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A biorenaissance – the hope for the future

by

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For healthy people on a healthy planet

A biorenaissance - the hope for the future

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A biorenaissance - the hope for the future

by Stephen Boyden

In this paper I would like to communicate some personal conclusions that I have come to about some of the critical challenges that face our society today. To do this, I need first to say something about my work in biohistory that led to these conclusions. Of course, I cannot hope to summarise 40 years work in a page or two. I can only refer to a few key aspects that have bearing on my theme. [1]

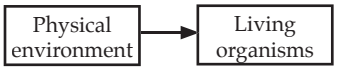
Theoretical approach

When I started work in this area in the mid 1960s I had a background in the life sciences and had carried out research in immunology. However, at that time I was becoming increasingly interested in the study of human situations from a biological perspective. In fact at that time I referred to the work of our group at the Australian National University as 'Biology and Human Affairs'.

Our theoretical approach took the history of life on Earth as its starting point.

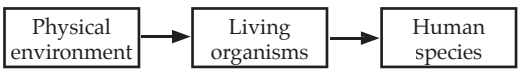
In the beginning there was, of course, no life. Only the physical world existed – referred to as the *Physical environment* in the Figures below. Then, perhaps around 4500 million years ago, the first *Living organisms* came into being (Figure 1).

Figure 1



Eventually, over many millions of years there evolved an amazing array of different life forms. [2] Among these, emerging some 180 000 years ago, was *Homo sapiens*. Because of this animal's special relevance to our studies, it is separated in our conceptual scheme from other living organisms (*Human species* in Figure 2).

Figure 2



Through the processes of biological evolution the human species had acquired a distinctive and extraordinarily significant characteristic – the capacity for culture (Figure 3).[3] And as soon as human culture came into existence it began, through its influence on people's behaviour, to have impacts not only on humans themselves but also on other living systems. It evolved as a new kind of force in the biosphere, destined eventually to bring about profound and far-reaching changes across the whole planet (Figure 4).

Figure 3

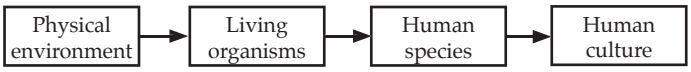
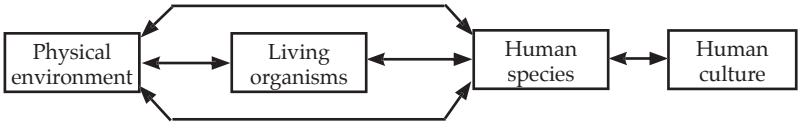


Figure 4



This interplay between human culture and the processes of life became the central theme of our work—not only because we found it very interesting in its own right, but also because it is clearly extremely important.

However, as natural scientists we were immediately confronted with a problem. We had been accustomed to dealing with variables of a kind that are reasonably easy to measure and to describe in scientific terms. But in this extended system we find that some of the most important determinants of biological change—such as the assumptions of a dominant culture—are very difficult to quantify or to describe scientifically.

Some people may feel we would have been well advised to leave this cultural dimension well alone. This is the domain of social scientists and students of the humanities. Certainly, biological scientists usually do steer well clear of culture and social institutions and processes.

We appreciated, however, that this would be ridiculous, because in the real world there are constant and highly significant interactions taking place all the time between these cultural forces and the more concrete biophysical components of the total system. An understanding of this interplay is surely a prerequisite for wise decision-making in our complex world.

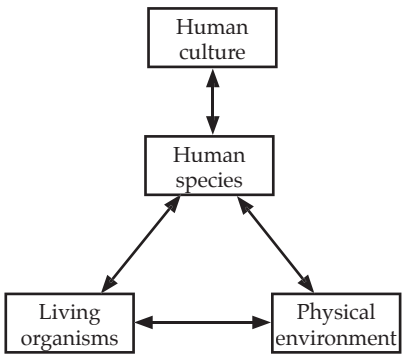
There are also other reasons why it makes good sense to take account of cultural processes in the study of human situations from a biological standpoint. These include the following:

- The aptitude for culture is the product of biological evolution through natural selection. It is the most distinctive biological attribute of the human species
- This aptitude must have been of selective advantage in the natural environment of humankind, although it may not be so in other settings
- Human culture is totally dependent on the processes of life for its existence, and it is very much affected by biological and biophysical happenings
- Human culture is an immensely powerful biological force, in that it has highly significant impacts, through its influence on human behaviour, on biological systems.
- These impacts became increasingly important after the introduction of farming, and even more so since the industrial transition.
- Some biological and biophysical principles are of great relevance to our understanding of human situations (e.g. nutrient cycles, the evolutionary health principle[4]).

