

Contents

<i>List of Figures</i>	ix
<i>Preface</i>	x

Part I Transformative Learning in Contemporary Global Culture

1 Introduction	3
2 Contradictions, Incoherence and Confusion	11
Contradictions, incoherence and confusion in the school classroom	11
An alternative approach to environmental education	14
Gaia theory and cultural transformation	20
Coming to grips with sustainability	25
3 Learning to Think Differently	27
An adequate terminology for learning to think differently	28
An overview of the process	31
Critical elements of the process	33
4 Atoms, People and Other Things	47
The enlightenment answers to the perennial questions	48
Critique	49
5 The Laws of Nature	62
The laws of nature – an overview	63
Understanding the concept of law as immanent through myth	72
6 A Flawed System of Ideas	80
Incoherence	81
Contradiction	82
The origin of the concept of the detached observer	83
7 Alternative Assumptions	87
The world as a process	87
Everything is radically interconnected with everything else	95
Detached participation	99

8	A Return to the Perennial Questions	102
	What is real?	103
	What is the world like?	106
	A little more about terminology	112
9	Towards a New Cultural Model	116
	Community	119
	Science	125
	An adequate theory of history	135
 Part II Transformative Learning in Post-colonial Societies		
10	Transform, Reform, Reaffirm	145
	The impact of colonialism	146
	Interpreting the past, visualising the future	149
	A fresh anchorage	161
 Part III Transformative Learning in Practice		
11	Secure Their Foundation	165
	The process of cultural transformation	165
	Priorities today	174
	A variety of possible transformative learning exercises	175
	The facilitator	177
	Some suggestions for planning and conducting transformative learning exercises	180
	Suggestions for each step in the transformative learning course	183
 <i>Appendix 1: Pesticide Use and Human Health</i>		
		189
 <i>Appendix 2: Pests</i>		
		192
 <i>Notes</i>		
		195
 <i>References</i>		
		200
 <i>Index</i>		
		206

1

Introduction

[M]odern scholarship and modern science reproduce the same limitations as dominated the bygone Hellenistic epoch, and the bygone Scholastic epoch. They canalize thought and observation within predetermined limits, based upon inadequate metaphysical assumptions dogmatically assumed.

(Whitehead, 1933, p. 122)

In the past half century there has been a tremendous increase in the production and consumption of goods and services worldwide. All along it has been assumed that this would improve the well-being of all people everywhere in the world. In the first decade of the 21st century, there are good reasons to question this assumption. There is now more food produced but no reduction in the extent of malnutrition from lack of food. Some old diseases have been controlled, but many have not, and some of those that were controlled are again on the increase. Yet other diseases are on the increase from excessive food consumption. Equally disconcerting are the host of new and mostly unexpected problems that increased production and consumption have created – environmental degradation, social disintegration, increasing economic disparities, loss of cultural diversity and escalating conflicts over access to dwindling natural resources. All the frantic efforts to ameliorate these problems – more education, scholarly studies, scientific research and aid – do not seem to be having very much effect.

At the same time, increasing numbers of people the world over, and in all social and economic strata of society, are protesting the injustice and exploitation which seem to be an inevitable feature of the Western (now increasingly global) cultural model. They also point out that this model is unsustainable as well. All these people are at least tacitly questioning

the assumptions upon which this model is built. Many radical changes in mainstream ways of thinking and doing are being proposed – changes that imply alternative assumptions. So far, however, these alternatives do not appear to have a coherent rationale, and so lack the power to bring about actual changes on the ground. Between those who question the existing cultural model and propose alternatives and those who maintain that there is nothing wrong, or who are busying themselves attempting to fine-tune the existing model, there is no real communication; they are on different wavelengths.

Meanwhile, virtually everyone is inwardly apprehensive about the future. It is understood that the model of contemporary global culture is unsustainable – the logic is undeniable and the evidence compelling – but there is a feeling of powerlessness to do anything about it. There is insufficient clarity about what must be done and how. And, of course, there is the all-too human unwillingness to jeopardise the security of the status quo, however unsatisfactory and precarious.

How is this vast and complex phenomenon to be understood? Is there any single viewpoint that can capture all its varied aspects and reveal their interconnections and significance? Only from such a viewpoint, it seems to me, is there any hope of coping with it. This is the most important question we can ask ourselves today.

The 20th-century philosopher A. N. Whitehead in his book *Adventures of Ideas* (1933) has pointed out that such crises have been a recurring feature of Western civilisation. A crisis situation builds up because the concepts of the worldview of a given cultural era become increasingly inadequate in helping people make sense of the new phenomena that changing circumstances bring before them. People are increasingly unable to solve, or, in many cases, even to recognise, the problems that emerge. Unsolved problems accumulate. The ‘changing circumstances’ are often brought about in the first place by the continued use of the concepts of the existing worldview after they have ceased to be relevant.

He further observes that these inherited assumptions – the ‘certainties’ of the age – are not matters of fact, but merely speculative assumptions. Therefore, to resolve the crisis, assumptions must first be changed. With a different set of assumptions – if we do a proper job of formulating and assembling them – existing problems may disappear altogether simply because they are no longer seen as problems, or because it becomes possible to define them in ways that make them solvable.

