted to human beings only?[159]

In *Wisdom of the Elders*, Knudtson and Suzuki argue that both culturally and scientifically there is much to learn from indigenous societies. The defining feature of indigenous societies is a distinctive culture "in which, at least traditionally, they have *a profound and deeply rooted sense of place and relationship with the entirety of the natural world*".[160]

Here is the question – what might the landscape management practices of a modern technologically developed society look like if it displayed *a profound and deeply rooted sense of place*? Clearly we would value our landscape, not just for its agricultural and mineral wealth, but for something more subtle, in the same way that Europeans value their great cathedrals, museums and art-galleries.

The tremendous success of the Landcare programme in Australia is a demonstration that collective consciousness is changing. The revitalization of degraded landscapes is becoming a major collective endeavour, a community art-form equivalent to the building of a sublime gothic cathedral. "Just as thought, observations and skill are used to create culturally significant symbols, environmental repair brings landscape back to life, in a symbolic and material healing of degraded ecosystems."[161]

Environmental journalist Robyn Smith is optimistic. She believes that Australia is finally starting to grow up:

> …we have left our frontier stage behind us and are moving into the next one, one of consolidation and responsibility. It seems that white Australians are now ready to take on the role of stewardship of the land, a role previously taken by Aboriginal Australians.
>
> Survival in this country has always meant cooperation and co-adaptation.
>
> Maybe we have learned the lesson that this is what we need to do in order to prosper as a country and as a people.[162]

Policy Recommendations

The policy recommendations that follow are offered with caution. So much depends on the political and cultural context, quite apart from the ecological context. However, since drought in Australia was what motivated me to begin this writing project in 2007, it seems fitting to conclude with the broad outlines of a policy on water and land management. Notwithstanding my insistence in this essay that water policy cannot be separated from issues of land management, land management policy has not been included below for two reasons. First, the policy list would be extended by many pages. Second, land management is even more dependent on local conditions than water management.

- The purest water is obtained by catching rain where it falls or trapping surface water as close to the rain source as possible. This policy requires many distributed storage facilities. It is consistent with the preferred policy of decentralizing the production and distribution of the essential requirements of life.
- In many parts of Australia, ground water is the only available source of potable water. The iconic Australian outback could not have been settled without it. However, ground water must also be conserved – not abstracted in excess of recharge. Centres of urban population should not rely on ground water, except in emergency.
- Desalination is a poor option, given its cost and the brine disposal problem. However for urban populations, desalination powered by renewable energy sources may be appropriate.
- Capture of rainwater from clean surfaces in the urban environment should be a priority. Treatment of stormwater to potable standard is expensive, as is recycling. Therefore water should be used multiple times before recycling.
- Water storage and treatment in aquifers should be implemented wherever appropriate. The inertness of the geological matrix is an important consideration.
- It may sometimes be useful to link distributed water storage facilities into a water grid, especially in regions with unreliable rainfall. However water grids are expensive to maintain and the policy of transferring water to develop one catchment at the expense of another cannot be supported.
- All artesian wells, that are spilling water freely, must be capped.
- Irrigation channels should be sealed to minimize evaporation and ground leakage. Storage and irrigation practices, which result in the evaporation of 50% or more of the harvested water, should be abolished. This figure can be progressively diminished.

- Promote reafforestation programs of high ground and water ways. Promote agro-forestry.
- The maintenance of a small-scale cloud seeding project appears justified in Australia on the available evidence.
- Water is a common heritage and a necessity of life. Unlike oil, which is also a necessity of modern life, freshwater has no viable substitute. Its depletion in quantity and quality has profound social, economic and ecological consequences. Therefore water should remain in public ownership. It also follows that the distribution of water should not be privatized and nor should water be reduced to an economic asset traded for profit.
- The harvesting, storage and management of water should be decentralized to maximize local water security. LGAs should be organized along catchment boundaries. LGs should be responsible for water accounting, catchment by catchment.
- National water authorities are required to coordinate management of river basins and to supervise inter-basin transfers and aquifers that underlie several river basins.
- Regulatory authorities should be administratively isolated from companies providing the actual water services.
- A system of regulated water trading could ensure efficient distribution.
- Acceptance of the *precautionary principle* which was agreed to at the Rio Earth Summit (1992): "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

