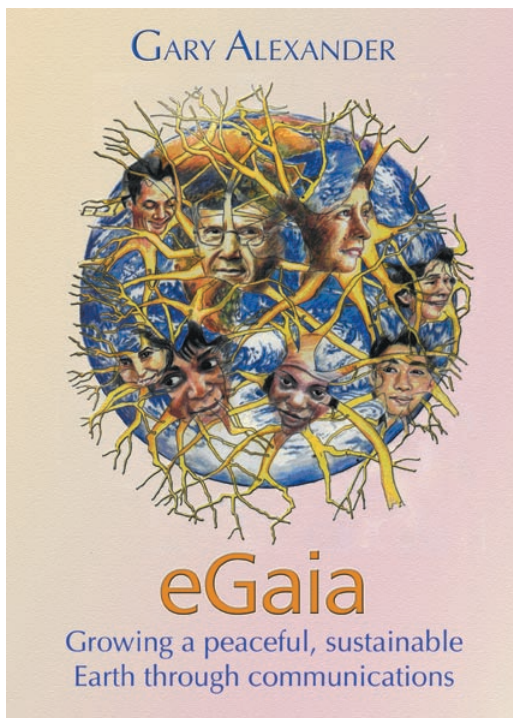This is an extract from *eGaia, Growing a peaceful, sustainable Earth through communication*s, by Gary Alexander. Published by Lighthouse Books, 2002, copyright Gary Alexander, 2002. Extracts from this book may be freely quoted and copied so long as proper acknowledgement is given.

# PART one

FROM

GLOBAL

CANCER

TO

GLOBAL

NERVOUS

SYSTEM

# HUMANITY AS
# A GLOBAL CANCER

The world is certainly not like the eGaian image today. Nor are the dominant trends in that direction. Humanity is now more like a global cancer than a global nervous system. The cells in an organism are normally in communication with each other. When their growth is sufficient it stops. Cancerous cells lose that controlling communication. Their growth continues until the body supporting it dies, taking them with it. This chapter looks at several aspects of the global cancer, which underpin motivations for eGaia.

**You**  So this is the gloomy chapter.

**Me**  I'm afraid so. Let's get it out of the way early. You will find lots of horrible facts you can use to shock your friends. But at least it ends on a hopeful note, by arguing that the problems are socially created and are thus not inevitable.

# A cancer of the natural world

> "At some time in the 1970s, humanity as a whole passed the point at which it lived within the global regenerative capacity of the Earth,…"
> *World Wide Fund for Nature* [1]

A hundred thousand years or so ago we were one medium-sized mammal among many, with no more effect on the planet than any of the others. We were (and are) one of a handful of species of great ape. Life flourished throughout the seas, the land and the air – forming forests, grasslands, aquatic and other ecosystems.

The planet as a whole has had a limited stability over its five billion year life. Major ecosystems maintained their general form over long periods of time as a result of feedback effects such as predator-prey relationships. Food webs and decomposers acted to recycle the raw materials of life indefinitely. The effect of life as a whole on the physical Earth was to maintain the general conditions it needed to continue. The presence of life kept the composition of the atmosphere, the surface temperature and the presence of liquid water far from chemical equilibrium as needed for life's survival. [2]

This relative stability was punctuated from time to time by periods of very rapid change. There have been five mass extinctions in which most of the species alive at the time were wiped out. The best known extinction was 65 million years ago when the dinosaurs disappeared. There have been major rapid changes of weather and climate such as the start and end of ice ages. These ideas are developed in Part II of the book, The five-billion-year story.

We are now in one of those periods of very rapid change. This time it is due to human activity, which now dominates the world physically and biologically. We are certainly no longer one medium-sized mammal among many.

3

The concept of 'environmental footprint' has recently been developed to measure the area of land needed to support a person at a given level of technology. On this measure, the wealthier countries already consume on average three times their fair share of sustainable global output.[3] Human population growth and the prospect of development in the poorer countries will make this worse.

**4**

## Extinction of species

> "My greatest fear for our world is that global warming may produce an increased rate of extinction and eventually reach some threshold point, triggering a cascade of mass extinction, a free-fall of death. Each species on the earth is like a tiny piece in a four-dimensional jigsaw, interlocking with other species," *Peter Ward* [4]

It is not just the odd pretty butterfly that is in danger. The rate at which species are becoming extinct is comparable to that of the great extinctions of the past. All of the other great apes – the chimpanzees, gorillas and orang-utans, our closest cousins – are threatened with extinction within the next 20 years or so. The normal background rate of extinctions is about 10 to 25 per year, while now it is probably in the thousands. Expert sources agree:

- "The World Wide Fund for Nature (WWF) said unless there was co-ordinated action by governments in central Africa and south-east Asia there could be no halt to the dramatic decline in the numbers of great apes – chimpanzees, gorillas, bonobos and orang-utans – and their eventual disappearance."[5]

- "A total of 11,046 species of plants and animals are threatened, facing a high risk of extinction in the near future, in almost all cases as a result

of human activities. This includes 24 percent (one in four) of mammal species and 12 percent (one in eight) of bird species. The total number of threatened animal species has increased from 5,205 to 5,435."[6]

- "Cascade effects occur when the local extinction of one species significantly changes the population sizes of other species, potentially leading to other extirpations."[7]

5

## Loss of natural habitats

- "Forest cover has been reduced by more than 20 percent worldwide, with some forest ecosystems, such as the dry tropical forests of Central America, virtually gone. More than 50 percent of the original mangrove area in many countries is gone; wet-lands area has shrunk by about half; and grasslands have been reduced by more than 90 percent in some areas. Only tundra, arctic, and deep-sea ecosystems have emerged relatively unscathed."[8]

## Damage to agriculture and fisheries

- "Agriculture, forestry, and fishing are responsible for 50 percent of all jobs world- wide and 70 percent of the jobs in sub-Saharan Africa, East Asia, and the Pacific. …Although crop yields are still rising, the underlying condition of agroecosystems is declining in much of the world. Soil degradation is a concern on as much as 65 percent of agricultural land. …About two-thirds of agricultural land has been degraded in the past 50 years by erosion, salinization, compaction, nutrient depletion, biological degradation, or pollution. About 40 percent of agricultural land has been strongly or very strongly degraded."[9]

- "…freshwater ecosystems are far and away the most degraded, with some 20 percent of freshwater fish species extinct, threatened, or endangered in recent decades. …[for coastal ecosystems] Almost 70 percent of the major fisheries are fully fished or overfished,"[10]

## Change to the physical world: climate and weather

The scientific evidence for climate change, increases in severe weather, and changes to the composition of the atmosphere are becoming much clearer, as presented by the IPCC:[11]

- "The atmospheric concentration of carbon dioxide ($CO_2$) has increased by 31% since 1750. The present $CO_2$ concentration has not been exceeded during the past 420,000 years and likely not during the past 20 million years. About three-quarters of the anthropogenic emissions of $CO_2$ to the atmosphere during the past 20 years is due to fossil fuel burning. The rest is predominantly due to land-use change, especially deforestation. …several centuries after $CO_2$ emissions occur, about a quarter of the increase in $CO_2$ concentration caused by these emissions is still present in the atmosphere."

- "The atmospheric concentration of methane ($CH_4$ ) has increased by 1060 ppb (151%) since 1750 and continues to increase."

- "Globally, it is very likely that the 1990s was the warmest decade and 1998 the warmest year in the instrumental record, since 1861"

- "...over the latter half of the 20th century, it is likely that there has been a 2 to 4% increase in the frequency of heavy precipitation events."

- "The globally averaged surface temperature is projected to increase by 1.4 to 5.8°C over the period 1990 to 2100. …Glaciers and ice caps are

projected to continue their widespread retreat during the 21st century. Global mean sea level is projected to rise by 0.09 to 0.88 metres between 1990 and 2100."

- "Global mean surface temperature increases and rising sea level from thermal expansion of the ocean are projected to continue for hundreds of years after stabilization of greenhouse gas concentrations (even at present levels), owing to the long timescales on which the deep ocean adjusts to climate change."

## Effects of environmental degradation

The World Bank has distinguished the effects of the major environmental problems on both health and productivity:[12]

- "More than two million deaths and billions of illnesses a year are attributable to water pollution. …Urban air pollution is responsible for 300,000 – 700,000 deaths annually and creates chronic health problems for many more people."

- "Diseases are spread by uncollected garbage and blocked drains; the health risks from hazardous wastes are typically more localized, but often acute. Wastes affect productivity through the pollution of groundwater resources."

- "Ozone depletion is responsible for perhaps 300,000 additional cases of skin cancer a year and 1.7 million cases of cataracts. Global warming may lead to a shift in vector-borne diseases and increase the risk of climatic natural disasters."

## Humanity at war with itself

Humanity out of communication with the natural world, and so acting as a cancer upon it, is only one part of the bad news, and doesn't even get near to the root of it. The environmental disruption is merely a side effect of a fundamental fragmentation of human culture. In many ways, humanity is at war with itself.

We are not even living well at the expense of the planet that supports us. Those parts of humanity with the largest material consumption generally also have little sense of spirituality or community, high mental and emotional instability, unstable families and relationships, high drug use and crime rates, economic insecurity, political corruption and so on. And that is only the richer parts. The poorer parts are beset by wars, poverty, famines, harshly repressive and highly corrupt governments etc.

For most of our evolutionary history, humanity lived in small bands that were communities based around extended families. Language and culture evolved to enable us to take advantage of the resilience, flexibility and sheer enhanced ability that support from a group gives to an individual. Our bodies, brains, minds and hearts are adapted to being part of that kind of a community structure. The inherently collaborative nature of humanity is developed further in Chapter 5.

The culture of traditional communities gave people a sense of who they were, what they could contribute and what they could expect from life. Children grew up with role models and support from adults other than their parents. All productive activity was clearly in support of community needs, desires and culture. Crime was rare because of community pressures. Moreover, those huge classes of crime and corruption motivated by obtaining money (which we think of as inevitable today) simply couldn't happen before a monetary economy developed.

**You**  So are you saying that we need to return to that primitive way of life?

**Me**  Not at all. For a start our population is now much too large. We also don't want that limited, culture-bound view. Moreover, early cultures were not the eco-friendly paradises some myths would suggest. What I am saying is that we need to re-create the sense of connection and community support from that way of life in our own. It is the key to happiness. And we also need to re-create the direct connection between production and needs/wants.