These two insights offer us the viewpoint needed to understand our present situation ‘in a single glance’, as it were, and indicate where a beginning needs to be made in coping with it. From this viewpoint,

what is happening can be seen as a definite (even if messy) process that we may be able to describe, and even to facilitate. The current tumult is the first, and essential, phase of a transformation of our worldview. It is the womb of a new cultural model.

In the broad sweep of European intellectual history, Whitehead discerned an alternation between periods of speculation and scholarship. At times, new directions of thought seem to arise spontaneously in response to a growing perception of the inadequacy and irrelevance of existing patterns of thought in dealing with contemporary experience. Radical new ideas appear that are unsettling to existing science and scholarship, giving rise to much controversy and confusion.

Scholarship, by its strict attention to accepted methodologies, is superficially conservative of belief. But its tone of mind leans towards a fundamental negation. For scholars the reasonable topics in the world are penned in isolated regions, *this* subject-matter or *that* subject matter. Your thorough-going scholar resents the airy speculation which connects his own patch of knowledge with that of his neighbour. He finds his fundamental concepts interpreted, twisted, modified. He has ceased to be king of his own castle, by reason of speculation of uncomfortable generality, violating the very grammar of his thoughts.

(Whitehead, 1933, p. 112)

However, the new speculative insights are eventually accepted, developed and consolidated. A new period of scholarship ensues. The new insights are '... furnished with methodologies and handed over to the university professors...' (Whitehead, 1933, pp. 108–9).

The first period of such speculation in recorded European history occurred in Greece in the 4th and 5th centuries BC. Ancient Greek culture is usually considered to have extended over a period of about a millennium from about 800 BC to AD 200. Bertrand Russell reckons the first notable products of Hellenic culture were the Homeric epic poems and that philosophy began with Thales around the beginning of the 6th century BC (Russell, 1946, Book I, Chapter 1). 'The beginning of philosophy' signals the beginning of a movement from a mythical mode of engagement with the world to a speculative, rational mode. This process intensified during the 5th century and culminated in the 4th century in the works of Plato and Aristotle. Then followed a period in which the speculative insights of the 4th century were explored and developed, giving rise to distinct philosophical schools and to systematic, rational

enquiry. This period roughly began with the conquest of Greece by the Macedonians and continued to the death of Cleopatra. In his analysis, Whitehead uses the terms Hellenic as a shorthand expression to refer to the speculative period of Greek culture of the 4th and 5th centuries BC, and term Hellenistic for the period of scholarship that followed.

Hellenistic culture was continued in mediaeval Europe as Scholasticism. The speculative insights of the Hellenic period, as fleshed out and systematised during the Hellenistic period, along with some Christian theological doctrines, formed the worldview of this age. It was an age of didactic scholarship, traditional in outlook, resisting change and intolerant of speculation.

A new age of speculation occurred, this time in Western Europe, in the 17th century, again leading to a profound change in the worldview of European civilisation. This new wave of speculation, termed the Enlightenment, questioned and discarded most of the doctrines of the Scholastic era, and the very assumptions underlying them, replacing them with assumptions that form the conceptual framework or worldview of contemporary global culture, or more briefly, 'modern' culture.

The details of what changes occurred during these two past episodes of speculation will be dealt with more appropriately in later chapters. The point to be made here is that there have been speculative intervals in the course of European history when radical changes in worldview occurred, and that another such interval is now underway.

In the quotation at the head of this chapter, Whitehead also implicitly frames an agenda for any serious enquiry into this phenomenon of transformation. He asks, in effect, the following questions.

1. What are the assumptions that are being dogmatically upheld?
2. Why are they being dogmatically upheld?
3. Why are they inadequate?
4. Why at certain times in history is a given set of assumptions, in fact, given up?
5. What is the process by which a given set of assumptions gives way to a new set?

An attempt will be made in the chapters that follow to answer these questions.

At this point, it might, however, be useful to make a preliminary comment on the first of these questions. Whitehead was one of the most penetrating thinkers of the 20th century. He was the first to understand the challenge of the new discoveries in sub-atomic physics of

the 1920s, and the only one to date, I think, to respond adequately to it. He realised that ‘... the notion of vacuous material existence with passive endurance, with primary individual attributes, and with accidental adventures had... vanished from the field of ultimate scientific conceptions.... Some features of the physical world can be expressed that way. But the concept is useless as an ultimate notion in science and cosmology’ (Whitehead, 1929, p. 309). Further,

Cartesian subjectivism in its application to physical science became Newton’s assumption of individually existent physical bodies, with merely external relationships. [I] diverge from Descartes by holding that what he has described as primary *attributes* of physical bodies are really the forms of internal relationships *between* actual occasions and *within* actual occasions. Such a change of thought is the shift from materialism to organism, as the basic idea of physical science.
(Whitehead, 1929, p. 309)

As a footnote to the above quote, it may be added that his term ‘actual occasions’ refers to his radically alternative assumption that the ultimate sole real entities of the world are not physical things at all, but units of process, or ‘drops of experience’ (Whitehead, 1929, p. 18).