Something to think about

A vision of the future

Policy is not enough. Vision is required. Australian academics are turning their minds not just to modern technology but to the Australian landscape as a vibrant living entity. They see a marriage of bio-technology and managed healthy eco-systems. Here is just one example of a growing literature of futures thinking applied to the Australian landscape. In this example, Alexandra and Riddington imagine a flight over the Murray-Darling Basin (MDB) in 2105.

"In 2105, an international delegation of sustainability experts interested in catchment restoration toured the MDB. Flying low over the catchment this is what they saw. Blue haze hovers over ancient mountain forests in the south. From the foothills, north to the plains, large areas of plantations

and woodland regrowth dominate. Streams snake over the riverine plains, buffered by riparian forests, among mosaics of plantations, short rotation bio-energy forests, and a diversity of crops…

"The rivers sustain significant irrigated crops, despite the reallocation of water to environmental flows, native title claims and climate change. The fertile, arable plains support sophisticated *industrial ecosystems* producing a variety of industrial feedstock, biofuels, bio-pesticides, novel pharmaceuticals and intensive horticulture and viticulture. Precision farming systems use sophisticated monitoring technology to control inputs and focus cropping on areas that maximize profit and minimize risk, including environmental risks. Pest management is bio-intensive and relies on beneficial insects, natural pathogens and plant-based extracts. Bio-digesters produce energy and fertilizers from 'waste products'.

"Traditional crops are still grown, but many new crops feed the 21st century revolution in biological and chemical engineering producing nutritional supplements, fuels, oils, medicinal herbs, resins, tannins, natural rubber, gums, waxes, dyes, flavours and fragrances.

"Former grazing properties support plantations and regenerated forests, earning income from carbon credits, biodiversity bonds, biomass energy and utility timber production. Small residential villages – clusters of eco-housing – are surrounded by productive gardens, small farms, orchards and vineyards. Detailed catchment plans, revegetation and threatened species management plans are being successfully implemented, with few remaining signs of land degradation.

"Agriculture, manufacturing and food processing remain important to local economies with sizeable dairy, cropping, horticulture and timber industries. Agricultural production is concentrated where it is profitable and sustainable, due to ongoing international pressure to minimize agricultural subsidies. Damaging environmental practices are unviable as markets dictate strict environmental performance and proof of eco-efficiency using comprehensively audited, internationally recognized environmental management systems."[163]

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About the Author

Michael Towsey studied biology at Auckland University (New Zealand) in the late 1960s and later obtained his PhD in computer science from Queensland University. For most of his career Michael has been a research scientist. He started in the field of plant physiology, moved to crop physiology and after obtaining his PhD turned to biological applications of machine learning. Michael is a founding member and associate of Prout College. In relaxed mode, he plays in two recorder ensembles and potters around in a community garden.

Appendices

1 Water Statistics

Measures of water volume

Volume (litres)	*Weight (metric)*	*Length cubed*	*Appropriate scale*
1 litre (L)	1 kg	$(0.1m)^3$	Bucket
1 kilolitre (kL)	1 tonne	$(1m)^3$	House tank
1 Megalitre (ML)	1000 tonnes	$(10m)^3$	Weir/farm pond
1 Gigalitre (GL)	1 Megatonne	$(100m)^3$	Large dam
1 Terralitre (TL)	1 Gigatonne	$(1km)^3$	Large lake

Distribution of water on Earth (from Figure 1.1 of Goodman[164])