The upright model (here and now)

This historically based conceptual map (Figure 4) can also be applied to the present day, and for this purpose it is convenient to rotate the scheme vertically (Figure 5). This orientation is appropriate because the processes of life in the natural environment are located at the base of the 'pyramid', underpinning and making possible the human species—as well, of course, as human culture.

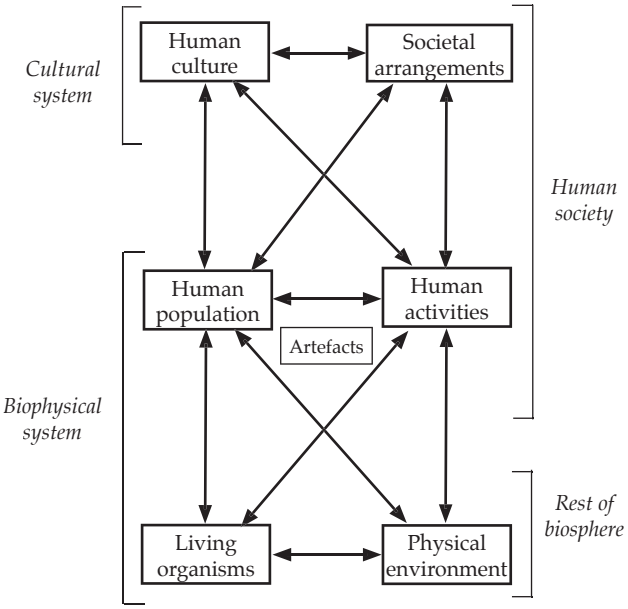
Figure 5



For the purposes of this discussion, let us complicate the scheme a little. Because we are especially interested in the impacts, on the environment or on humans, of what people actually do, it is useful to split the *Human species* (Figure 5) into the *Human population* and *Human activities* (Figure 6).

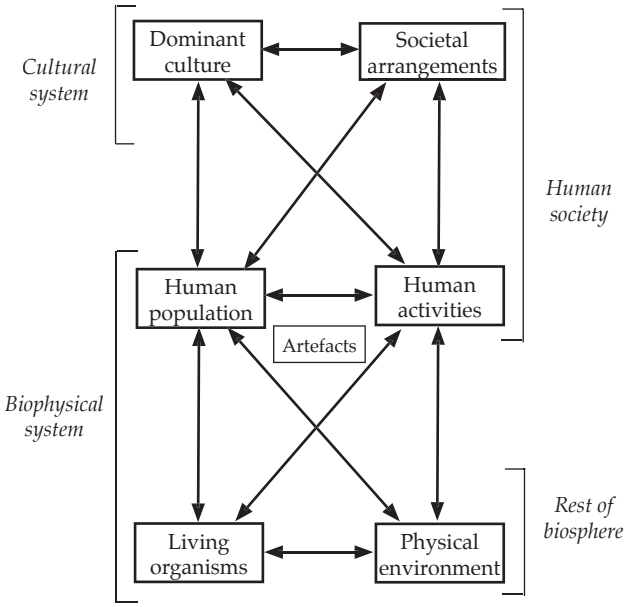
It is also useful to divide *Human culture* (Figure 5) into two parts. The first part is *Culture* itself, which is the information stored in human brains and transmitted through language. It includes knowledge of language itself, and general knowledge of the environment, history, the arts and technologies, as well as assumptions, priorities and religious beliefs (Figure 6). Our focus is often on the *Dominant culture* of a society—that is, the culture that largely determines the patterns of human activity in that society (Figure 7). The second part is designated *Societal arrangements*, which includes society's economic, regulatory, political and educational arrangements and its institutional structure (Figures 6 and 7). Societal arrangements are largely determined by, and to some extent determine, the characteristics of the dominant culture.