To be clearer about how bad is the condition of humanity as a whole, here is a series of quotations from experts who have looked at different aspects of it. Mostly, it is about the appalling way people can treat other people, sometimes deliberately, and sometimes as a side effect of other activities. The statistics give an impression of the extent of this, but do not convey the full horror of it, which we can glimpse from the more personal stories we see in television images of genocide and famine.

Wars

- "There were 27 major armed conflicts in 1999, there were 11 in Africa, 9 in Asia, 3 in the Middle East, 2 in Europe and 2 in South America. All but two of the conflicts were internal. Most of the major armed conflicts registered for 1999 are protracted (17 have been active for at least eight years) or recurrent (4 conflicts). Seen against the 19 conflicts in 1997…there was a sharp upturn in the last two years of the decade…. Foreign military intervention occurred in only 5 of the 27 conflicts waged in 1999, suggesting that it remains the exception and is not becoming the rule.

- Total world military expenditure increased by 2.1% in real terms in 1999 and amounted to roughly $780 billion. While this is almost one-third less than 10 years earlier, it still represents a significant share of world economic resources: 2.6% of world gross national product (GNP)."[13]

## Human rights abuses

According to Amnesty International, human rights were abused by governments all over the world, democratic or otherwise, on a very large scale.[14] See their reports for details. Here is simply a table indicating its scale.

| Type of Abuse | Number of countries |
| --- | --- |
| Extrajudicial executions | 38 |
| "Disappearances" | 37 |
| Torture and ill-treatment | 132 |
| …leading to death in custody | 81 |
| Prisoners of conscience | 81 |
| Unfair trials | 51 |
| Detention without charge or trial | 63 |
| Death penalty | 34 |
| Human rights abuses by armed opposition groups | 46 |

## Crime

Crime is endemic all over the world, affecting large proportions of the population. The table below shows the percentage of the population victimised each year in a range of countries.[15]

| Country & year of survey | % of population | Country & year of survey | % of population |
|---|---|---|---|
| Netherlands, 1995 | 31.5 | Italy, 1991 | 24.6 |
| England & Wales, 1995 | 30.9 | USA, 1995 | 24.2 |
| New Zealand, 1991 | 29.4 | Sweden, 1995 | 24.0 |
| Australia, 1991 | 28.6 | Malta, 1996 | 23.1 |
| Switzerland, 1995 | 26.7 | Germany (west), 1988 | 21.9 |
| Scotland, 1995 | 25.6 | Belgium, 1991 | 19.3 |
| France, 1995 | 25.3 | Finland, 1995 | 18.9 |
| Canada, 1995 | 25.2 | Austria, 1995 | 18.8 |
| Spain, 1988 | 24.8 | Northern Ireland, 1995 | 16.8 |

The cost of crime is not just the direct costs to the victims, but also includes the cost of running services like the police, customs, courts and prisons.

- "The annual cost of crime in Britain is £60 billion – more than £1,000 for every man, woman and child in the country."[16]

## Hunger and poverty

- "Thirty million people a year die of hunger. And 800 million suffer from chronic malnutrition."[17]

- "Until 1996, the number of poor people was on the decline, but by 1998 it was on the rise again. Today there are more than 1.3 billion chronically poor people in the world."[18]

- "In over 70 countries, per capita income is lower today than it was 20 years ago. Almost three billion people – half the world's population – live on less than two dollars a day."[19]

### Inequality

- "The total wealth of the world's three richest individuals is greater than the combined gross domestic product of the 48 poorest countries – a quarter of all the world's states. In 1960 the income of the 20% of the world's population living in the richest countries was 30 times greater than that of the 20% in the poorest countries…in 1995 it was 82 times greater".[20]
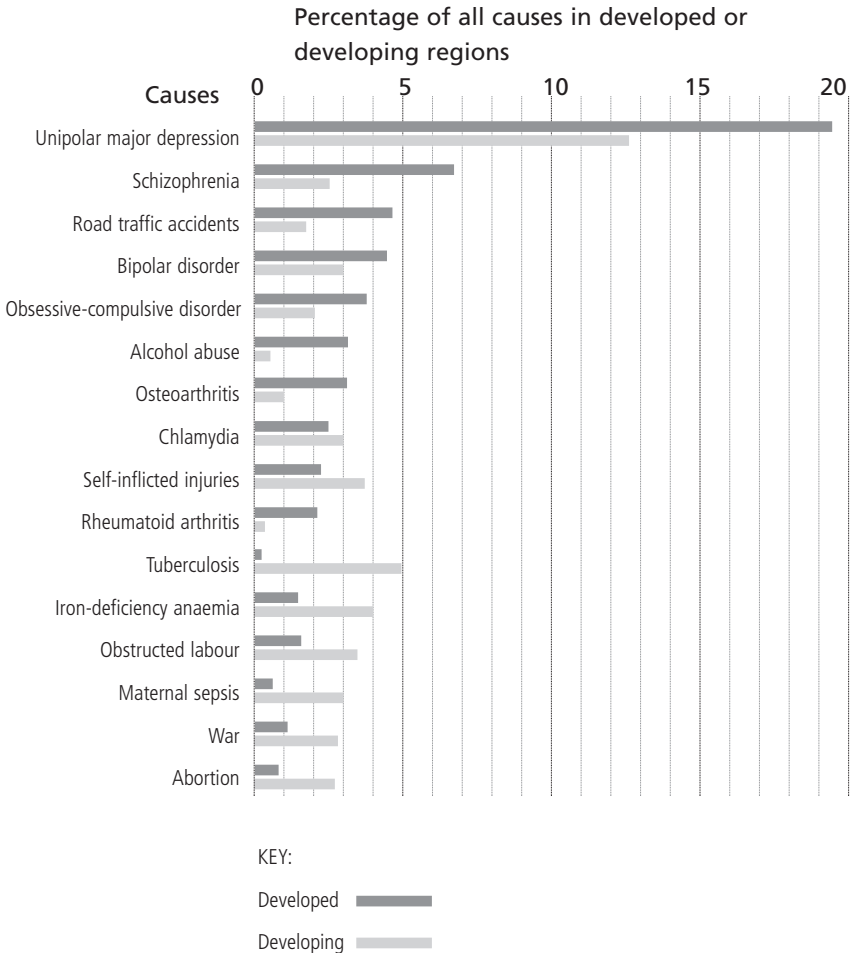
### Family and emotional problems

The family within a community has traditionally been the basis of human societies. In many countries now, much of the sense of community is gone and even the family is in very poor shape.

- [For the United States] "Cherlin compares the likelihood of marrying, divorcing, remarrying and redivorcing of four cohorts of women (born 1908-1912, 1928-1932, 1948-1952, 1970). …The marriage rates are quite similar [but the] likelihood of divorce is dramatically different for each of these generations. The lifetime chance that the first generation would divorce was 22% while the lifetime probability for the great-granddaughters born in 1970 is 44%."[21]

- "Overall, about 25% of children live in single-parent households. It is also estimated that about 40% of children will EVER live in a single-parent household while they are under 18 years of age."[22]

- "40 population-based quantitative studies, conducted in 24 countries on four continents, revealed that between 20% and 50% of the women interviewed reported that they had suffered physical violence from their male partners. In addition, surveys also indicate that at least one in five women suffer rape or attempted rape in their lifetimes."[23]

The same source shows that mental health problems are the largest cause of illness and disability for women throughout the world, and it is actually far worse in the developed regions as the following graph shows.

The ten leading causes of disease burden for women, aged 15+, 1990

**Percentage of all causes in developed or developing regions**

| Causes |
| --- |
| Unipolar major depression |
| Schizophrenia |
| Road traffic accidents |
| Bipolar disorder |
| Obsessive-compulsive disorder |
| Alcohol abuse |
| Osteoarthritis |
| Chlamydia |
| Self-inflicted injuries |
| Rheumatoid arthritis |
| Tuberculosis |
| Iron-deficiency anaemia |
| Obstructed labour |
| Maternal sepsis |
| War |
| Abortion |

KEY:

Developed

Developing

# The problem with money

" Money is institutionalised mistrust"
*Professor Mike Hussey*

One further aspect of the global cancer, which links the other two sets of problems (cancer of the natural world and humanity at war with itself) is central to the reasons they perpetuate themselves. An increasing amount of people's activities are motivated by money, and the inherent problems are made much worse by the form of our current globalised economic system.

**You**  You have come to the conclusion that money is the root of all evil!

**Me**  The actual quote is from the Bible,[24] (*I Tim vi 10*) "The love of money is the root of all evil things." but no, I don't agree with it. The root is social and spiritual fragmentation, the loss of connection with the Earth and sense of community between people. Money enables us to carry on dealing with each other despite that. It looms large in the global cancer but is not at its root.

Instead of being constrained and controlled by the needs of humanity, much less the natural world, our modern globalised monetary system has taken on a life of its own. Flows of money have become relatively isolated from physical constraints. In 1995, only 2 or 3% of money flows were to do with trade or investment. The rest were speculative – buying and selling currencies.[25]

Most of our productive effort is now through paid work, motivated largely by our need for money. If the work is beneficial to our community, to the planet, to ourselves and if it gives us prestige and social standing, that

is a nice side benefit, a luxury for some rather than the immediate and direct motivation for that work. The global economy is driven by money flows, not need. This is a major source of our environmental problems and social problems.

From the statements of most politicians and the media, with their emphasis on economic growth, globalisation and the dominance of the market, it is easy to believe that our present economic system is inevitable and is more or less optimum despite its apparent flaws and instabilities. This despite the fact that it is continually changing and has been in its present globalised form for only a few decades.

Doing things for money is a relatively recent invention, and even barter is not the original form of exchange. For most of humanity's evolutionary history we lived in small bands where people worked co-operatively and did things for each other in ways for which the terms 'primitive money' or 'barter' miss the point. Sometimes various commodities were used in ways modern people have called 'money', but actually it was more like gift-giving, often highly ritualised and subject to custom and tradition. Various human cultures have invented other systems of organising the ways in which they exchange and do things for each other (see Chapter 6). Our present economic and monetary system is actually one of the strangest, but happens to have grown to dominate the planet.

As Chapter 9 demonstrates, a co-operative economy can produce a synergy where the result is greater than the sum of people's efforts. This produces the qualities of a group functioning as an organism, which is the fundamental eGaian image. In a competitive economy people feel that they are in a war. Other organisations are trying to take their markets. Other people in their organisation are trying to get their position. This creates a sense of oppression.