Oceans (97%),
Freshwater as both ice and liquid (3%) which is divided as:
Polar ice caps + glaciers (75%)
Rivers, lakes, groundwater (25%) which is divided as:
Surface water – rivers and lakes (1.2%)
Ground water (98.8%)

Average annual water balance of world (Table1.1 from Goodman 1984)

	Volume (thousands of cubic kilometres)		
Region	*Precipitation*	*Evaporation*	*Runoff*
Australia	7.1	4.7	2.4
Europe	6.6	3.8	2.8
North America	15.6	9.7	5.9
Total Land Areas	111.0	71.0	40.0
Oceans	385.0	425.0	-40.0

Volumes and flows

Volume of typical Olympic swimming pool (50m x 25m x 2m) = 2.5 ML.
Volume of water in Sydney Harbour = 500 GL.

Total water consumed by 20 million Australians per year: >24,000 GL (1200 kL per person).
Total water consumed by 6 million Israelis in one year: >2,000 GL (333 kL per person).
Total water consumed by Melbourne in 2006: 273 GL.
Amount of water transpired from corn field: 25 – 35 kL per hectare per day.
A single large tree can transpire 500 L of water per day.
Reported flow through Murray River, May 2007 after autumn rains – 103 GL.
Burdekin Falls Dam (North Queensland) in full flood – 13 GL per day. (Williams, 2007)
Variability of annual flow of the Balonne River through the Queensland town of St George:
In a wet year, 8500 GL, with 250 GL a day during a rain event.
In a dry year, 85 GL.
Rice crops require 12-13 ML per hectare.

The Great Artesian Basin

The basin is the largest and deepest artesian basin in the world, covering a total of 1.7 million square kilometres and underlying about one-fifth of the continent, including most of Queensland. The basin is 3,000 metres deep in places and is estimated to contain 8,700 million ML (cubic kilometres) of groundwater.[165] The present rate of extraction from the basin is about 500 GL per year. That is an annual discharge equal to the volume of Sydney Harbour.

The GAB discharges through mound springs, many in arid South Australia. The discovery of the Great Artesian Basin opened up thousands of square miles of country in inland New South Wales, Queensland and South Australia, previously unavailable for pastoral activities. European discovery of the basin dates from 1878 when a shallow bore near Bourke, New South Wales, produced flowing water. There were similar discoveries in 1886 at Back Creek east of Barcaldine, Queensland, and in 1887 near Cunnamulla, Queensland.[166]

Dams and storage

Volume of Cubbie Station Reservoir, Queensland = 500 GL. (1 Sydney harbour)
Variability of Lake Argyle, created by the Ord River Dam, Western Australia:
Average: area = 980 square kilometres, volume = 10,700 GL.
In flood: area = 2,072 square kilometres, volume = 34,000 GL.
Traveston Dam: stage 1 yield = 70 GL/year. Average depth = 5m.
Australia has 450 large dams with a combined capacity of 81,000 GL.
In the Murray-Darling Basin there are 200 major storages (above 1 GL) and 79% of the annual flow is extracted for irrigation.
Victoria has about 300,000 farm dams.

Daily per capita consumption of water for different cities

(see www.acfonline.org.au)
Brisbane 2004 – 339L (Australian Bureau Statistics)
Brisbane 2006 – 312L (GHD)
Official Queensland Government target – 300 L
Sydney – 230 L
Melbourne – 221 L
Melbourne – 206 L (2005-2006). Figure quoted from *The Age*, 1st May 2007
UK – 150 L