Figure 6



Figures 6 and 7 display a box for 'Artefacts', which include all human-made components of the system, such as roads, buildings, machines and works of art. Strictly speaking, arrows should connect Artefacts with the other sets of biophysical variables; but these are omitted for sake of simplicity.

Figure 7



This scheme can be adapted, with suitable modifications, to any level of society, from the individual to the planet as a whole. In each case the same sets of variables are pertinent. All changes in human ecosystems can be described in terms of this simple conceptual map.

However, the scheme tells us nothing, of course, about the nature of the relationships and interactions between the different parts of the system, nor of the on-going dynamic processes within it. We use it simply as a starting point for thinking about the pathways of interaction within human ecosystems between these different aspects of the total system—as a device for reminding us of the key sets of biophysical and cultural factors to be borne in mind in our attempts to understand what is going on. Such understanding also requires a basic grasp of biological and biohistorical principles and of the sensitivities and interdependencies of living systems.

A word about flows

All interactions in human ecosystems involve, and can be described in terms of, flows.

This obviously applies to the *biophysical system* (Figure 6). In the *rest of the biosphere* there are flows of energy, nutrients and other materials in the oceans and in the atmosphere. The impacts of animals on each other (e.g. predation, displacement) all involve flows of energy and matter. There are also flows of energy and materials between *human society* and the *rest of the biosphere*, as there are between human groups within the human population. Knowledge of these flows is essential for the understanding of the ecology of human communities.[5]

There are also flows in human society of information between individuals and groups. These involve variables in the abstract cultural dimension of the system. The learning of language, cultural assumptions, values and technological know-how all involve flows of information from the environment to and from the brains of individuals. And the exchanges of money within human populations are also essentially flows of abstract information—money being a symbolic product of culture that confers certain powers on its owners.

Our main interests

We were especially interested in the interplay between human culture and the biophysical world in the context of three interrelated themes:

- Culture-nature interplay as it affects patterns of health and disease in human populations
- Culture-nature interplay as it affects the health of ecosystems
- The processes of cultural maladaptation and cultural reform.

Here I will focus on the last of these themes.

Cultural maladaptation

The capacity for culture was clearly of major biological advantage for humankind in the evolutionary environment, and in more recent times it has resulted in an amazing increase in the number of humans on Earth.

Apart from its practical advantages, culture adds richness to human experience. It did so in the days of our hunter-gatherer ancestors—as in story telling, musical traditions, dancing and other forms of artistic expression. And it does so today in so many ways. It makes a huge contribution to the sheer enjoyment of life.

On the other hand, the outcomes of the capacity for culture are not all good. Culture has also been responsible for a colossal amount of human suffering, anguish and pain. It can lead us into big trouble—and certainly it is doing so in the modern world.

One of the important features of cultural evolution, especially after the advent of farming, is the fact that cultures have often come to embrace not only factual information of good practical value, but also ideas and assumptions that are sheer nonsense, leading to behaviours which were equally nonsensical. We refer to these nonsensical assumptions as *cultural delusions*.

Sometimes cultural delusions have resulted in activities that have caused a great deal of unnecessary human distress or damage to ecosystems, or both. We call culturally-inspired practices with these undesirable characteristics *cultural maladaptations.*

A particularly tragic example of cultural maladaptation was the ancient Chinese custom of foot-binding, which prevented the normal growth of the feet of young girls and caused them excruciating pain. This extraordinary practice well illustrates the propensity of culture to influence people's mind-sets in ways that result in behaviour that is not only nonsensical in the extreme, but also sometimes very cruel and destructive and contrary to nature.

This particular cultural maladaptation was mutely accepted by the mass of the Chinese population for some forty or more generations.

Female circumcision, which is still practised in some societies today, is another example of a cultural maladaptation involving mutilation of the human body.

Throughout the history of civilisation different cultures, including our own, have come up with a fascinating range of delusions about how social well-being can best be achieved, and some of these have led to blatant examples of cultural maladaptation.