15

In a war there are lots of losers. Most the of world's population are economic losers. It is only the Western developed nations that have a substantial part of their population that isn't poor, and even they suffer the psychological effects of the economic war – insecurity and stress. Wars favour the powerful, so it is not surprising that poverty is so widespread.

The problems become clearer when expressed in the language of communication and control. What are the goals of an activity or organisation? What is it trying to accomplish? What information does it have to enable it to reach those goals? Is it inherently stable or unstable?

## The wrong goals

Having money rather than need or desires as the motivation for activities simply means the economy is upside-down. The best companies try to put their customers' needs first, but even then there is an underlying conflict. They want and need you to patronise them, even if it really isn't in your best interests to do so. Huge amounts of productive work are devoted to encouraging people to want more of anything. Shopping has become one of our most popular leisure activities. Governments encourage their citizens to consume more.[26]

We are told we must increase production – not so much because the public is in desperate need of genetically modified foods, digital TVs, the next generation of computers or a new theme park, much less because we need to preserve the health of the environment – but because we need to produce more to safeguard jobs. Consumption serves production, not the other way round.

As money became the dominant mechanism of exchange, the connection with real needs and desires became looser. It has become highly abstract, with money flows taking on a life of their own. Survival has come

to depend upon maintaining the flows of money. Bankruptcy generally means the end of an organisation, regardless of whether it is corrupt or dedicated to the public good. Charities need to maintain their cash flows to survive too.

This creates an inherent contradiction between the need to survive and any other goals, such as serving the public or looking after your staff. The 'bottom line', the effect on the financial balance sheet is widely used to mean 'that which is real, undeniable'. In fact, it is just a convention, an artefact of the way we organise ourselves economically. In a co-operative economy the only 'bottom line' is everybody's well-being.

Once society's goal is maximising – or simply maintaining – flows of this abstract entity money, all sorts of madness become possible.

- A rainforest can be cut down for short-term economic gain because its vital biological contribution has no economic value.

- The food and drink industry promotes junk foods that emphasise profit not nutrition, producing a huge increase in chronic and degenerative diseases.

- An airport or a railway station becomes a shopping mall, trying to extract as much money as possible from the people who use it, because its inherent function doesn't provide enough revenue.[27]

- Television channels appear that are fully dedicated to advertising, with no programme content at all.

- Companies will produce new versions of solid, useful well-loved, well-understood products and convince consumers that the old ones are obsolete or old-fashioned.

Since it is money and not service which motivates people, many 'legitimate'

activities are actually more like people preying on people: making and selling shoddy goods, hard selling on your doorstep or your telephone. And then there are the downright damaging activities, such as corruption and organised crime. In traditional societies crime is quite rare and tends to be mostly to do with interpersonal conflict.

- "Corruption diverts perhaps 30 percent from billions of dollars spent annually for international development loans. Importantly, this illegitimate cash flow becomes the primary reason why funds are requested."[28]

- "By most estimates, the traffic in illicit drugs is one of the world's most substantial money earners. The retail value of drugs, at around 500 billion US dollars a year, now exceeds the value of the international trade in oil and is second only to that of the arms trade."[29]

> **You** So the world's two largest industries are the arms trade and the illegal drugs trade?
>
> **Me** So it would seem. How's that for an upside-down economy?

Sustained economic growth, that hallowed goal of politicians, central bankers and business people, appears sensible only in the context of an economy following local goals which are disconnected from physical reality. No natural process can ever grow indefinitely. It will always find some natural limit. A recession may actually be good for the environment because production and consumption are lower.

If there is to be any hope that our economy will take on a sustainable form, such as that described in Chapter 10, the goals of individuals and organisations will have to be aligned with that, and not with the abstraction of money flows.

The problems with balanced exchange

We are so used to balanced exchange – you pay for what you receive and get paid for your work – that the more generalised exchange of traditional societies doesn't appear to be a serious alternative. It doesn't seem suitable for 'real' work.

> **You** Yes, it is a matter of fairness. Why shouldn't people be rewarded for what they do, and be more highly rewarded if they do more?
>
> **Me** Fairness isn't usually an issue when people know each other well, appreciate each other as individuals and are pleased for each other's well-being. It is much more of an issue when they see their goals as opposed.

We have become blind to the major difficulties with balanced exchange. In the competitive world, the supposed fairness of being paid for your work and paying for what you receive is often illusory. Because people don't share the same goals, because they are not working for each other's well-being, prices and wages are often contentious. They are set not so much by considerations of fairness, but by considerations of power and of what the market will bear. Much effort goes into bargaining over pay; major disruption can result when there is no agreement. For many, payment for work is so low as to be exploitative and keeps them in permanent poverty. So coming to agreement on pay can be a major cost to an organisation.

The comparative 'value' of different forms of work is highly arbitrary. Does fairness explain why a company director, a famous entertainer or leading athlete earns hundreds of times the income of a nurse, a teacher or a street cleaner? Why should a factory worker in a western country be paid many times what someone in the third world gets for doing a similar job?

Some people have a say in what they will get paid for a job – the more so the higher their earnings in the first place. However, most people must take what is on offer, regardless of whether they can live adequately on it, and regardless of any considerations of fairness. So the reality is that working for money, where the goals of employer and employee are opposed, is often grossly unfair.

In the monetary economy  all kinds of special arrangements have to be made for the many cases when balanced exchange breaks down.

- Insurance is needed because balanced exchange breaks down in emergencies.

- Welfare systems need to be set up (in more progressive countries) for those people on the sharp end of monetary exchange.

- Pensions are needed to look after the elderly, who are no longer cared for by their families and the community.

## Misused and misleading information

An economics textbook will tell you that, theoretically, in the conventional economy all information should be public and shared for a perfect market. "The assumptions of perfect competition… [include] …perfect knowledge, we assume that everyone knows what is happening in every part of the market in which he is interested."[30]   In the much simpler markets that existed a few hundred years ago, that might have been approximately true. It certainly isn't now.

If two organisations are in competition, it is certainly not in their interests to provide full and public knowledge of their costs. That information is usually part of their competitive advantage and is jealously guarded. As to a knowledge of the strengths and weaknesses of their

products, a company will try to provide the best gloss on it rather than full and public knowledge, as otherwise consumers will patronise their competitors. So simply because of competition the information consumers need to make the best choice for their own needs is hidden.

The price of goods is in many cases the only way to distinguish one product from another. It is often the main factor determining whether and which product someone will buy. In principle, price should give some measure of quality and should be related to the cost of production.  In practice, the monetary price is a very poor indicator.

- How much of the price of that luxury perfume represents the cost of making it and how much is mark-up because it is meant to appeal to well-off people?

- Can you tell from the price which pair of trainers was made by children in a third-world country working for almost nothing?

- Can you tell from the price which furniture was made from wood grown sustainably and which wasn't?

- Can you tell from the price that that low cost chicken spent its whole life in a cramped battery cage?

> **You** Probably yes! Why else would it be so cheap?
> **Me** Ok, but that's perhaps the only one you could work out – and some wouldn't be able to

One particularly clear example of the difference between information available in a competitive and co-operative economy is in the software market. Competing brands of similar software jealously guard their features, taking their competitors to court if they copy their best features

too closely. Often competing software produces files that are not compatible with each other. Worse still, an old version of a word processor will not be able to read files produced by a later version. The manufacturers of the best-selling brands encourage this, because it forces people to buy their products if they want to share files with others using that brand. The result is a natural monopoly of the product that got the biggest market share early, regardless of whether or not it is the best. Anything else is restricted to a niche market supplying special needs or interests.

In contrast to the competitive software market, there has also been a co-operative software sub-culture that traces its origins back to before the days of personal computers. Unfortunately, it has always served people who are computer professionals or serious amateurs, rather than either the general public or business users.[31] It has spawned the Free Software Movement , "dedicated to promoting computer users' right to use, study, copy, modify, and redistribute computer programs." The essential point of the free software movement is that programmers should have access to the original code that created the software. That way, all the original author's best ideas and clever tricks are freely available to later authors. Instead of software that has copyright protection, the Free Software Movement[32] provides 'copyleft' protection, which says that

> "This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation."[33]

Over time, the efforts of members of the free software community continually improve their software, building upon the best ideas and discarding the second best. All their efforts combine synergistically. The result is usually software that is extremely solid and reliable. Any problems that appear are quickly removed. The new improved version is distributed

to all that want it. Probably the best example of this is Apache, a 'web server' used by more professional web sites than any other program.[34]

In contrast, competitive software companies work against each other. Much effort goes to stopping competitors. Software is sometimes designed so that competing products won't work with it, and distribution arrangements prohibit retailers from including competitors software on machines sold with a leading operating system. Programmers spend a lot of effort re-inventing features that are desirable, but try to make them slightly different so as not to infringe copyright. Any problems that occur are not corrected until the next version of the software, for which consumers are charged whatever the market will bear for an upgrade.

It should be pretty clear which of these approaches better serves its users and makes more efficient use of its developer's time and effort.

## Inherent instability

The business cycle, in which periods of relative prosperity and recession alternate, is often taken as a fact of life, as though it were a law of nature. Actually, it is an artefact, a side effect of a world economy based on money and competition. In a co-operative economy it simply could not arise in the same way that money-based crime and corruption cannot in a society that doesn't use money. Worse, as globalisation developed through the 20th century, the world became increasingly linked so that downturns in one part of the world are likely to lead to downturns elsewhere. A large organisation or a small farmer can find their survival determined by events in some remote part of the world which have nothing to do with how well they are doing their job or how well they are satisfying their customers. A major steelworks, said to be among the most efficient in Europe was closed because exchange rate fluctuations made it unprofitable.

We are now in a position where a global economic crash is not only possible but likely. It could make the 1930s depression look like a minor blip. It could be triggered by wars, by disruption and fears due to terrorism, or by environmental disruption. For example, global production of oil is expected to peak and then decline within the present decade. That will have a huge economic effect which is largely unappreciated. Climate change is creating extreme storms and flooding which could put insurance companies under impossible pressure. It may change agricultural patterns, and even lead to runaway global warming with catastrophic consequences.

In general the causes of economic instability and what limited cures might be possible are assessed in terms of the existing system. Should there be more government regulation or more deregulation? Might accounting procedures or changes to taxation improve stability? Could changes in the banking system help?[35]   For example, writing about the 1990s Asian crisis and others, Chakravarthi Raghavan writes:[36]

> "The root of these crises can be traced to imprudent financial liberalization and the subsequent failure to adequately manage and control the resultant capital surges."