2. Interesting (or Disturbing) Factoids

- 34,000 tonnes of dog poo is washed into Melbourne's Port Phillip Bay by stormwater each year.[167] This is relevant if we intend to recycle stormwater.
- Australia has 180,000 kilometres of pipes to supply and dispose of water.
- Australia's largest private irrigation company is the Murray Irrigation Area. It takes 1500 GL from the Murray each year, more than three-quarters of NSW's share of the Murray water.
- The list of pesticides recommended by the National Registration Authority for growing cotton include endosulphan, pyrethroids, ovasyn, kelthane, larvin, methomyl, profenofos, comite.[168]
- "Sandra Postel, one of the top experts on the impact of irrigation practices around the world, says it is a sad fact that no irrigation era in history has survived beyond a century or so." (As quoted in Fullerton.[169])
- To keep the Murray Basin suitable for agriculture, 600,000 tonnes of salt are pumped out of the ground each year and transported out of the basin, a hugely expensive operation. Dry land salinity is Australia's biggest national disaster.
- Until recently, Brisbane was losing 10-20% of its drinking water because of leaky pipes and infrastructure.

3 The Australian Greens Water Policy

The following is quoted from *Policy Snapshots*, distributed by The Australian Greens[170] just prior to the 2007 Federal elections.

Preamble

Australia is the driest inhabited continent, yet Australians are among the world's heaviest water users. We need to use our water wisely and plan for a sustainable future in a drying and increasingly uncertain climate.

Climate change means that we cannot rely on runoff-dependent energy-hungry solutions such as new dams, mega-pipelines and desalination plants to secure our future water supplies. We should embrace water sensitive design principles, meet water efficiency targets, and capture and reuse stormwater.

The Greens will:

- Ensure that all future land-use planning addresses climate change.
- Keep all major water resources and infrastructure in public ownership.
- Set water efficiency standards for new developments and appliances.
- Provide incentives to retrofit existing buildings with rainwater tanks and grey water systems.
- Support the recovery of 3500 GL of water to restore the Murray Darling ecosystems and commit $3 billion to buy back permanent water allocations in the Murray-Darling.
- Ensure that development in northern Australia protects our wild rivers and does not repeat the mistakes of the south.
- Support water recycling and demand reduction initiatives.

4 Proposals of the Wentworth Group

The Wentworth Group has five proposals that State and Federal governments of Australia could implement immediately:

- Clarify water property rights and the obligations associated with those rights to give farmers some certainty and to enable water to be recovered for the environment.
- Restore environmental flows to stressed rivers, such as the River Murray and its tributaries.
- Immediately end broad scale landclearing of remnant native vegetation and assist rural communities with adjustment.
- Pay farmers for environmental services (clean water, fresh air, healthy soils). Where we expect farmers to maintain land in a certain way that is above their duty of care, we should pay them to provide those services on behalf of the rest of Australia.
- Incorporate into the cost of food, fibre and water the hidden subsidies currently borne by the environment.

5 Sarkar's Proposals

Sarkar's proposals for water management are scattered through a number of talks. The key features of his approach are:

- Most emphasis to be placed on the harvesting of rainwater and its storage.
- Maximum reafforestation to encourage rainfall over land.
- Minimal use of ground water by irrigators and industry.
- The decentralization of water storage and promotion of catchment self-sufficiency.

The following are some passages quoted in full, each starting with the name of the discourse and the date it was given. The discourses can be found in *Ideal Farming Part 2*,[171] *Prout in a Nutshell, Part 17*,[172] and *Proutist Economics*.[173]

"Water Conservation" (25th March 1989, Kolkata)

"The inner spirit of our water conservation programme is that the amount of existing surface water should be immediately doubled. But it is preferable if it is increased tenfold. This can best be done by a decentralized approach to water management which increases the depth, the area, or both, of water storage systems. The first step is to increase the depth of those ponds, tanks, dams, lakes, rivers and reservoirs which are already being used for storing water. The second step is to increase the area of these storage facilities, while the third step is to increase the plantations around them… In addition to this, many new small-scale ponds, tanks, dams, lakes and reservoirs should also be constructed. As a general rule, surface water should always be utilized in preference to subterranean water."

"Water Conservation" (25th March 1989, Kolkata)

"The banks of all water systems should be covered by dense forests. The science behind this is that the roots of the trees retain water. When the water-table subsides, the roots of the trees slowly release water. Hence, a pond surrounded by trees will never run dry. The foliage of the trees also minimizes evaporation."