For example, according to the dominant cultures of the Mayans and Aztecs, social well-being could be achieved by pleasing the gods, and the best way to please the gods was to torture, mutilate and then sacrifice human beings. Victims had their hearts cut out, or were decapitated, shot full of arrows, sliced to death, stoned, skinned, crushed, buried alive or tossed from the tops of temples. Apparently children were frequent victims because they were considered pure and unspoiled.

Again the point to be emphasised is the fact that, while there may well have been a handful of sceptics among the Mayans and Aztecs, the great majority of these people really believed that the torture and sacrifice of humans was an entirely appropriate behaviour.

Cultural gullibility is a fundamental characteristic of our species.

Another conspicuous characteristic of human culture is its propensity to cause human populations to become divided into different antagonistic and hostile groups. The hatred and animosity between these groups is often due entirely to spurious and pernicious assumptions in their respective cultures, inherited from a distant past.

Cultural reform

Fortunately, humans also have the potential to bring culture back on track when it goes off the rails. I refer to this process as *cultural reform.*

The processes of cultural reform are often quite complicated, involving prolonged interactions between different interest groups in society. A key role is usually played initially by minority groups, occasionally by single individuals, who start the ball rolling by drawing attention to an unsatisfactory state of affairs. We can refer to these people as *first-order reformers*. A prime example of a first-order reformer is Rachel Carson who, in her epoch-making book *Silent Spring*, drew attention to the insidious and destructive ecological impacts of certain synthetic pesticides.

Almost invariably the expressions of concern coming from first-order reformers are promptly contradicted by others, the *anti-reformers.* This backlash often involves representatives of vested interests who fear that the proposed reforms will be to their financial disadvantage. They are likely to argue that the problem does not exist or that it has been has been grossly exaggerated, and they try to ridicule the reformers by calling them alarmists, fanatics, scaremongers, prophets of doom and similar names.

The first-order reformers are, in time, joined by *second-order reformers* who also take up the cause. Eventually, if they are successful, a change comes about in the dominant culture, and members of governmental bureaucracies and other organisations set about working out ways and means of achieving the necessary changes. Their efforts may still be hindered to some extent by the stalling tactics of anti-reformers. There are many examples of this reform anti-reform pattern in history.

There is no guarantee that the processes of cultural reform will be successful. Some have been successful, while some have failed dismally. Whether or not they succeed depends largely on whether they are based on good understanding of the causes of the maladaptation, and on whether they come into play soon enough and on sufficient scale.

The world today

It is self-evident that human society today is characterised by some very serious cultural maladaptations. An important distinction between some of these present maladaptations and those of the past lies in their scale. For the first time in human history the whole of humanity is under threat.

The two most critical causes for concern are:

1. *The existence of weapons of mass destruction*. Despite the end of the cold war, weapons of mass destruction stored in the arsenals across the world, and still being developed by some nations, represent a horrendous threat to humankind and the biosphere.
2. *Human-induced ecological damage to the life support systems of the biosphere*. This is the result of the massive growth of the human population over the past few generations and the even more explosive increase in the intensity of industrial activities.

There are many other undesirable features of human society worldwide today—all consequences of our aptitude for culture. They include gross disparities in conditions of life, widespread poverty affecting hundreds of millions of people, and the ongoing culturally-inspired armed conflicts and terrorist activities between different cultural groups. While these cultural maladaptations do not threaten to bring an end to civilisation, unless weapons of mass destruction are used, they are nonetheless highly unsatisfactory features of the present situation.

All these undesirable aspects of the human condition today are the result of maladaptive delusions in contemporary cultures. While each of the issues demands urgent cultural reform, in this paper I will concentrate mainly on the ecological predicament.

Ecological constraints

The issue of ecological unsustainability is obviously of critical importance, because if a society is not sustainable ecologically, it cannot in the long term be sustainable in any other way. And human activities on Earth are at present of a kind, and on a scale, that are not ecologically sustainable, and they are continuing to increase in intensity.