Never questioned is whether this chronic instability is actually inherent in the basic structure of the economy. The inherent instability comes from a combination of:

- the loss of natural controls in our upside-down economy, where the goals are the producer's need for money rather than the consumer's needs and the health of the environment

- a competitive economy   in which everyone's goals are set against everyone else's.

The dynamics of an economic downturn usually reflects a separation and non-alignment of everyone's goals. For example, some event may cause fear and a loss of confidence among the public or businesses. They postpone planned purchases, since of course they are not part of an ongoing relationship with those they are buying from. Since less is purchased, companies postpone their purchase of supplies and may let go of staff – again, because the company goals are not the same as that of their suppliers and staff. This means that people have less to spend and more companies' income is reduced. And so the downward spiral feeds back upon itself and continues.

> **You** Of course, in planned economies, such as 20th century communism, there were no business cycles either.
>
> **Me** Exactly. That was a radically different economic system, and it shows again that business cycles are simply an artefact. However, centrally planned economies have other fundamental problems. Their information flows are even worse. How can a centrally produced five-year plan match the ever-changing needs and conditions of a population?

Even central bankers and finance ministers recognise the instability of the global financial system:

- "As we all know, the financial crises of recent years, first in Mexico in 1994, then in Asia in 1997, and in Russia and Brazil in 1998, have clearly demonstrated that there is inherent instability in today's liberalised market economy."[37]

- "Since 1980, over two-thirds of IMF member countries have experienced at least one serious banking-sector difficulty…And, as we

all know, national financial crises have been transmitted to other countries, threatening not only the economic well-being of those countries but also the stability of the international financial system as a whole."[38]

## Is the global cancer inevitable?

The picture painted so far in this chapter is pretty bleak. No-one could doubt the desirability of dramatically reducing the global cancer. So are these problems inevitable, inherent in the nature of things? If so, there would be no point in even thinking about eGaia.

Take two examples. In most countries people drive their cars on the right side of the road, but in quite a few they drive on the left. If you live in a place where people drive on one side, no individual can choose to do otherwise. It is a behaviour pattern that is strongly locked in. You risk killing yourself if you violate it. There are laws and police to ensure compliance. Vehicle design, road design and signs are all consistent with it. It is a complex pattern of behaviour that regenerates itself as new roads are built consistent with it, and new drivers are trained. Yet change is possible, given sufficient will and social co-ordination (basically, passing a law to enable and enforce the change). A few countries actually have changed.

On the other hand, if we decided to change the law of gravity, so that we could fly unaided at will, thus reducing fuel use, traffic congestion, etc no amount of will and social co-ordination would enable us to do so.

The question is whether the global cancer is more like the first or the second example. The answer is neither easy nor obvious, but this book is predicated on the assumption that it is the former.

**You** Sure, you just pass laws against wars and that's the end of them.

**Me** Very funny! Getting the will and the social co-ordination is not simple and is, of course, the key issue. We'll get to that. For now, it is simply the possibility I want to establish. The global cancer seems inevitable because there are so many interlocking factors that combine to regenerate it. But I believe it is an open question.

Simply in environmental terms, is sustainability possible, given current and future human population levels? And if physically and biologically possible, would it mean either continuing inequality with plenty for a few and poverty for most, or at best a life of great austerity for everyone?

Firstly, will the human population rise indefinitely, making any kind of adjustment to the Earth impossible? It doesn't seem so. World population is now about 6.1 billion and is still rising, but the rate of increase has peaked and population may stabilise towards the end of the 21st century.

- " the global annual increment -- that is, the number of people added to the world's population each year -- is thought to have peaked between 1985 and 1990 at about 87 million per year."[39]

There is even the possibility that world population overall may reach a maximum and then decline:

- "the United Nations Population Division's biennial compendium, World Population Prospects… will include a "low variant" projection that anticipates zero population growth for the world as a whole by the year 2040, and negative growth--that is to say, depopulation--thereafter."[40]

What about energy? Is our use of fossil fuels and nuclear power inevitable? Could renewable energy sources (wind, solar, water, wave energy, etc) produce all of humanity's requirements? Yes, certainly: the technologies are now very well established and are being used more and more. The amount of renewable energy available would be ample on current projections. But the total of humanity's requirements in the future depends upon how our societies are organised. All of humanity could live materially comfort-able lives with much lower overall energy use than at present. The principal obstacles to increased use of renewal energy are economic and social, not technical or physical. We are very fixed in our present social patterns.

Is hunger inevitable, given the size of the Earth's population? It doesn't seem so:

- "Food is not in short supply. In fact, food products have never been so abundant. There is enough available to provide each of the Earth's inhabitants with at least 2,700 calories a day. But production alone is not enough. …"[41]

- "…some scientists calculate reassuringly that, with present-day technology put to work on all potentially arable lands, planet earth could feed fifteen, twenty or even forty billion inhabitants. But rarely does the real world intrude upon theoretical computations wearing such a gaunt face as it does in the case of food."[42]

Hunger is caused by the social patterns that exclude people from the food that is produced and from the land they need to grow their own, not by biological constraints. We certainly don't need another 'Green revolution' in food, using for example, genetically modified plants.

What about other aspects of serious poverty? Are they beyond the scale of what is possible to provide? Not at all.

- "The UN calculates that the whole of the world population's basic needs for food, drinking water, education and medical care could be covered by a levy of less than 4% on the accumulated wealth of the 225 largest fortunes. To satisfy all the world's sanitation and food requirements would cost only $13 billion, hardly as much as the people of the United States and the European Union spend each year on perfume."[43]

What is at issue is who gets what and who doesn't, not whether it is physically possible to eliminate poverty. The present system, with people locked into the pressures of financial flows, simply doesn't address the problems of serious poverty.

And then there is disease. There is a statement earlier in this chapter about the large number of illnesses and deaths that are a by-product of environmental degradation, particularly in poorer countries. Similarly, it is well known that the improvements of the health of populations in the more developed countries in the early 20th century were largely due to better hygiene and living conditions rather than advances in medical science. So again, here is a major problem rooted in social patterns, and certainly not inevitable.

What about wars, and especially the genocides and ethnic cleansings which so marred the 20th century? It is not that the Germans, Serbs, Rwandans, (and now the Israelis) have some gene that makes them particularly bloodthirsty or evil. Rather, when the conditions are right for it, groups of people get caught up in destructive ideas that become self-regenerating within that group, locked in place by powerful emotions. Often it is fears and insecurities arising from difficult economic conditions, which are then turned against some other group of people by demagogic leaders.

These large-scale ethnic conflicts can be seen as diseases of the human spirit. As with physical diseases, it is the underlying social patterns that create the susceptibility – not something innate and inevitable in human nature. The same arguments apply to all aspects of the global cancer. The conditions under which they are likely are widespread, and so they happen. There is no inevitability about them.

To the extent that societies are organised to do anything about it, the symptoms are usually tackled – often too late to do any good – rather than the conditions that give rise to them. The conditions come from the particular and largely accidental way human societies have developed. They are mostly taken for granted as, for example, our assumption that exchange must be through money.

If we have any hopes of living in a world without the global cancer, we need to be aware and organised to avoid those conditions, but also have strategies for catching them early should they arise. That is the purpose of eGaia.

# eGaian principles

eGaia is the answer to the 'miracle question' described in the Preface when applied to the problems of the global cancer. It is an unashamedly Utopian vision of the future, designed to help clarify our problems and design sensible ways to resolve them. The miracle question goes something like this:

"Imagine yourself a modern day Rip Van Winkel who goes to sleep one day and doesn't wake up for two or three generations. While you are asleep a miracle occurs, and all the problems you see around you now are solved. What would life be like then? What does it mean to be a sustainable world and to be a peaceful world? What might you find when you woke up in several generations time after the miracle occurred? What would be different?"

The purpose of asking this is to help separate out the question of what we would like from that of how might we get there. Suspend negativity and cynicism at least until the book explores first steps and considers how far they could go.

> **You**  Yes, but in your own mind you surely believe that it will happen.
>
> **Me**  Not necessarily, but I do think it is a possibility. My concern is that if we don't at least look at the whole picture we will try solutions that don't actually address the problems they are meant to solve.

## Three basic principles

This chapter suggests three overall principles, which follow directly from the analysis of the global cancer in the last chapter, and which characterise the world that our modern-day Rip Van Winkel awakes to.

1.  *Peace*  People have come to see all humanity as part of their extended family, accepting and appreciating the differences between cultures. They have added to their sense of identity a strong sense of being part of humanity and a concern for its overall well-being. Human activities are organised to take into account the needs of other groups and co-ordinate with them, rather than compete with them. To make this possible, the basic human communication skills of seeing from another's perspective, appreciating human differences, coming to agreement, and especially handling conflict would be seen as the most basic and fundamental parts of human culture. Thus handling competition and conflict has become a well-understood process. Conflict resolution would be as natural a social technology as growing food.

2.  *Sustainability*  Looking after the health of the natural world – the whole of the living Earth – has become a primary value for all of humanity. So human activities are organised with that in mind.

3.  *The right goals*  In the miracle scenario, the direct pursuit of peace, human well-being and sustainability have replaced our current goals of

pursuit of profit and financial survival (with human well-being as its supposed side-benefit). It transforms much of the economic and political structure of the world. The basic social organising principle is to be aware of the core goals and to act to correct errors, or deviations from them. What could be more simple or direct? In engineers' terms, it means society is organised as an error-correcting, feedback control system with its goals the well-being of the whole.

> **You** So that's it? These three principles are all we need to create a Utopian world?
>
> **Me** Only at the most abstract level. They may seem like platitudes when looked at in isolation, but I don't think it is obvious how they might all be satisfied at once. That, in practical terms, is what this book is all about.
>
> **You** Well an error-correcting feedback control system certainly does sound rather abstract. What are you on about?
>
> **Me** Here's a simple example. Imagine a farm in which the farmer's goals are to keep his land in a natural state of fertility, his livestock leading reasonably natural healthy lives, while doing his best to satisfy the food needs of the local population and to give himself and other farmworkers satisfying work. Imagine that farming is organised so that these goals become the farmer's motivation and not the needs of an industrial farming system or the prospect of a higher income.