"Lakeside and Riverside Plantations" (16th March 1988, Kolkata)

"For afforestation programmes to be successful, surface water must be conserved. This can best be accomplished by increasing the water capacity of existing storage systems and building new systems. The cheapest and easiest method of creating new water storage systems is to construct small-scale ponds and lakes."

"Integrated Farming" (20th February 1988)

"Irrigation is also an important aspect of farming. As a principle, subterranean water should not be used for irrigation purposes. Subterranean water should not be disturbed, otherwise the level of the water-table will drop, leading to an acute shortage of water. The best system is to collect surface water. The rainwater, even from light showers, should be collected where it falls. If the huge reserves of water under some deserts are harnessed, it may do more harm than good. It is always better to conserve surface water.

"Water conservation, irrigation and afforestation are essential for desert reclamation. In the Thar Desert of India, a canal has been constructed to bring water from the Ganges to irrigate the land. The Ganga Nagar area has been reclaimed and is now producing large quantities of wheat. The canal can be extended even further into the desert. Conserving surface water is the best method of irrigation and is preferable to exploiting underground water reserves."

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Sarkar, P. R., *Proutist Economics – Discourses on Economic Liberation* (PE). AM Publications, First Edition, 1992. ISBN 81-7252-002-6. (Note: *Proutist Economics* contains all the author's discourses on economics, which are also contained in *Prout in a Nutshell*.)

Sarkar, P. R., *Human Society, Part 1* (HS1). AM Publications, Fourth English Edition, 1998. *Part 1* was dictated in Bengali in 1957. First Bengali Edition, 1959. First English Edition, 1962. (Note: All the chapters in this book are also published in *Prout in a Nutshell*.)

Sarkar, P. R., *Human Society, Part 2* (HS2). AM Publications. Fourth English Edition, 1998. Dictated 1967, First Bengali Edition, 1967. First English Edition, 1967. (Note: All the chapters in this book are also published in *Prout in a Nutshell*.)

Sarkar, P. R., *Human Society* (HS). AM Publications, Second English Edition, 1999. First English Edition, 1987. (Note: *Human Society* is the one volume book containing both *Human Society, Part 1*, and *Human Society, Part 2*.)

Sarkar, P. R., *Problems of the Day* (POD). AM Publications, Fourth English Edition, 1993. The discourse was originally given in Bengali, 26 January 1958, Bhagalpur. First published in both Bengali and English, 1959. (Note: This discourse is also published in *Prout in a Nutshell*.)

Sarkar, P. R., *Idea and Ideology* (I&I). AM Publications, Seventh English Edition, 1993. First English Edition, 1959. Originally dictated in English, 1959. (Note: The last two chapters of this book, which deal with Prout, are also published in *Prout in a Nutshell*.)

Sarkar, P. R., *Discourses on Prout* (DOP). AM Publications, First English Edition, 1993. This book is a series of six discourses given in English at the First Conference of Proutists, 17-22 October, 1959. (Note: These discourses are also contained in *Prout in a Nutshell*.)

Sarkar, P.R. *Ideal Farming*, (IF). AM Publications, 1990. This book is a compilation of discourses on farming.

Sarkar, P. R., *The Electronic Edition of the Works of P. R. Sarkar* (ElEdit). AM Publications, Version 7.0, 2006. (Note: All the discourses and books by P. R. Sarkar included in the above reference list are also available in this electronic edition. ElEdit Version 7.0 contains the most recent translations available of all Sarkar's discourses and books.

Note: In the following endnotes, a space may have been inserted into some URLs in order to facilitate formatting. If a URL does not work, check for the insertion of a gap.

Endnotes

[1] Prout (the Progressive Utilization Theory) is the socio-economic theory developed by the Indian philosopher, Prabhat Ranjan Sarkar (1921-1990). For an introduction to the social philosophy of Sarkar see in this volume, "The Biopsychology of Cooperation" by Michael Towsey. For an introduction to Sarkar's economic proposals see also in this volume, "The Three-Tier Enterprise System".