This shift from materialism to organism of which Whitehead speaks indicates the nature of the fundamental assumptions that must be confronted today. Virtually, all present discussion, from this point of view, is superficial. We speak of transformation, but in fact leave the most fundamental of contemporary assumptions unexamined.

This shift to a concept of organism is, to my mind, indispensable to the effective transformation of the worldview of contemporary global culture. Indeed, it is the very direction in which new currents of thought are tending. At the same time, the materialist assumption of substantial, enduring material entities as the ultimate real things of the universe is, in my experience, the most stubbornly held of all contemporary assumptions. As Whitehead says, it boils down to whether we ‘see’ primary *attributes* of individual entities or relations *between* and *within* entities.

Another introductory comment on Whitehead’s agenda may also be helpful at the beginning of this essay. His insight of an alternation of periods of speculation and scholarship seems to me to imply a latent challenge to the prevailing progress theory of history.

In *Adventures of Ideas* he writes, ‘One aspect of the adventure of ideas is this story of the interplay of speculation and scholarship, a strife sustained through the ages of progress’ (Whitehead, 1933, p. 113). Again:

‘The difference between the two, namely the Hellenic and the Hellenistic types of mentality, may be roughly described as that between speculation and scholarship. For progress both are necessary’ (Whitehead, 1933, p. 112). He thus makes it clear that he interprets the overall course of Western history as progressive, even if punctuated by repeated episodes of speculation. In this, he conforms to the modern notion of progress. This is one instance in his writings where he does not think a fundamental assumption of contemporary global culture needs questioning.¹ In this essay, I will argue that this assumption most certainly does need to be questioned.

The concept of progress which dominates our cultural era first appeared at the time of the European Enlightenment. It derived from the conviction that the workings of the universe could be completely and finally known through the systematic exercise of human reason. The success of the scientific enterprise launched at that time seemed to justify this assumption. Nature could be understood and made to serve human needs, leading to ever-greater levels of human material welfare. This assumption was then extended to the social domain; it would now be possible to perfect human nature and society by means of rational thought based upon contemporary observation. From this point of view, medieval European culture was seen as a dark age of human ignorance and superstition to be wiped out by the ‘light of reason’. In the future, European civilisation would continuously and inevitably move in the direction of the universal goal of securing true and final human happiness.

This concept provided a new organising conceptual framework for interpreting history. In terms of this framework, Europeans saw themselves and their new-found cultural model as the culmination of a long, slow movement of human civilisation towards the discovery of the sure means of perfectibility. All previous European cultures are seen as stages in this progression from primitive beginnings to their own enlightened state. Non-European cultures are then accommodated in this same time sequence; they become what Shiv Viswanathan terms ‘contemporary ancestors’ (Viswanathan, 1988). Since progress is seen as a universal phenomenon, all contemporary ancestors will inevitably become enlightened, and so pass into the cultural stage of contemporary European (now Western) culture.

From this theory of history, the further notion arose that it is the moral duty of the West to assist non-Western cultures to become ‘modern’ as rapidly as possible. In practice, of course, this notion of helping people ‘for their own good’ was profoundly self-serving since it was

used to justify Western economic exploitation that was the objective of colonialism in the past and development and globalisation today.

The progress theory of history is now being questioned (e.g. by Goldsmith, 2003; Jackson, 2005; Sachs, 1999; and Viswanathan, 1988). There are two main lines of this questioning. One is to ask, what does the term progress really mean? It implies linear change. The question is, change in what, and in what direction? There is steadily increasing disillusionment about the answers given to these questions by the Enlightenment thinkers; our collective experience of the 20th century helps us to see their naivety and fuzzy mindedness. A second line of questioning is to ask why, if modern global civilisation represents progress, we are in such a mess. Contemplating the present state of the world, Zac Goldsmith concludes that progress, as epitomised by the contemporary global economic system, '... is unrealistic, undesirable, unnecessary and impossible' (Goldsmith, 2003).

Even when attention is confined to European culture, it is difficult to sustain the argument that the enlightenment worldview and the culture it has given rise to is an unqualified improvement over what went before. True, many of the problems of mediaeval European culture have been solved, but many new ones, no less serious, are appearing in contemporary global culture. Perhaps the notion of progress is misplaced; perhaps there is only change from one Scholastic age to the next, with the differences being of emphasis – exaggerations and neglects in different directions (refer again to note 1).

Looking to the stage of world history, it is obvious that the European cultural model has been imposed on the rest of the world by force and has not been adopted voluntarily because of its intrinsic superiority. Force, military and/or economic, is an essential feature of all empires, including the present-day empires of global capital and media (Goldsmith, 2001).

Another arresting piece of evidence against the progress theory of history, which will figure in Chapter 5, is that a key concept, that of 'radical interconnectedness', now appearing in the dialogue on cultural transformation was a central feature of ancient Greek culture but was discarded subsequently. If that was 'progress', what is it we are now seeing?