# The Earth becoming an organism

If humanity with its current huge population and dominance takes on this role of caring for the Earth-as-a-whole, the result is that it would come to have a coherence and a wholeness it has never had. In that respect it would become like a gigantic organism.[1]

Gaia is the name of the ancient Greek Earth goddess. Gaia theory has been popularised by James Lovelock and others as "a theory of the Earth as a living organism – where the evolution of the species and their material environment are tightly coupled but still evolve by natural selection"[2]. The Gaia theorists show how the effect of life as a whole on the physical Earth is to maintain the general conditions it needs to continue. Because of the presence of life, the Earth has become a loosely self-regulating system that keeps the composition of the atmosphere, the surface temperature, the presence of liquid water far from chemical equilibrium, as needed for life's survival. Similarly, a mammal or a bird keeps its internal temperature constant, regardless of the outside temperature.

However, to call the Earth an organism now is going too far. The Earth is now more properly thought of as an ecosystem. In an ecosystem like a forest or a seashore, the different
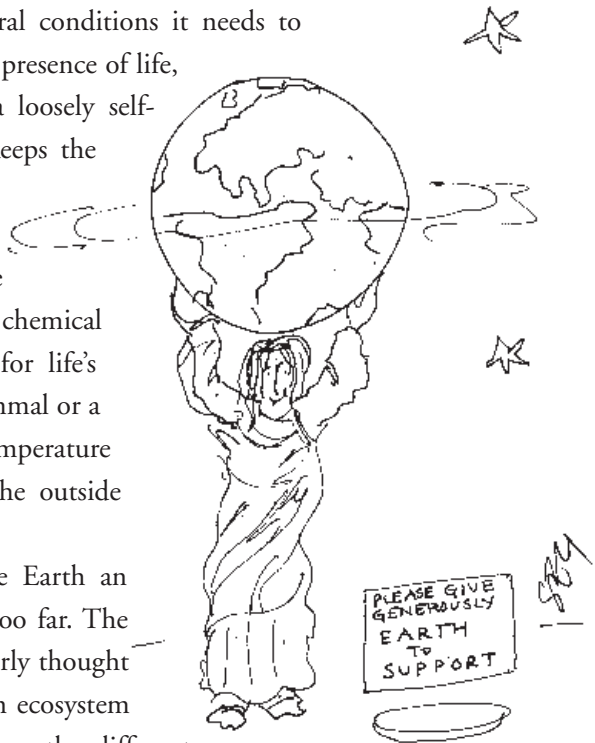
creatures live together in a mixture of competition and mutual support or symbiosis for self-regulation. The work of the Gaia theorists shows the importance of mutual support even in an ecosystem, in contrast to popular views of nature which see competition as predominant. This idea is developed much further in Chapter 4.

The Earth now lacks the wholeness and coherence which characterise those things we currently call organisms. The coherence of an organism goes along with a greatly reduced role for competition between its parts and much more mutual support. When an itchy scalp results in a hand scratching it, that is a highly co-ordinated co-operative response by billions of cells. No ecosystem has that kind of co-ordination. However, a large-scale global effort to relieve a famine or earthquake damage in one country has something of the same character.

The point of the three fundamental eGaian changes above is to spread that kind of support and co-ordination to all aspects of human life, and beyond – to the natural world. Such a change would mark a major step in the evolution of life on Earth. Through its evolutionary history, the scale of the coherence of life has increased from that of the first microbes, to complex cells, to multi-cellular forms, to organisms like plants and animals. Extending that coherence to the whole planet, creating a planetary-scale organism, could be the next step in that progression. That is the full significance of the miracle.

## Humanity as a global nervous system

This book suggests that the mechanism for the social process that changes the Earth into an organism is communication and information processing. The function of humanity within that organism would be analogous to a nervous system. An animal with a nervous system is an error-correcting

feedback control system with the nervous system as its communication and information processing system. A nervous system is as much controlled by its body as vice versa. It is part of the body and responds to its needs. Thus when you scratch that itch, the nervous system first has to notice the discomfort and send signals about that to the brain (feedback). Comparing the signal (itching) to the desired state (no itching) shows there is an error. The nervous system then determines the action required and sends signals through the nerves in the arm and muscles to activate the movements needed (the error-correcting control).

Similarly, transforming the Earth into an organism involves humanity becoming integrated within it. Humanity responds to the needs of the Earth rather than trying to control it for its own purposes. For humanity to look after the health of the natural world, it has to monitor its state, work out where action is needed and act accordingly. For humanity to look after its own health, it has to monitor and understand that, going beyond the differences in perspective of different groups, and act accordingly.

This emphasis on communication and information processing is the reason for the e in eGaia. In this miraculous eGaian future, electronic communication will be the key technology that connects us to each other. A nervous system-like culture will need rich communication to form locally and globally self-organising and self-regulating social structures. Moreover, as described in the final part of this book, it is also the key to the kinds of practical first steps leading in that direction.

**You**  Surely you're not saying that the development of the Internet is leading us to a peaceful, harmonious future? As far as I can see, apart from the convenience of email, it is mostly another way of selling things, making the world still more commercial.

**Me**  In fact, the early development of the Internet was along co-

operative lines but I agree that since it has come to mass popularity it is becoming part of the commercial juggernaut as you say. However, as it links a substantial part of the world's population, it opens opportunities that weren't there just a few years ago. There are now opportunities for new groups of people to co-ordinate their activities with eGaian aims in mind, and for the use of information beyond the control of the mass media empires to highlight and counteract some of the damage we are now doing. It is human communication that will make the difference. Electronic media simply provide the infrastructure for that communication.

## Underpinning the basic principles

The growing popularity of the Internet is just one of the changes that underpins an eGaian future. The three principles that opened this chapter all have echoes in recent history.

It is only during the past century – through films, radio and TV – that people have seen into each other's cultures on a mass scale. People everywhere now identify with the victims of famine and war anywhere. An eGaian culture would require us to move beyond the culture-bound blindnesses of our past. We are only now reaching the point where we can build a sense of identity as part of the global human species rather than as part of one culture competing with the rest.

In the past few decades we have been able to see the Earth from space, to give us a sense of the Earth as home to us all. Now the living Earth and the threats to it are becoming understood. At the same time as our population has burgeoned and our technology has increased its impact, our scientists have become able to monitor the damage we are doing. Global

warming, holes in the ozone layer, loss of habitats and species, air and water pollution are now routinely taught in schools. Children are many of our most committed environmentalists.

During the last century we developed an understanding of feedback, stability, control and their use in self-regulating systems. These ideas inform our understanding of how organisms and ecosystems maintain their form and health. As we have developed machines that communicate, the theory of communication has grown with it. Studies of human psychology have teased out important principles of how we make sense of the world and how we form our sense of self. It is only through the conscious application of these ideas that we can replace our destructive expansion with a stable, self-regulating culture.

This powerful cocktail of ideas, together with the technical means of communication, gives us the opportunity to create self-aware, stable, self-organising social structures based upon co-operation and community. The image of eGaia can provide pointers in the direction of that future. It can generate guidelines for ways to behave, ways to live sustainably and in harmony with each other. This can provide the 'shoulds' and 'oughts' which science, as we know it now, cannot. These turn out to be the same at a deep level as some of the teachings of the ancient religions, but without the need to appeal to ancient authority.

The image of eGaia builds upon the earliest spiritual imagery of humanity: Gaia, the Mother Earth goddess. It can provide a sense of being part of a larger whole and also a sense of purpose. Many people share large parts of this vision. Huge numbers are seeking ways of living more sustainably. Many are looking for co-operative, community-based ways of living. The æther is thick with new forms of spirituality, many based on a regained harmony with nature.

# A TASTE OF
# AN eGAIAN FUTURE

This chapter moves beyond the abstraction of the previous one to give some idea of how an eGaian future might work in practice. What might life be like with humanity functioning as a global nervous system? As this is still an imagined answer to the miracle question, it must resort to fiction.

**Yes**  So now you are a Utopian novelist.

**Me**  Not even a short story writer I'm afraid, so apologies if my characters are two-dimensional. The story is there to bring alive the social principles. Nevertheless, it inevitably embodies my fantasies and tastes: as you read it, you may find that you like the social principles, but would prefer a different tale.

The point of the story is to show some possible mechanisms for implementing the three basic eGaian principles:

- peace – how could a community handle the conflicts and problems which arise between people while maintaining a sense of mutual concern and understanding?

- sustainability – how could a community organise itself in such a way as to take into account the needs of the natural world – but without leading an extremely basic, ascetic life?

- the right goals – how could a community use communications to organise itself economically in a way which is directly determined by the needs of the natural world and humanity, rather than indirectly through monetary exchange? Can co-operative structures provide the choice supposedly offered by competitive markets?

This tale is set some time in the future, after the miracle, in a world which has moved a lot of the way towards an eGaian society. It is a tale of a day in the life of some of the members of 'Pinecone Network' which is a group of perhaps several hundred people in a provincial town in some western country. It is one of many such networks in the town, all loosely linked to each other and to larger networks of different kinds.

## Merry

Merry is a young girl, recently turned 12, who is just joining Pinecone Network in her own right. She has been using it through her parents' accounts since she was small, so she knows a lot of its members already. She has just completed a short introductory course and has been given her membership.

Merry accesses Pinecone Network through her computer and opens her new account. She starts by setting up the identity she wants the Network to know her by. She puts in an icon she has been working on in preparation for this, a nickname, and a short description of herself.

She opens her Account Book and finds that her parents have transferred all her favourite clothes and things from their accounts to hers. So now she has her own footprint (from Chapter 1: environmental footprint accounts for the area of land needed to support a person at a given level of technology). As she looks through each item she can see that it includes two ratings, one for its impact on the Earth, and one for the number of hours of human effort it took to create. Her footprint is the total of the footprints of all the things in her account.

Merry has grown up with the idea that a sensible person tries to get what they want while keeping their footprint at a reasonable level for their age. She looks at the public parts of the accounts of various other people in Pinecone Network that she knows, to see what their footprints are. They all seem quite different. Some are well above their age average and others are well below it.

Merry opens the contributions section of her account. It is completely empty. Is that fair, she thinks? All those chores she has done, all those errands she has run, all the help she has given to the old people at Watermelon House? Why shouldn't children's early contributions be there when they join, like in her friend's network up north. At least they will be in there from now on. She looks at the public parts of the accounts of various children who are already members. A lot of them seem to put in very few hours a week, but some put in so much time she isn't sure she believes it.