[2] Here Sarkar has adopted the terminology of the Indian system of administrative subdivision. Rural *Districts* are divided into *Blocks* and the *Blocks* into *Villages* (the smallest administrative unit). In urban areas, the District is divided into *Municipalities* (or City Councils) and the *Municipality* into *Wards*. This system was inherited from the years of British administration and consequently has similarities to administration in Australia and New Zealand where a Local Government Area is the equivalent of an Indian block. See http://en.wikipedia.org/wiki/Administrative_divisions_of_India for more detail on India's current system of administrative units which, it should be noted, is not entirely similar to that proposed by Sarkar.

[3] The Wentworth Group is a group of high profile and authoritative scientists concerned for the environment. They make reports and issue statements, particularly concerning water management, which carry considerable weight in Australian policy making debates. http://www.wentworthgroup.org/, link valid 20 December 2009.

[4] Fullerton, T. *Watershed*. Pub. Australian Broadcasting Corporation, 2001.

[5] Black, Maggie. *The No-nonsense Guide to Water*. Published by *New Internationalist* in association with Verso, London, 2004. ISBN: 1-84467-509-2

[6] As quoted in Hamlin, Christopher. *A Science of Impurity.* Hilger, 1990.

[7] Gore, Al. *The Assault on Reason*. Bloomsbury Publishing, 2007. ISBN 9780747591597.

[8] Hamilton, Clive. *Scorcher: the dirty politics of climate change*. Black Inc. 2007.

[9] Oeppen, J. and Vaupel, J.W. "Broken Limits to Life Expectancy". *Science* 10 May 2002: Vol. **296**. no. 5570, pp. 1029 - 1031. DOI: 10.1126/science.1069675

[10] This list was suggested, on the author's request, by a doctor whose specialty is public health.

[11] Fagan, Brian. *The Long Summer: How climate changed civilization*. Granta Books, London, 2004. ISBN: 1-86207-644-8.

[12] Allan et al (2001) as cited on p 307 in *Water Demand Management*. Edited by David Butler and Fayyaz Ali Memon. IWA Publishing, London, UK, 2006. ISBN: 1843390787.

[13] Lawson (2002) as cited in *Water Demand Management* (2006) Ibid.

[14] Adams, Shar. "Water shortage man-made", *The Epoch Times*, 20-26 September 2006, p 1.

[15] Ibid.

[16] Ibid.

[17] Demasi, Maryanne. *Ground Water: When it comes to water these days every drop counts*. Catalyst, ABC Television, 2007. Transcript at http://www.abc.net.au/catalyst/stories/s1872399.htm, link valid 20 December 2009.

[18] Fullerton, 2001 Op. Cit.

[19] White, Mary. *Running Down: water in a changing land*. Kangaroo Press, 2000. ISBN 0-7318-0904-1.

[20] Australian Broadcasting Corporation. *Snowy Hydro Defends Water Management*, 30 March 2007, http://rage.net.au/news/stories/2007/03/30/1885540.htm, link valid 20 December 2009.

[21] "Farmers launch tree-felling protest", *The Australian*, 3 July 2007. http://www.theaustralian.news.com.au/story/0,20867,22011333-1702,00.html, link valid December 2007.

[22] Fullerton, 2001 Op Cit. p 86

[23] Leaman, David. *Water – facts, issues and problems*, Leaman Geophysics, Second Edition, 2005.

[24] Fagan, 2004 Op. Cit.

[25] de Blas, Alexandra. *Land Clearing and Rainfall in W.A.* Earthbeat, Australian Broadcasting Corporation, Radio National, Saturday 17 July 2004, http://www.abc.net.au/rn/science/earth/stories/s1152730.htm, link valid 20 December 2009.