Thus, while progress in the sense of the elaboration and refinement of concepts and practices within a cultural era is a fact, to apply the concept across cultural eras is questionable.² If the progress theory of history is doubted, another way must be found to explain the periodic irruption of speculation. The way suggested in this essay is to see such

episodes of speculation as the means whereby a human community periodically adjusts its outlook, redefines itself, in response to changing circumstances. A specific cultural configuration is born, it grows, matures, ages and passes away. A new configuration arises in its place. Every cultural configuration is appropriate, and hence successful, at its florescence; in its decay a burden and obstruction (O'Sullivan, 2002).

This alternative theory of history could give us a much-needed new perspective on our own situation at the beginning of the 21st century, a breath of fresh air that can help clear away the fog of confusion, denial and fear that has settled upon us.

Further, setting aside the progress theory of history would free us from the sense of the inevitability of the contemporary global cultural model, giving us space to contemplate the possibility of an alternative and perhaps more flexible model for the future, and to experiment.

Index

- actual entities
 definition of, 51, 88
 as ultimate real things, 95
actual occasions, *see* actual entities
adequacy (of worldview), definition of, 29–30
adequate, definition of, 30
Agenda, 21, 146
Agri-History Foundation, 151
Agri-History Journal, 151
agriculture, 117, 122–3, 128, 133–4, 152, 192–4, 196
Ahuja, U., 153, 198
Almora, x
 see also Uttarakhand Environmental Education Centre
Alvares, C., 99, 133
Anaximander, 104
anchorage, 161–2
answers (to questions in alternative science paradigm), 132–3
apeiron, 104
archetypes, 109
arete, 65, 68
Aristotle, 43, 104, 169, 173
associations, 89
assumptions
 alternative, xi–xii, 87, 168
 of alternative science, 128
 current, xi
 de novo, 166
 inherited, 4, 145, 152, 155, 156, 179
 of mechanistic science, 127–8
 metaphysical, 3
 primary, 80, 87, 116–18;
 definition, 29
 secondary, 112, 116–18, 173–4;
 definition, 29; validating, 171, 173–4
 speculative, xi, 4
Atman, 105
atom, 48, 49, 51, 87, 88
 atomised society, 120–1
 Greek atomists, 49, 81
 subatomic particles, 48, 51–2, 77, 93
 subatomic physics, 6–7, 96, 97
autopoeisis, definition of, 22
autopoeitic systems, 22, 59, 93, 119–20, 137, 138, 165–6
awareness, 104, 113–14

Babikwa, D. J., 36–7, 39
Bacon, F., 71, 167, 169, 184
Bajaj, J. K., 71
Bakshi, R., 184
Basham, A. L., 73, 158
beauty, 68
Being, 103, 154, 156
Berkeley, G., 43, 167, 169
billiard ball metaphor, *see* laws of nature, law as imposed
biodiversity, 153
birds, the two, 157
Bohm, D., 97
Box, D., 125
Brahman, 105, 115
Brihaspati, 77
bringing forth a world, 88–9, 108, 114–15, 118
British empiricists, 169
brute facts, 24–5
business, *see* localisation; systems
business leaders, 25–6

Cajete, G. A., 139, 150, 196
Campbell, J., 74, 109, 141
cancer, 132–3
capitalism, 77
Capra, F.
 alternative science, 125
 autopoeitic systems (definition), 22
 bringing forth a world, 114–15
 definition of matter, 43, 49, 59
 scientists' reaction to Gaia, 20

- causes, efficient and final, 92–3
see also laws of nature
- Chaitanya, K., 77, 150, 158
- chance, 77, 93
- child-centred learning, 31–2
- classification of episodes of
 experiencing, 109
- cognition, definition of, 29, 113
- cognitive dissonance
 crossing the threshold of, 35–42
 definition of, 34–5
 disempowerment, 37–9, 196
 emotional turmoil, 35–6
 intellectual discomfort, 35
 resistance to, 41–2
- coherence, definition, 29, 50–1, 112,
compare incoherence
- collaborative learning, *see* learning,
 collaborative
- collective unconscious, 109
- colonialism
 Earth Charter and, 146, 198
 economic, 146–7
 impact of, 146–9
 settlement, 147–8
- communism, 77
- community
 as an autopoietic system, 119–20
 definition of, 119–20
 disappearance in global society,
 120–1
 distortions of village community,
 123
 traditional, 122–4
- competition, 32
- complexity theory, 20
- confusion, x–xi, 14, 28, 31
- consciousness, 29, 113–14
- contemporary ancestors, 8
- contemporary global culture, x, 30,
 62, 72, 82
- continuity
 discontinuity, 139–40
 logical continuity, 70
- contradictions, 12–14, 82–3
- Copernicus, N., 30, 167, 168
- corporate social responsibility, *see*
 oxymorons, examples of
- cosmology, 28
- creation, 107, 155
- critique of mechanistic materialism,
 49–61
- cultural model
 construction of, 116–18
 definition, 30
 discontinuity in, 139–40
 Enlightenment, 76–7
 global, 3–4
 new, 116–18
 traditional, 145, 149–50
- cultural myth, 154–6
- cultural reform, 32–3, 161–2
- cultural transformation, 20, 32–3,
 161–2, 165–74
- culture
 definition, 119
 mainstream, *see* contemporary
 global culture
 non-Western, 139
 Vedic, 139
see also indigenous knowledge
- dance metaphor, *see* laws of nature,
 law as immanent
- darkness, 154, 156
- Darwin (neo-Darwinian theory of
 evolution), 127
- debates (organised by *The Ecologist*
 magazine), 195–6
- deception, 71
 self-deception, 33
- deduction, 66
- deductive thinking (Aristotelian mode
 of), 138
- Democritus, 43
- Descartes, Rene, 43, 67, 82, 85–6,
 168, 169
- detached observer, 83–6, 100
- detached participant, 100,
 111, 114
- detached participation, 100
- determinism, 110–11
- development, x, 12, 25, 119–20
- Dharma, 64–5, 115, 121, 138
- discontinuity, qualitative, 95
- DNA molecule (and
 micro-explanations), 70–1
- dogmatism, 3, 112