She looks at her cousin's account: Bertha has a public rating of 9. She's been doing things for almost a year for which she has asked for public ratings. Merry thinks about the sort of things she might do now and when she is older that might be rated. Perhaps she can join a group picking strawberries at Elderberry Farm. That might be a tasty beginning for a main skill as a biologist, which she has been thinking about.

**You** Let's see if I've got the points here. You have an economy where people have accounts for buying from the Network, but they use 'footprints' not money. Footprints include, somehow, the effect on the Earth and the number of hours it took to make the thing?

**Me** Yes, that's about right. Cost has those two main components – effect on the Earth and on other people, expressed directly, rather than (as now) hidden or ignored within monetary cost.

**You** And people also have contributions, in hours, which is what they do for the Network? But how is that connected to what they get? Is it sort of like having credit?

**Me** No, it's quite different from credit. Now you can't consume without having money or credit. Therefore, having money has become a goal in its own right. In Pinecone Network what a person gives to the community and gets from it are separate and reflect human variety. However, their totals are public. Serious or professional contributions are rated and so are subject to public opinion from within the community. That becomes the principal control over behaviour, not the possession or lack of money.

## Albert

Albert is 49 and manages Apple Transport, a small firm that was once a car showroom and garage. He is still its legal owner, but for all practical purposes it is a co-operative 'owned' by the community it serves, including both its customers and its employees, who are intensely loyal to it. Apple Transport takes full responsibility for all aspects of its customers' vehicles. It gets them, services and updates them and disposes of them.

---

### *Apple Transport*

This month's customer satisfaction rating 92%

**We look after all vehicles, new and old.**
**Updating and renewing our speciality**
**Our vehicles all have very low ecological footprints**

*For a worry-free life, let us look after your group's vehicles.*

**Short-term and back-up vehicles always available**

*Links*
Who's working this week?
Bookings for parts, service, up-dating
Vehicles available/wanted

---

Albert spends about three days each week working for Apple Transport, which is considered to be a lot. A couple of his employees share his managerial responsibilities and stand in for him when needed. Albert often spends another day or two working at other small jobs which interest him. He also helps out at the market garden/farm and at the town hospital.

He starts each day at his computer, looking at Apple Transport's sign-up sheets on Pinecone Network. First he checks that enough people have signed up to work for him over the next few days. He has a workforce of about 5-10 each week, most of whom work for him a few days each week. They are drawn from a much larger pool who work for him from time to time. He always has enough in reserve to cover absences or peak workloads.

The workforce is variable but well organised and reliable. Many of them work at more than one transport vehicle co-operative locally.

He notices that Conan will be in this week. That is probably because one of Conan's best friends has also returned. Albert has noticed that his workforce has settled down recently into two overlapping groups, each containing a few people who don't get along with one or two in the other group.

Albert then checks the customer lists. For urgent jobs, Albert can always fit people in. He may sometimes have to call in extra people or consult with the customer's regular repairer, but his workforce has the needed flexibility. He often sends someone out for minor breakdowns.

There is a rating system on-line which most of the customers use after every visit. Albert prides himself that his garage and his employees almost always receive very high ratings. That is the basis of his very strong customer loyalty. He and his staff carefully check out each case of a low rating to see what they can learn from it. Can they improve their working practices? Does someone need more training? Was it a misunderstanding and if so, how can they avoid that in future?

Francoise has booked in for a service next week. She is a new customer who has changed to Apple Transport from another firm. He must find out why she has changed. Were there problems between her and someone at her old firm?

Albert sees that he could do with two more workers for Friday because a lot of customers have booked in. He sends a group email to all his regulars pointing this out. If this doesn't do the trick within the next day or so, he will make a few phone calls and sort it out. And then next Monday almost no-one has booked in. So he emails two of the staff due to work then and tells them not to come in. He hopes they will be happy to have the day off.

He looks through the messages in the Regional Transport Network, which links all the firms like his as well as the researchers in the university and other related trade networks. As a senior person in his industry locally, he has also qualified as an inspector, and he signs up to inspect two firms in the area. He also puts Apple Transport down for inspection. With the inspections, customer ratings, and research information he gets, his firm is kept on its toes and is far more up-to-date and efficient than it ever was in the old days of competition.

And now the day starts properly with the first customers, all of whom he knows, mostly for several years. He chats with them, discussing whether any of their vehicles need updating or modifying. It is relatively unusual now for people to have entirely new vehicles. There has been a fashion recently for changing the body shells of the smaller cars, made of tough, lightweight but re-cycleable plastics. They can be made in some wild custom colours and designs to order. Albert can search on the network for suitable vehicles, and modify them as needed.

He has a group of customers who enjoy having older vehicles, and with his help, can usually keep them going indefinitely. All his vehicles use fuel very efficiently, and with all the recycling of parts and the sharing of vehicles, they add very little to each customer's footprint.

It is quite a light day for Apple Transport. There are only two mechanics around, so Albert helps them out. He has farmed out a couple of jobs to another firm that had a few cancellations.

> **You** The main thing that strikes me is flexibility. People seem to work when it suits them.
>
> **Me** Yes, it's important that people are motivated to work because they like the work and because of the respect it gives them. That flexibility is made much easier by the on-line sign-up

sheets. The workload can be adjusted either up or down to follow demand. Albert has neither need nor desire to try to influence demand. The relationship with customers is important, also the use of on-line feedback to support it. Socially, it has some of the qualities of an extended family. Quality is maintained by feedback and peer inspection, not fear of loss of customers. That makes it function as an error-correcting control system

## Elvis

Elvis is the manager of Elderberry Farm. Now 60, he has been a farmer all of his life. He often reflects on the complete transformation of farming within his lifetime. The word farm doesn't really do it justice anymore. In a way it is a modern high-tech version of what medieval estates used to provide.

Elderberry Farm is one of the principal sources of food for Pinecone Network and other local networks. But it does much more. Its woodlands provide fuel for the community and wood for furniture and building materials. The wood is also used as the raw material for the chemicals which Pinecone Plastics needs, replacing the oil an earlier generation would have used. The farm is a re-cycling centre for organic wastes which are converted to fertilisers and which also produce gas and alcohol as fuels. Up on Pinecone Ridge is a row of large wind turbines producing electricity. Elderberry Farm is a major supplier of fuel and electricity to homes, factories and workshops in the area. The result of all this is that Elderberry Farm helps the people of Pinecone Network keep their ecological footprint very low.

The farming methods have changed radically too. The woodlands have been extended to include fruit, nuts, berries and many other perennial edible plants. They are the home to deer, pigs, and various other animals that live wild and are culled for food by the farm. Organic agro-forestry has become the norm, with even the remaining fields looking more like mixed grassland than earlier single crop farming. The farm now requires a lot more labour than it did in the 20th century. However, this has not proved to be a problem, as Elvis supplements his small core of skilled staff with large numbers of casual workers.

The farm has been planted with an eye to aesthetics as well as food efficiency. It is now considered very beautiful and is a popular place for Pinecone people, who come to work there, just hang out, or participate in various events.

Elvis used to enjoy pop festivals and camps in his youth. He has turned Elderberry Farm into a place where people come to work during the day and to be entertained and party in the evenings. He regularly books entertainment and theatre workshops, catering for different interests on different dates. In between, people come and entertain themselves. Elderberry Farm has become as popular with performers as with its farm labourers. Then often wander amongst the labourers, with songs and street theatre.

He gets on his computer to check on the bookings for the next week. He sees that Bertha and her friends have booked again. Mostly, people book in groups of friends who camp together. He sees that Delilah, the dance teacher, is running a workshop and guesses that was one of the main attractions for Bertha and friends. He looks at the list of tasks coming up and selects a few he thinks would appeal to Bertha's gang. There is a tremendous variety due to the rich nature of the farm.

Elvis would not be able to manage without the help of the farm management software that has been developed for the new type of farm. It helps him keep track of what is becoming ripe and where so he can arrange for it to be picked, and can prepare notices for the community and the supermarket. It monitors the state of the energy sources on the farm, so he can advise all his customers. His skill, as a good modern farm manager, is to keep the farm as near as he can to a natural ecosystem while intervening just enough to make most of its produce of value to people.

> **You** This farm is an environmentalist's dream. It's organic, feeds local people, looks good, supplies energy. I'm not sure quite what is the point of turning it into a festival, though.
>
> **Me** Well, it's absolutely in line with the principle of fitting in with the health of the natural world. The point of the festival atmosphere is to create motivation to work. Farm labour is made attractive by spreading it widely among the people the farm feeds and making the work fun. Isn't that better than forcing it upon the poor? It's a different kind of relationship than you usually get between a farm, its customers and workers. That way the issue of competition with other farms nearby or across the world doesn't arise.

## Henrietta

Henrietta is 76 and lives in Watermelon House, a large co-operative hostel owned by Pinecone Network. It caters largely for single people and couples without children. It was converted into a hostel from a redundant hospital. It has sections that are adapted to the needs of the elderly and those with disabilities.

Henrietta is partially disabled, as a result of a stroke a few years ago, but

her mind is sharp. She likes making an active contribution to the community. Pinecone Network has opened opportunities for this in ways that would have been impossible for older and disabled people in earlier times. She likes living in a mixed community with people of all ages. She often works in the kitchen in Watermelon House, as she has always loved cooking. Often when there is cooked food left over, she puts it in small containers, freezes it and sends it to the supermarket.

Henrietta spends much of her time organising the Transport Users Co-op. It functions as a self-organising taxi and delivery service for Pinecone Network. It is heavily used by children and people with limited mobility, saving huge effort for parents and carers. They like and trust it because they generally know the drivers. Henrietta and the drivers take their user ratings very seriously and try to learn from any low ones.

Organising the Co-op is relatively easy for Henrietta because of its on-line software. Henrietta has become quite good at using it, but she does need regular help from Delilah, who is her personal computer consultant. She is very excited about getting a new computer to run the new version of the software. Some of its parts will be taken from her old one, and the whole machine won't add much to her ecological footprint. She has asked for a bright pink case that she thinks will go with her curtains.

Much of the signing up for shifts, rides and deliveries is done directly by people on line. However, there are still plenty of people who don't want to do that. Mostly they telephone Henrietta. The co-op owns a small fleet of cars, mini-buses and vans, which are supplied and cared for by Apple Transport.