The ecological unsustainability of present society is largely due to the recent massive growth of the human population as well as the explosive increase in intensity of industrial activities. As an indication of the magnitude of the pressure that our species is putting on the biosphere, humankind is today using about 12 000 times as much energy, and giving off about 12 000 times as much carbon dioxide, as was the case when people first started farming about 450 generations ago. By far the greater part of this increase has occurred in the past three or four generations.

While there are uncertainties about specific details, ecologists agree that if the present trends in resource use and waste production by humankind continue, the biosphere's capacity to support civilisation will be seriously eroded.

Especially important among the manifestations of this ecological unsustainability are global warming due to the greenhouse effect, the thinning of the ozone layer due to CFCs and other substances, worldwide pollution of ecosystems with persistent organic pollutants, land degradation due to various causes and dramatic loss of biodiversity.[6]

The cultural maladaptations behind these changes are the outcome of the worldview, assumptions, priorities and values of our society's dominant culture, which are simply not compatible with the attainment of ecological sustainability. I am thinking especially of the ideology of 'ever-moreism', which is the cultural delusion that social well-being necessarily requires an ever-increasing acquisition of material goods, and consequently an ever-increasing use of resources and energy and outpouring of waste products.

This cultural assumption is reflected in current societal arrangements—including in particular the economic system, which demands perpetual growth in resource and energy use and waste production.

In turn, these cultural assumptions and societal arrangements find expression in human industrial and technological activities, and in the fact that increases in car sales, retail

expenditure and the construction of buildings are hailed as causes for celebration, despite the fact that they all contribute to ecological unsustainability.

Ever-moreism is manifestly absurd. It can only lead to ecological collapse in the long term. But it is mutely accepted by our most powerful political parties and by the mass of the population. Cultural gullibility is indeed a fundamental characteristic of our species.

However, commonsense tells us that there must indeed be a limit to the capacity of the living systems on which we depend to withstand this onslaught. In the long term, culture and society must be in tune with the processes of life that underpin our existence. The crucial question, of course, is: How far are we from reaching this limit?

Opinions on this question differ. A middle view is that of the Union of Concerned Scientists who assert that we have only a few decades.[7]

Personal conclusions — hope in a biorenaissance

I am among those who appreciate that the survival of civilisation and well-being of humankind will require radical changes in patterns of human activity. We must create a new kind of society that is sensitive to, and that satisfies, the health needs of the processes of life, within us and around us, and on which we are totally dependent. That is, it must be a *biosensitive society.*[8]

So, what are the chances of the processes of cultural reform overcoming the current cultural maladaptations before it is too late?

On the positive side, the reform process is already underway. An increasing proportion of the population are coming to appreciate the insanity and unsustainability of present economic policies and patterns of activity.

On the negative side, the remedial changes so far are only peripheral—nibbling at the edges. The juggernaut rolls on. And, as in all cultural reform movements, there are the anti-reformers, employing every device known to them to maintain the status quo.

And yet I am a moderate optimist. I see a glimmer of hope. The fact is that humans really do have amazing ingenuity when motivated. I emphasize 'when motivated'. The manufacture of nuclear weapons, the development of computer technology, putting men on the moon and the elimination of smallpox are among countless recent manifestations of this fact.

I believe it is well within the capacity of humankind to bring the current ecologically destructive processes under control. But right now the motivation to make the revolutionary changes in societal arrangements and human activities that will be necessary to achieve this end is lacking, and without it there will be no significant change.

In my view the motivation will not come about unless and until there comes about a dramatic shift in the dominant culture. It will not come about unless and until this culture comes to embrace, at its core, a fundamental understanding of the processes of life and the human place in nature—and, as a consequence of this understanding, a profound respect for the living world. I use the term 'biounderstanding' for understanding of this kind. And I call this radical cultural change a 'biorenaissance'—'renaissance' because it would mean that once again, as in the days of our hunter-gatherer and early farming ancestors, interest in, and respect for, nature would be centre stage in the cultural system.

I am not talking just about an increase in environmental awareness, but rather of a radical transformation in the worldview, assumptions, values and priorities of our civilisation's dominant culture. Biounderstanding must become part of the shared knowledge of all peoples.