- dreams, 74
 dreaming, 113–14
 dropouts, 25–6, 167
 Du Toit, D., 38–9
 dualism
 in Platonic and Western thought, 67–8
 subject-object, 106
 see also duality
 duality (of subject and object), 103
 Dunne, C., 196–7
 Dweller at the Source, 106–7, 113

 Earth Charter, 146, 198
 Earth Goddess, *see* Gaia
 East India Company, 146–7
 ecological ego, 100
 ecological individual, 100
 ecological self, 100
 ecosystem, 15, 16, 22
 village, 124
 ecosystem health, 15, 16, 124
 education for sustainable development, 173
 Einstein, A., 35, 56
 emergent property, 23, 32, 58–9, 107
 criticism of, 58–9
 empire
 British, 146–7
 of global capital and media, 9
 Roman, 146–7
 Enlightenment, 6, 48, 81–2, 138
 environmental education
 contradictions in, x, 12–14, 189–91
 Our Land, Our Life, 14–20
 role of NCERT in, 12
 episodes of experiencing, 87–9
 ethics, 121–2
 experience, definition of, 29
 experimentation
 in alternative science paradigm, 128–32
 in mechanistic science paradigm, 127–8

 factories of understanding, 78
 fallout, 127
 see also global, cultural model,
 negative fallout from;
 unexpected outcomes
 Father Sun, 196–7
 feedback, *see* information feedback
 Fien, J., 181
 force, 70
 formal institutions and transformative learning, 171–4
 see also universities
 formative elements of thought, *see* universal formative elements of thought
 Forms, 66
 see also Ideas (Plato); Pythagorean orientation
 fractals, 71
 free will, 110–11
 Freud, S., 41
 Fukuoka, M., xiii, 35, 53, 98
 fundamentalism, 79

 Gaia
 her children, 77–8
 a Pandora's box, 25
 reaction of scientists, 20–1, 74–6
 reactions of students, 21–2
 theory, x, 20–1, 176
 see also myth
 Gaian process, 98
 Galileo, 169
 Gandhi, M. K., 148–9, 198–9
 generalised definition (of the seven formative elements of thought), 51, 54, 59
 global
 cultural model, negative fallout from, 3–4, 34, 149, *see also* Western cultural model
 village, 120–1
 globalisation, 26, 172
 Goerner, S. J., 125, 127, 131, 138–9
 Goldsmith, E.
 community, 121
 empire of global capital and media, 9
 Gaian process, 98

- non-Western cultures, 139
- the Way, 136, 140, 196
- Goldsmith, Z., 9
- Goodwin, B., 23, 71
- Gordon, K., 184
- Gough, N., 42
- grassroots, 138
 - projects, 170–1
- Graves, R., 74, 197
- Greek mythology, *see* myth
- green revolution, 151
- greenwashing, 25
- Griffith, R. T. H., 106, 197
- ground of experiencing, 104
- Gunaratna, 100

- Haight, M. J.
 - Gaia theory, 20–5
 - neutered theories, 21, 76, 173
 - student journals, 21–2, 182
 - transformative learning, 173
 - university and globalisation agenda, 172–3
 - university degree
 - courses/programmes, 173
- happiness, 120, 141
- Harman, W., 28–9
- Harre, R., 70
- Hashimoto, Y., xiv
 - see also* Takahashi, Y.
- Hattingh, K., 121
- Heisenberg, W., 35
- Hellenic age, 6, 66, 169–70, *compare*
 - Hellenistic age
- Hellenistic, 6, 78
- Hellenistic age, 3, 7–8
 - see also* scholastic age
- Heraclitus, 67
- Hibbard, W., 41
- hierarchy, 89, 197
- history
 - alternative theory of, 135–41
 - cyclical theory of, 136
 - Indian agricultural, 151–4
 - progress theory of, 7–10, 150–4, 195
 - theory of departure from the Way, 136–9
- Hobbes, T., 167
- holistic, 63–4

- Howard, A., xiii, 35, 98
- hubris, 77
- Hughes, T., 78
- Hume, D., 70, 167, 169