Today she will be getting a visit from Delilah's son, who she often looks after. He helps her clean her room, and enjoys the stories she tells him about the bad old days before Pinecone Network. She tells him about her

own mother, and how difficult things were when she was old and infirm. In those days, old people had to rely on help from the government, from strangers. Now the community looked after its own. Henrietta had been a political activist, and remembers how difficult it was to get anything changed. It is so much better with these new networks: everything is done on a personal basis.

> **You** Interesting…this is a clear mixture of the environmental and the social. You've got a responsive, friendly, semi-public transport system which must save a lot of fuel. If it worked well, some people wouldn't want their own cars.
>
> **Me** Yes, there is concern for the Earth and a co-operative social structure. And the way the Transport Co-op is organised illustrates the error-correcting feedback system working to the right goals.

## Francoise

Francoise is 33 and lives with her partner, Gerry and their two children. Both Francoise and Gerry lead busier lives than are fashionable these days. This puts pressure on their family lives in a way that would be more familiar in the early 21st century. Fortunately, the community support provided by Pinecone Network removes much of the problem.

Their older son, who is 12, often spends afternoons at Watermelon House, where he has several adopted grandparents among the elderly residents, including Henrietta. He runs errands and does odd jobs for them. They help look after him, teach him and feed him. Both children have busy social lives. Francoise frequently uses her computer to arrange for them to be taken and collected by the Transport Users Co-op organised by

Henrietta. But more often they walk or cycle. These days traffic is so much lighter and there is so much less street crime that Francoise thinks that is quite safe.

Francoise and Gerry both devote much time to sports. Francoise co-ordinates sporting events using the latest Community Sports Planning software. Everyone can access it through the network. Through it she can identify groups who are interested in different sports at various levels. She uses it to match interests with venues and coaching. Software used in this way, to match supply and demand for all sorts of purposes – for goods, services, events, facilities – has become the foundation of social organisation.

Francoise usually works for several days each week in the Pinecone Plastics factory. It is still legally a part of an old-style multi-national and has close links with their other factories and research labs. At the same time, it has become a co-operative, integrated within Pinecone Network. It has recently been upgraded with the most modern automated equipment and serves a wide range of needs for Pinecone people.

The factory is a large modern building – like many others, roofed with solar panels. Some panels are photovoltaic and produce electricity; others are thermal to heat water. Most of its additional needs for fuel and electricity are supplied by Elderberry Farm. It tends to adjust its workload seasonally, increasing its output when the wind or the solar energy are greater, and reducing output when they are lower.

Most of the raw materials needed by Pinecone Plastics come from recycled plastic from components it has made in the past. Most of its output is designed for this. Additional raw materials are made by chemically digesting wood and other vegetable matter from Elderberry Farm, but some comes from farther afield. All of this helps keep the

---

### *Pinecone Plastics*

This month's customer satisfaction rating 85%

**Spare and replacement parts for almost anything**

**Custom colours and designs our speciality**

**Our advanced, automated equipment
means *fast* service**

*Links*

Standard items: household items, knobs, connectors, you name it, we have it

Custom design: large library of designs, easy to use design software

---

ecological footprint of its products very low. One of Francoise's regular tasks is to find sources for specialised materials from collaborating factories and farms in the region.

Today she is working on some new car body panels that Albert's Apple Transport has ordered. She doesn't have the design for that model in her library, so sends a message to the other plastics factories in the region asking for help. In her inbox there is a short article from the regional research labs describing an easier way to clean out used moulds. That will save her and all the other plastics factories hours. In the old days, one firm would use information like that to gain competitive advantage over the others.

She finds a request for dustbins from a factory in the next county, (its

machine has broken down) and offers to produce them. Also, she finds an order for a bright pink case for Henrietta's new computer.

> **You**  Another environmentalist's dream! It uses renewable energy and local raw materials.
>
> **Me**  Yes, and re-use and re-cycling means it provides its customers with a good material living standard at low environmental cost. Also, notice that it responds to the requests from its customers. It doesn't need to go out looking for customers. Its workload varies with the seasons, with the weather, with demand. That, plus the rating system, is what makes it a control system responding directly to needs and its environment. The communication networks are what make it practical.

## Gerry

Gerry is one of those energetic people who can't stop doing things. He spends several days working in the supermarket, but then invariably signs up for several shifts around the community. He often drives the minibuses and vans for Henrietta's Travel Co-op, he and his rugby mates take shifts together working on the roads and parks (always a good laugh), and he occasionally shows off his newly developed cooking skills in the hospital kitchen. And on top of that are his sports.

To help at mealtimes, Gerry often brings back frozen meals from the supermarket. These are not the old-fashioned, highly processed kind but are usually locally made by enthusiastic cooks in Pinecone Network.

The supermarket work provides him with his major challenges. It is very different from the supermarkets of old. Although it is still legally part of one of the big three from the early 21st century, in practice it is more like

---

### *Pinecone Supermarket*

Customer satisfaction rating 96%

**Everything you need under one roof and garden.
The best of local food, goods, crafts …
If we don't have it, we'll find it for you.**

*Links*
Regular orders for collection or delivery
This week's special items

---

a medieval marketplace, serving its local community. It is a distribution place for most of what is produced by Pinecone Plastics, Elderberry Farm and other local organisations: food, clothing, goods, everything. Most are locally produced, but a significant proportion are not, and may come from anywhere in the world. It has strong links with distributors and other supermarkets.

Parts of the supermarket and its garden are full of small stalls from local workshops and other enterprises. This includes furniture, craft items, refurbished and re-designed clothing, renewed appliances. Anything that can be repaired, recycled or improved passes through it. It is also a main collection place for re-cycling. The food is mostly fresh, organic and local, but there are plenty of cooked meals, made by those Pinecone people who love cooking. The result is that it helps the people of Pinecone Network live well while keeping their ecological footprint low. As markets have always been, it is an important meeting place. It has been beautifully

decorated, with sculptures and other artwork. There is always entertainment of some sort, and lots of stalls.

The challenge for Gerry is to provide the best match he can of supply and demand. Through the on-line networks he keeps careful track of what people want and what is available. He often puts out polls and questionnaires asking about what people want in the future. People routinely rate what they have received so he has feedback on quality and satisfaction.

The bulk of what the supermarket provides is routine and in plentiful supply. That includes the basic food staples, household goods and appliances. Much of this is ordered through people's computers. They either collect it in person or the supermarket delivers it, helped by the Transport Users Co-op. When people order something the supermarket doesn't usually carry, Gerry searches through the trade networks to find it. For luxury items, he and the other markets have developed a number of strategies. That batch of a special new ice cream flavour was offered on a first-come, first-served basis. Jewellery, art and other rare items sometimes circulate, with people holding onto them for a few months, or even just for a special occasion. Sometimes there are prize draws for special items.

> **You** OK, so most things are local. That reduces transport which is good for the environment. But why do you need prize draws? Don't people simply buy what they want? In fact, you haven't said anything about prices, salaries or anything about how money is organised.

> **Me** Being local, it isn't much affected by economic conditions across the county, much less across the world. I haven't said anything about money because I am assuming that money isn't used. Gerry tries to match supply and demand as best he can. He doesn't need to influence demand to improve his

cash flow. Within Pinecone Network people make their contributions and receive what is on offer. Their total contributions are public knowledge as is their total footprint – so giving and receiving are subject to social approval, but are not linked on an item by item basis. Work is motivated by people enjoying it, by the prestige and approval they get for doing it, and because it is needed. Everything that we use money for is done through information: real costs (footprint), finding out what people want, organising who will do what work, knowing what is available, all made convenient by the on-line networks. People do what they want and get what they want. Unpleasant work isn't forced upon the poor, and scarce goods aren't rationed to the rich.

## Conan

Conan is 25. He lives with his girlfriend, Delilah, in Watermelon House. Conan and Delilah eat most of their meals in the hostel's large dining room, which caters not only for residents, but also often for their guests or visitors to the community. The dining room walls are an ever-changing art gallery. It is also frequently used for musical and community events. It is a social focus for its residents.

Conan is more interested in doing things with his hands than with his computer, in contrast to many of his contemporaries. He likes working with machines and tools. He sees himself as a craftsman and an artist. His work is mostly around the hostel, but he is also a regular worker at Apple Transport. He loves the challenge of taking old cars that no-one wants anymore and updating, repairing and customising them so they will once again be someone's pride and joy.

He starts his day by checking his shifts at Apple Garage, and signs up

for the date when his mate Sasha is on. Conan then looks through the list of jobs people have asked for in the hostel. There is that tricky plumbing job with the awkwardly sized pipe. He fills in an order form to have it custom made at Pinecone Plastics factory. A few seconds later a receipt comes back saying it has been booked and will be ready in two days. He then selects two jobs to get on with for the morning, but decides he will spend the afternoon working on his new mural for the dining room.

Conan is troubled by quite dramatic mood swings. Sometimes his temper is easily triggered, and he has a history of violence both to people and to things. People are aware of his difficulties and help him to handle them, partly by helping him avoid situations in which his anger will be triggered. There have been times when his mood has become so dark that he has been put into a secure community for the duration. When he has injured someone, he has been helped to understand fully what he has done, has had to make peace with the victim, and do something agreed to attempt to make up for the injury.

> **You**  You have some communal living for those not in families, which makes environmental sense. But the interesting thing is that we now have a villain. Not everyone here is perfect.
>
> **Me**  Conan is not a villain. He is more difficult than most but he lives in a community which has learned to handle him with sympathy and in a way which repairs the emotional and physical damage as best it can. In our world he would probably have been put into a prison which would have turned him into a bitter but well-trained criminal.
>
> **You**  This strategy must rely upon there being relatively few such people around.
>
> **Me**  Yes it does. They aren't grown and hardened as they are today.

Conan didn't grow up with peers who respected and glorified his violence. He always had opportunities to make positive contributions to his community that gave him approval and respect. That is what made his problems manageable. This is an example of society as an error-correcting control system in the social realm. The understanding that is shown to him and that he had to show to his victims is an example of using communication to solve social problems.

## Delilah

Delilah has lived in Watermelon House with Conan for several years. She loves his playfulness and his practical talents. She has had special training to help him handle his darker moods. Like many young people nowadays, she splits her time between various passionate interests. For her, it is dancing and computers. Delilah has had dance training since she was a child. She is very popular in the region, getting bookings for solo performances and as a choreographer running classes and workshops. She gets consistently high ratings. With the current revival of the arts, the opportunities are much greater than in earlier generations.