And with this new understanding and worldview, ever-moreism and other bio-insensitive assumptions will naturally disappear from the dominant culture.

Shared biounderstanding across the community would result in significant changes in what people see as being most important. The health of living systems would move to top place in the hierarchy of cultural priorities, and this crucial change would have significant impacts on the outcome of decision-making at all levels of society, from individuals and families through to governments and international organisations. This effect would have repercussions through the whole social system, with desirable consequences for our relationships not only with the rest of the biosphere but also with each other.

I am therefore personally convinced that:

1. A cultural renaissance of this kind is an essential precondition for the achievement of a truly biosensitive society and, accordingly, for the long-term survival of civilisation. I believe the benefits for humanity would be profound and far-reaching, extending well beyond the attainment of ecological sustainability.

2. By far the most urgent need at the present time is therefore in the realm of education. This must be our highest priority. We must aim for a society in which everyone, no matter what his or her area of specialisation, has a basic grasp of the story of life on Earth, the human place in nature, and of the important ecological and health issues that confront us today—reflecting the reality that we are living beings and that we are totally dependent on the rest of the living world for our very existence.

For these reasons, my own main interest these days is in the ways and means by which this new learning and understanding might be brought about.

Some readers may see this as pie-in-the-sky stuff; but I do not believe it is impossible. I certainly hope it is not, because I am quite sure that if it does not happen—if there is no biorenaissance—then civilisation will not survive far into the new millennium.

Notes

1. Most of the points made in this paper are developed and described in more detail in the following publications:

Boyden, S. 1987. *Western civilization in biological perspective: patterns in biohistory*. Oxford. Oxford University Press.

Boyden, S., Dovers, S., Shirlow, M. 1990. *Our biosphere under threat: ecological realities and Australia's opportunities*. Melbourne. Oxford University Press.

Boyden, S. 2004. *The biology of civilisation: understanding human culture as a force in nature*. Sydney. UNSW Press.

2. For summaries of the evolution of life in Earth see NSF publication *People and Nature: the big picture* and Pan Paper A1 on the Social Change section of the NSF website*.

3. The word culture is used in this paper to mean the abstract products of the capacity for culture, such as learned language and the accumulated knowledge, assumptions, beliefs, values and technological competence of a human population. This use of the term is consistent with the first definition of 'culture' given in Collins Dictionary: 'The total of the inherited ideas, beliefs, values and knowledge, which constitute the shared bases of social action' (*Collins Dictionary of the English Language*. 1979 Collins, Sydney, Auckland and Glasgow).

4. The evolutionary health principle: If an organism is exposed to conditions of life that differ significantly from those that prevail in its natural environment (i.e. the environment in which it evolved), it is likely to be less well adapted to the new and different environment, and is therefore likely to show signs of maladjustment. That is, it will be less healthy than in its natural environment. This basic principle applies to both plants and animals, including humans. For further discussion on this principle and its significance for humankind see Pan Paper A3 on the NSF website.*

5. The first analysis of the flows of energy, water and certain nutrients in an urban ecosystem is described in Boyden, S., S. Millar, K. Newcombe and B. O'Neill. 1981. *The ecology of a city and its people: the case of Hong Kong*. Canberra. Australian National University Press.

6. For a summary of these ecological causes for concern see Pan Paper A2 in the Social Change section of the NSF website.*

7. For more detail and references see Pan Paper A1 on the Social Change section on the NSF website*.

8. We have introduced this term 'biosensitive' because we feel the need for a single word to describe the kind of society that we must aim for. The expression 'ecologically sustainable', or simply 'sustainable' has come to be used widely in recent years. Of course, society must be ecologically sustainable—otherwise in the long term it cannot continue to exist. But ecological sustainability is surely the bottom line. We must aim for something better than mere sustainability. We must aim for a society that is not merely sustainable, but rather one that really promotes the health and wellbeing of all sections of the human population as well as the health and well-being of the ecosystem of the natural environment on which we depend. So, we are using this term biosensitive for this purpose. It is not ideal, but we will continue to use it until someone comes up with something better.

* www.natsoc.org.au

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