- 'I', 48, 103–4, 107, 111
- Icarus, *see* myth
- Ideas (Plato), 67–8, 88
- incoherence, x, 81–2
- inconsistency, *see* contradictions
- India, 11, 14–15, 120, 147, 198–9
- Indian Education Act, 147
- indigenous knowledge, 151–4
- indigenous peoples, 148
 - cultural change, 149
 - effect of colonisation on, 147, 148
- induction, 71
- industrialisation, 11
- Infinite, the, 104–5, 197
- information feedback, 132, 138, 188
- infusion, of environmental concerns
 - in to school textbooks, 12
- insoluble problems, 185–6
- interconnectedness, radical, 95–9
- intuition, 29, 60–1, 88
- intuitions, 153; *see also* universal
 - intuitions, theory of

- Jackson, M. G.
 - agriculture, 152, 196
 - community, 122, 123
 - education, 25–6, 172
 - environmental problems, 26, 99
 - interpreting history, 151–2, 153, 198
 - progress theory of history, 9
 - science, 128, 130
 - transformative learning, 172
 - Vedic culture, 138, 150, 152, 153
 - worldview, definition of, 28
- Janse van Rensburg, E., 38–9
- Jantsch, E., 197
- Jickling, B., 121–2, 134–5
- Jones, A., 119
- Jordens, J. T. F., 139
- journals
 - students', 21–2
 - use in transformative learning
 - exercises, 182

- Jung, C. G., 74, 109, 196–7
 just society, 124
- Kanani, P. R., 129
 Kant, I., 23–4, 57–8
 Kepler, J., 167, 168
 knowing
 according to Whitehead, 93–4
 criticism of current notion of, 59–61
 definition of in contemporary
 global culture, 60
 knowledge, definition of, 29
 knowledge, traditional, *see* indigenous
 knowledge
 Kothari, R., 161
 Kumar, S., 147
- Laing, R. D., 41
 law of gravitation, 30, 66, 195
 laws of nature, 63
 law as immanent, 63–5, 92, *see also*
 Rta
 law as imposed, 65–9, 95–6
 law as mere description, 69–72;
 criticism of, 70–2, *see also*
 positivist doctrine, definition
 learners (in transformative learning
 exercises), 199
 learning, collaborative, 17
 learning to think differently
 definition of, x, xi, xii, 27–8
 overview of the process, 31–3
 see also cognitive dissonance;
 standing outside oneself, the
 process; transformative learning
- life
 according to Whitehead, 93
 as an emergent property of matter,
 58–9, 72, 94
 is real, 22–5
 ‘light of reason’, 8
 living in harmony with nature, 25
 localisation, 31–2, 125
 Locke, John, 24, 167, 169
 logical consistency, 29–30, 51
 logical, definition of, 29–30
 logical mentation/thought, 67, 72–3
 limitations of, 68, 72
 Lotz-Sisitka, H., xiv, 37–9, 45
- love, 157–8
 Lovelock, J., 20, 74–5
 Luddite argument, 99
- macro-explanation, 128, 129
 macrocosmic, 107, 113, 198
 Many, the, 106, 107–11
 markers (in alternative and Vedic
 science paradigms), 128–9
 market, 149
 farmers’, 134
 mass psychosis, 78
 materialist worldview, 48–9, 105, 114,
 168–9
 Gaia theory as a threat to, 22–3
 mathematics, 195
 matter
 definition of in contemporary
 global culture, 51–2
 difficulties in defining, 23–4, 53–4
 general definition of, 51
 see also substance, difficulty in
 defining
 mavericks, 25–6
 meaning, 29, 35, 53, 60, 72–3, 74, 78,
 102, 105, 156
 meaningful, 88, 122
 meaningless, 77, 105, 137
 mechanistic worldview, 48–9, 105
 Medawar, P., 71
 mediaeval period (European), 138
 Mehra, K. L., 153
 memories, 29, 61
 merely given, 24
 metaphor, 73, 75
 metaphysical foundations, 40,
 Chapter 11
 metaphysical task, 50
 metaphysics, *see* speculative
 philosophy
 micro-explanation, 70, 96,
 128, 129
 problem with, 70–1
 microcosmic, 110, 160, 198
 Miller, J., 64–5
 Miller, J. P., 100
 mind, definition of, 113
 modernisation, x, 26
 Mokuku, C., 150, 196