She sits down for a short session at her computer. A video clip of her last performance has arrived by email. She edits it, adds some graphics, and puts it in her web site CV. Most of her bookings are by word of mouth and reputation, but the web site has got her occasional parts in distant shows. She agrees to a request to run a dance workshop on Elderberry farm soon.

Delilah loves her computer work because it challenges her in so many ways. She has a computer consultancy with a large group of regular clients. She gets them their computers, maintains and upgrades them, and recycles them when needed. She gets them new software when they need it and

teaches them how to use it. Mostly though, she helps her clients when they get stuck. That can tax her social skills hugely. She enjoys visiting them, and several have become good friends. She has learned to tease out exactly where they have misunderstood and then puts them right in a way which doesn't makes them feel stupid. She is constantly amazed that after all these years when computers have become a vital part of the culture people still have such difficulty with them. And that despite the fact that they have become so much more reliable and simple to use since the industry became non-competitive.

Today Delilah will spend some time at the Pinecone Communications Workshop, where most of Pinecone Networks computers and other communications devices are assembled and recycled. They are assembled to customer order from standard parts made elsewhere. However, the cases are made locally at Pinecone Plastics in colours and designs reflecting local fashions. With all the recycling and re-use, they have a very low ecological footprint. Delilah has to put together a new computer for Henrietta. She collects a few designs for cases that she thinks Henrietta will like and emails them to her.

Before going to the Workshop, Delilah spends some time on-line catching up with local software developments. She notes with satisfaction that some programming she did last week to make the Accommodation Booking software easier to use has been accepted. Within a few weeks it is likely that most accommodation co-ops will be using it. That will enhance her reputation.

> **You**  I'm not really sure if there is anything major that is new here. What is all this about her dancing?
>
> **Me**  This story reinforces the the close relationship between client

and provider, through customised production and personal service. People dealing with areas they don't easily understand do it through a personal agent. It also demonstrates the flexibility of people's lives. They are free to express their creativity if they want to. This is good for artists of all sorts. Artistic creativity has taken over from conspicuous consumption. One of the signs of a happy culture is living in a beautiful environment, both in its natural and man-made aspects.

## Bertha

Bertha is 17 and lives with her family. This morning she looks on the network for confirmation of her booking for the coming weekend at Elderberry Farm. She and her friends go there often to work on the farm while enjoying the music and dance that is laid on for them in the evenings. She loved the last dance workshop she did there with Delilah and knows there will be another one this weekend.

Pinecone Network has been a major support for her education, especially in her teenage years. Much of her education has been based around project work, some developed herself. Other projects are devised and set up by her teachers. Many have been collaborative projects, usually including some of her friends, but often with young people in other parts of the country or the world. Through the network she can find other young people to work with her, share information, co-ordinate work, and do background research.

Bertha looks on the network for replies to her application for a trip to an Eastern European country where there are still vestiges of ethnic conflict. This is part of her training in cultural conflict resolution, which

she hopes will become one of her main career areas.

From early childhood Bertha (along with all the other children) has been taught the communication skills which people have learned to see as the foundation of social education. Through games and little plays they have learned how to listen, how to put yourself in another's shoes, how to check that you have been understood or understand another. Her current ambitions build on that basic education.

On her trip she will be a trainee in a large team made up of locals and people from around the world. They were assembled in response to reports of the growing popularity of some demagogues who were stirring up hatred of an ethnic minority. The team has several main strategies. They look at the discontents among the people who are receptive to the demagogues. They acknowledge those discontents and help seek resolution for them. They also use a combination of media events and local community activities to help both groups in conflict to see the others as full people rather than as shadowy hate figures. They create opportunities for both communities to meet and work together socially. The leaders of this team are highly trained and experienced. They know how important it is to get into an area where trouble is brewing early enough, and with enough support and resources from outside. Then they can usually defuse the conflict before the hatred becomes too great on both sides. Bertha hopes she might eventually become that kind of team leader.

Bertha has planned to travel slowly, visiting various places on the way. Through the Accommodation Co-op in Pinecone Network she has found the names of people in all the places she plans to visit. They are all friends of people in Pinecone Network who offer temporary room and board to friends of friends, as do many people in Pinecone Network. Several have replied offering her rooms. Similarly, she finds messages from the Ride-

sharing Co-op offering her lifts for about half of the journeys she will need to make. For the remainder, she books seats on-line for the buses and trains she will be taking.

**You** A new tack. You seem to think childhood education about communication is crucial and that really big social problems can be headed off if they are caught early. You must be assuming that the local government and society around the troubled area allow the team in and support it. That wouldn't happen today.

**Me** The answer to the miracle question leaps across the question of how we get there and looks for what we would like. This future society is geared up to resolve conflicts, which it accepts as arising regularly. It uses communication to acknowledge people's concerns and promote mutual understanding, rather than imposing solutions by force. Teaching communications skills is crucial so that people simply don't get caught up in conflicts and difficult relationships as easily as they do today. I cannot over-emphasize this.

## Joline

Joline is a single woman aged 50 with two grown children. She has had long-term relationships, but is not in one now (although she has some possibilities). Her great passions are music and dance. She plays the flute, and frequently is seen wandering the fields and woodlands at Elderberry Farm entertaining the farm workers.

Joline is known throughout the area for her skills as a counsellor and mediator. She works with individuals, couples, families and work groups.

*Joline J – counsellor, mediator, arbitrator*

Difficult relationships?
Problems with your children?
Conflict at work? Depression?

*Would you like help to clarify your goals,
purposes and life path?*

Very discrete service.
Very experienced and well-trained

*Link*
On-line self-help groups
Sign up for relationship training
Frequently asked questions on relationships and conflict
Advice on personal growth and development

63

She has a reputation as the person to call when conflicts begin to appear in a workplace. With her help, a solution can usually be found before the conflict gets too serious. She also runs a lot of training courses, to help spread basic skills of communications and well-functioning relationships more widely through the population.

She has seen the Network grow in influence through her lifetime. She reflects on the parallel growth of communications skills in the community. They are now the foundation of every child's education. Without these skills, she doubts whether the new co-operative structures could ever have reached their present state of development.

She sometimes works with people she knows well, but most often it is by referral from people she knows. That way she retains the personal connection and also some detachment. Lately she has had to deal with several cases of people who had a lot of violence in their families when they were children. These are much rarer than when she first started this type of work. Now it is often dealt with early, and treatment given to both victim and violent parent. This has helped to break the cycle in which most violent parents had themselves been victims of violence as children, and so the pattern continued through the generations.

Another of Joline's interests is helping to facilitate community-wide decision-making in Pinecone Network. Most decision-making is the

business of the co-ops and other organisations, but issues like land use require the agreement of everyone. There was a proposal to expand the gardens of Watermelon House into what had been a small park. Such decisions are normally made by consensus, rather than majority vote, so that majorities cannot impose their will upon minorities.

Joline's skill is in helping groups with different views to understand each other's point of view, and then in finding solutions that are acceptable to everyone. The respect in which she is held means people are usually willing to accept her solutions. It sometimes amuses her to think that she is the modern equivalent of a politician. Yet in many ways she is the opposite of old-time politicians, who used to make a point of disagreeing with their rivals.

Much of this decision-making work is done on-line through discussions and repeated polls until a consensus emerges. Joline does very little of her counselling work on-line, but she does use her website to help her keep organised. It is useful to provide long-term support to former clients. And there are a few people who like the complete discretion of anonymous, on-line counselling.

Most of Joline's use of her computer is for organising her social life, getting routine food orders and maintaining her home and possessions. But its most special use is to keep in touch with her children. She loves the emails, photos and videos she gets from them both, and exchanges clips of music with both of them.

> **You** This is meant to show more of how the community solves its social problems.
>
> **Me** Yes, it is about the second fundamental quality, people as an extended family. This requires continuous attention and skill. Just as our society now has well-understood skills of building

roads and repairing them when needed, an eGaian society would need well-understood skills of building and maintaining relationships that work between groups and individuals. That's why I've again emphasized communications skills in schools. This is at least as important as concern for the natural world. It underpins the kind of collaborative society needed to solve our environmental problems.

## 66  Keith

Keith is pushing 60, with grown children and no partner – but a definite interest in Joline. For most of his earlier life he was a full-time academic, working at the local university as an environmental scientist. Now his life is much more varied. He enjoys being able to spend time on more physical pursuits, which keeps him feeling alive and healthy. He often spends time at Elderberry Farm, especially when they have jazz performances or when he knows that Joline will be there.

Some of Keith's work at Elderberry Farm is physical labouring, for the fun of it and to keep him healthy, but he also works as a scientific adviser. He regularly comes in to talk to the core staff to discuss the overall health of the farm and how well it is meeting the needs of its customers. Do any species need to be culled or protected? Do they need to introduce new predators to limit something? While mostly the farm grows quite naturally, the staff frequently make minor interventions to steer it in directions they think are needed. One of Keith's main contributions to Elderberry Farm is to keep in touch through the networks with the scientific community that specialises in agro-forestry farms of that sort. He gets advice when they have problems and learns of new approaches.

Keith is very content these days, enjoying his life. (And it might get

better still if things work out with Joline.) As an environmental activist for most of his life, he has been involved in the major transitions of the last few decades. As a young man he was sure that humanity was on track to destroy the planet. Now, human impact on the Earth is very much less, with less transport, local production, more recycling, less pollution, renewable energy sources. Much effort has gone into restoring and rebuilding wilderness areas and sea habitats.

He has seen the major changes in people's attitudes towards consumption. Nowadays, when people consume anything, the effect on their ecological footprint is automatically calculated. It has become a matter of pride to live well while keeping your ecological footprint low.

But far more important for people's everyday lives have been the social changes. The community focus and the communications skills have reduced crime, alienation and have improved family life. Economic uncertainty is rarely a problem and most people do work they enjoy. Perhaps most important of all is the sense of connection to each other and to the Earth. The idea that people make up the nervous system of the Living Earth has taken on an almost religious character, adding to the love and joy in all the Earth's peoples.

> **You**  Isn't that last bit a little over the top?
> **Me**  Sure, this is an over the top story. It's the answer to the miracle question. Do you want to settle for less in your hopes and dreams? This is a picture of a joyous future, not a let's-be-miserable-to-save-the-Earth future. I've tried to show how interconnected the environmental and social aspects are, and that solutions to the environmental problems come out of major social changes. Faced with the need for major changes

because of the global cancer, surely there is no point in going for some partial solution which still leaves the world full of misery? The answer to the miracle question is the change from humanity as a global cancer to humanity as a global nervous system.