[26] World Health Organization. *Health, Dignity and Development – what will it take?* 2004. http://www.unmillenniumproject.org/documents/WaterComplete-lowres.pdf, link valid 20 December 2009.

[27] World Health Organization. *World Water Day 2001 – floods and droughts.* 2001. http://www.who.int/water_sanitation_health/emergencies/floodrought/en/, link valid 20 December 2009.

[28] From Black, Op. Cit., p 12, who cites *H2O*, *Guardian Special Supplement*, 23 August 2003.

[29] Chalmers, Emma. "Labor floats plan to harvest stormwater". *The Courier Mail*, Monday 2 July 2007, p 2.

[30] Eutrophication is the process by which pond and lake waters become enriched (polluted) with mineral and organic nutrients, thereby promoting a proliferation of plant life, especially algae. This reduces dissolved oxygen content, lowers water quality and kills other plants and fish.

[31] Farmhand Foundation. *Talking Water: An Australian Guidebook for the 21st Century*. Farmhand Foundation, 2004. ISBN 0-9751235-0-5.

[32] White, 2000 Op. Cit.

[33] Endersbee, Lance. *A Voyage of Discovery: An earthshaking revelation of what is happening to our planet*. Self published via Monash University Bookshop, Australia, 2005. http://www.monash.edu.au

[34] Adams, Philip. *A dissident view of water and warming*. Late Night Live, ABC National Radio, 11 December 2006, http://www.abc.net.au/rn/latenightlive/stories/2006/1808528.htm, link valid 18 December 2009. The Australian scientist Vale Lance Endersbee (1925-2009) was no stranger to controversy. He was a climate change sceptic and a supporter of the Citizens Electoral Council of Australia whose approach to climate change is the adoption of nuclear energy.

[35] http://rio.twdb.state.tx.us/publications/reports/GroundWaterReports/GWReports/R360AEPC/Ch15.pdf

[36] CSIRO, the Commonwealth Scientific and Industrial Research Organization, is Australia's top research institution.

[37] Moore, Tony. *Cloud seeding to boost SEQ rain*. *Brisbane Times*, 12 July 2007. http://www.brisbanetimes.com.au/articles/2007/07/12/11838336727l3.html, link valid 20 December 2009.

[38] Sewell, W.R.D., et. al. *Modifying the Weather*. Western Geographical Series, Vol. 9, 1973. University of Victoria, Victoria, British Columbia, Canada. http://www.nawcinc.com/photopages/SeedingEffects.htm, link valid 20 December 2009.

[39] http://en.wikipedia.org/wiki/Cloud_seeding.

[40] *Brisbane News*. 6 June 2007, p 7.

[41] Salleh, Anna. *Making Water Out of Thin Air*. ABC Science Online, 2007. http://www.abc.net.au/science/news/stories/2007/1860729.htm, link valid 20 December 2009.

[42] There are several references for this research. A good introduction is an interview with Professor Tom Lyons from the School of Environment Science at Murdoch University. *Earthbeat*, ABC Radio National. http://www.abc.net.au/rn/science/earth/stories/s1152730.htm, link valid 20 December 2009.

[43] http://www.qwc.qld.gov.au/Projects+-+South+East+Queensland+Water+Grid

[44] Williams, Brian. "A Northern Oasis", *The Courier Mail*, Monday 2 July 2007, p 2.

[45] Miller, Claire. *Snowy River Story: The grassroots campaign to save a national icon*, ABC Books, 2005.

[46] Ransom, David. *Water Pressure*, Lateline, ABC Television, Australia, 1998. Transcript online at http://www.abc.net.au/lateline/stories/s12205.htm, link valid 20 December 2009.

[47] http://www.solarsailor.com/media_water_061012.htm, link valid 20 December 2009.

[48] Farmhand Foundation. *Talking Water: An Australian Guidebook for the 21st Century*. Farmhand Foundation, 2004. ISBN 0-9751235-0-5.