- Mokuku, T., 150, 196
 Mortari, L., xiii, 67–8, 82
 Mother Earth, *see* Gaia
 myth
 dangers of, 78–9
 definition of, 73–4, 75
 Gaia, 74–6, 78–9
 Greek, 197
 Icarus, 77
 interpreting traditional myth,
 154–61
 pernicious racial/ethnic myths, 78
 and purpose, 141
 Titanic, 76–8
 true, 78
- Nasadiya hymn, 154–5
 National Council of Educational
 Research and Training, 12, 189–91
 natural farmers, 133
 natural farming, *see* Nature's farming
 (or natural farming)
 Nature, 98
 Nature's farming (or natural farming),
 98
 necessity, 24, 111
 Nene, Y. L., 151–2
 neutering (of systems theory), 21, 76
 Newton, I.
 absolute objective time and space,
 55–6
 and cultural transformation, 167
 law as imposed, 48, 68
 law of gravitation, 168–9, 195
 receptacle theory of space and time,
 56
 Sholium, 55–6, 81
 transformation of Western
 worldview, 30
 No Number, the, 105
 Nonbeing, 103, 154–5, 156
 nonsense, 76
 novelty, 110–11
- object, 103, 158, *compare* subject (or
 subjectivity)
 objectivity, 103
 One, the, 103, 105, 111, 156
 Oppermann, S., 98, 100
- order, 71–2
 organism, 7, 26
 see also philosophy of organism
 Orr, D., 27
 Osborne, A., 65
 O'Sullivan, E., 10, 19, 29, 32, 34–5
 Our Land, Our Life (school
 environmental education course),
 14–20
 Owen, L., 139
 Oxford meeting, 74–5
 oxymorons, examples of, xi, 25
- Pande, A., 15
 Pande, G. C., 64
 Pande, L., 15
 Pande, S., 123
 Pandora's box, 25
 Panikkar, R., 64, 65, 156, 158, 159, 198
 Parmenides, 67–8
 participatory observation, 100
 particles, 22, 58–9
 see also subatomic particles
 particularisation, 66–7
 particularised definitions, 51, 59–60
 perception, 29
 see also sensory data, cognition
 perennial questions, 29
 alternative answers now suggested,
 103–12
 answers given by the
 Enlightenment, 48–9
 in Vedic myth, 160–1
 person, 29, 54, 82–3, 114
 Whitehead's definition of,
 94–5
 pesticide use, 11–14, 189–91
 pests, a story, 185, 192–4
 philosophy of organism, 88–95
 physicists, 52
 Pirsig, R., 65, 67–8
 Plato, 24–5, 67–8, 84
 Plotinus, 197
 positivist doctrine, definition, 69
 see also laws of nature, law as mere
 description
 post-colonial societies
 interpreting traditional myth,
 154–61

- post-colonial societies – *continued*
 loss of anchorage and vision in, 161–2
 progress theory, an obstacle, 150–4
 transformative learning exercises, 175–88
- Potential, the, 106–7
- practice, the test of practice in
 transformative learning, 45–6, 187–8
- Price, L., 135, 153
- primary assumptions, *see*
 assumptions, primary
- primary attributes (of physical bodies), 7, 52–3
- Principia (Newton), 55–6
- Prithvi*, *see* Gaia
- process, the world as, 87–95
- professors, 5, 25–6, 51, 167, 171–3
- progress theory of history, *see* history
- propositions advanced in the book, xi–xii
- Ptolemy, 30
- purpose, 140–1
- pursuit of happiness, 65, 120, 141
- puzzle, nine point, 185–6
- Pythagoras, 71, 169
- Pythagorean orientation, 66
- quality, 68
- quantum science, 96
- Radhakrishnan, S., 158, 160–1
- radical inter-connectedness, 9, 95–9
- rainfall prediction, 128–9
- real
 criteria of, 103
 What is real, 48–9, 103–6, 111–12
- realms
 emotional, 109
 intellectual, 109
 physical, 109
see also classification of episodes of experiencing
- reason, limits to, 68, 72–3
- reasoning, inductive, 71
- reform, 32–3, 162
- Renaissance, 138
- research methodology
 in the alternative science paradigm, 128–32
 as conversation with nature, 132–5
 in the mechanistic science paradigm, 127–8
- Rigveda, 64, 77–8, 106, 139, 154–5, 158–9
- Robbins, N., 146–7
- Rose, heroine in the film *Titanic*, 78
- Roszack, T., 41, 100
- Rowe, S., 100, 140
- Rta*
 as an autopoietic structure, 137
 definition of, 64
 and free will, 110
 as homeostasis in an organism, 64
 as an imperative for ethical behaviour, 77
 inexorable logic of, 92–3
 memory banks of, 109
 myth as a representation of the working of, 73
 pronunciation, 196
 putting one's trust in, 65
 return to Western culture, 98
 a *Sanskrit* word, 115
 from three points of view, 64–5
 and the Way, 136–7, 140
see also laws of nature, law as immanent
- Russell, B.
 definition of matter, 49–50
 definition of soul, 84
 earliest scientific propositions, 169–70
 mental outlook of medieval and modern men, 169
 relative objective time and space, 56
 substance, 53–4
 unity is rubbish, 71
- Sachs, W., 9, 74
- sacrifice, 65
- Sadhale, N., 134, 198
- Sanskrit (use of Sanskrit terms), 115
- satisfaction, *see* bringing forth a world
- scholars, 5
see also professors