[49] http://www.skysails.info, link valid 20 December 2009.

[50] Colborn, T., Dumanoski, D. and Meyers, J. *Our Stolen Future: How We Are Threatening Our Fertility, Intelligence and Survival*. Plume (Penguin), USA, 1997.

[51] http://www.qwc.qld.gov.au/Projects+-+South+East+Queensland+Water+Grid and http://www.cottonwoodwater.org/indirect_potable_reuse.htm

[52] Responding to public concern, the Queensland Water Commission has published a brochure listing the seven barriers in its intended plan to recycle water for domestic consumption:

- Barrier 1: Source control – to prevent harmful chemicals from entering the water cycle in the first place.
- Barrier 2: Wastewater treatment plant – a settling pond and biological reactor that removes most solids, organic matter, etc. After this point, the water could be used for outdoor irrigation.
- Barrier 3: Microfiltration – low-pressure membrane filtration to remove bacteria. This technology is already used in the manufacture of beverages.
- Barrier 4: Reverse Osmosis – a high pressure filtration process that removes salts, viruses and organic pesticides. The same technology is used in desalination plants.
- Barrier 5: Disinfection and Advanced Oxidation – uses ultraviolet light and peroxides to remove any remaining organics compounds.
- Barrier 6: Natural Environment – water is returned to storage dams or aquifers in readiness for final treatment.
- Barrier 7: Water treatment plant – the existing standard water treatment and sterilization.

According to the same Queensland Water Commission brochure, "Purified recycled water has been used to safely replenish drinking water supplies in North America and Africa for decades and more recently in Europe and Asia. Long-term studies have shown no adverse effects."

[53] Sarkar, P. R. *Prama.* AM Publications, 1987.

[54] Ransom, 1998 Op. Cit.

[55] Ransom, 1998 Op. Cit.

[56] The ruling Queensland Labor Party's promotion of the Traveston Dam against widespread opposition caused the sitting Labor member for the area, Andrew McNamara, to lose his seat in the subsequent State election on 21 March 2009. See "Traveston issue blamed for ousting McNamara", *The Sunday Mail*, 22 March 2009, p 9. At the time of publication the dam was finally stopped by the Federal Minister for the Environment on environmental grounds.

[57] ECO, Issue #04, Nov-Dec 2006, Sunshine Coast Environment Council, http://www.econews.org.au, link valid 20 December 2009.

[58] The *power scaling law* expresses this idea in precise language. For the mathematically minded a function obeys the power scaling law when the logarithm (log) of the count of X (where X in this case is reservoirs of a particular volume) plotted against the log of X (the reservoir volume) is a falling straight line over three or more orders of magnitude.

[59] For example, neurons in the brain are inter-connected according to a power law. Genes inside cells regulate each other according to a power law. It is also a property of social systems – the distribution of business sizes and the connectivity of the internet follow a power law.

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[132] Water Resource Plans result in many glossy brochures! See, for example, a variety of reports associated with the WRP for the Mary River Basin published by the Southeast Regional Water Planning Group, Department of Natural Resources and Mines (Queensland), April 2003.

[133] The five are:

- National Water Commission, a statutory authority within the Department of Prime Minister and Cabinet (PM&C).
- Office of Water Resources, an agency within PM&C.
- Department of Agriculture, Forestry and Fisheries (DAFF).
- Land and Water Australia, a statutory authority within DAFF.
- Department of Environment and Heritage.

Each of these separate bodies administers a range of different programs including the National Water Initiative, the National Action Plan for Salinity and Water Quality, and the Murray-Darling Basin Initiative. Although these programs address similar problems, they have different structures, different departments, different Ministers, different accountability mechanisms and different timelines. The Australian Labor party has said it will create a single Federal Government Agency to administer all Commonwealth water programs using the argument that Australia's water crisis is a national problem that demands a coordinated national response.

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[154] http://www.foodconnect.com.au/

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