- scholarship, 6 *compare* speculation
- scholastic age, 3, 19–20, 167–8, 173
see also Hellenistic age; speculative age
- Scholasticism, 6
- school curriculum, 11–14, 17–18
see also environmental education
- school education, 19–20
- school, Silindile, 37–8
- Schumacher, E. F., 132
- science
 alternative, 128–32
 definition of, 126–7
 mechanistic (research methodology in), 127–8
 new or web science inadequate, 125–6
 the positivist doctrine the dogma of contemporary science, 69
 research guidelines in alternative science paradigm, 129–32
 systems (neutered), 21
 Vedic, 128–9
 and violence, 98–9
- science as conversation, 132–5
- scientific management of resources, 25
- scientists
 and the Baconian doctrine, 71
 and cognitive dissonance, 35
 do not initiate a Hellenic age, 25–6
 of the Enlightenment, 168–9
 everyone a scientist, 130
 have failed to define matter, 49–50
 and micro-explanations, 70–1
 Newton and incoherence, 81–2
 opposition to Gaia theory, 20–1
 and questionable explanations, 70–1
- Selby, D., 95–9
- Sen, G., 196
- sensory data, 60
- Sherburne, D. W., 89–90, 91–2
- Shilling, R., 139, 148, 196
- Shiva, V., 197
- sick
 ecosystems, 124
 societies, 41
- side effects, 27, 151
- see also* fallout; unexpected outcomes
- Silindile Junior School, 37–8
- Sisters Seven, 106
see also universal formative elements of thought
- sleep, 103–4
- Smith, H., 104–5, 197
- Smith, Mr., 54
- society
 definition, 119–20
 post-colonial, 145–6, *see also* transformative learning exercises, in post-colonial societies
 traditional, effects of colonialism on, 146–9; transformative learning in, 145–6, 149–50, *see also* community, traditional
- Socrates, 83–4
- solar system, 30, 53, 168–9
- soul, 83–5
- Source, the, 106
- space
 absolute, 55–6
 objective, 54–5, 61
 problems with objective time and space, 57
 problems with subjective time and space, 58, 109–10
 receptacle theory of, 56
 relative, 56–7
 subjective, 57–8, 90–2
- space-time, 56
- speculation, 4–6
- speculative age, 167, 169–70, *compare* scholastic age
- speculative ideas, definition, 28–9
see also assumptions
- speculative philosophers, 168–70
- speculative philosophy, 50–1
- Spinoza, B., 167
- Sri Krishna Prem, 197
- Sri Madhava Ashish, 113–14, 197
- standing outside oneself, the process, 42–5
- Sterling, S., 19–20
- strange attractors, 71
- student journals, 21

- subatomic particles, 48, 89
- subject (or subjectivity), 103, 158
see also object
- substance, difficulty in defining, 53–4
- sustainability
 contradictions in the concept, 117
 definition of, 25–6
 and ecosystem health, 124
 incoherence in the concept, 117
 and university courses, 173
 unsustainability of modern
 scientific agriculture, 152
 varying interpretations of, 26
- sustainable development
see oxymorons, examples of
- sustainable livelihoods, 125
- sustainable society, 124
- symbols
 abstract word, 73, 155, 159
 of myth, 73, 155, 159
- systems
 autopoietic, *see* autopoietic systems
 gentle interventions in, 130, 134,
 196
 human-created, 125, 131–2
 mechanistic, 96
 neutered, *see* neutering (of systems
 theory)
 organismic, 96–7
 philosophical, 80, *see also*
 cosmology; worldview
 problems of predicting behaviour,
 23
 science, 21
 self-healing ability of, 133
 sick, 130
 the study of, 129
 theory, 20
 an understanding of, 128–9
see also science as conversation
- Takahashi, Y., 35, 36
see also Hashimoto, Y.
- talking at cross purposes, 32, 195–6
- tapas, 158
- Taylor, A. E., 24
- Taylor, M. A., 19, 29
- teacher orientation workshops, 18–19
- teachers, 17–19, 37–40, 196
- terminology, 28–31, 112–15
- Thales, 156
- That which is, 105, 106
- theory
 definition, 30
 Gaia, 20–1
 rediscovery, 153
 systems, 20
 universal gravitation, 30, 66
 universal intuitions, 153
- things
 as actual entities, *see* actual entities
 assumed definition in materialist
 worldview, 51–2
 generalised definitions, 51
 as material entities, 48, 51–2
see also matter, substance
- thinking differently, xi–xii, 113, 137–8
 definition, x
- thinking substance, 83, 85–6
- thinking, definition, 29
- thought
 discursive, 155, 159–60, 198
 normal, 72–3
 verbal, 72–3
- thread, imaginary, 114
- ‘throwing in’ suggestions, 36–7, 196
- time
 absolute, 55–6
 atemporal, 109–10
 objective, 55–8
 problems with subjective time, 58,
 91–2
 receptacle theory of, 56
 relative, 56–7
 subjective, 57–8, 90–2, 109–10
 sui generis, 91
- Titanic, as a myth, 76–8
- togetherness (of all actual occasions),
 90
- traditional culture, *see* culture
- transformation
 cultural, 165–6
 personal, 33–4
 social, 32–3, 162
- transformative learning
 definition of, x–xii
 process, xi, 27–8, 34
 theoretical framework for, 177

- transformative learning exercises
 course outline for, 180–1
 definition of, 174–7
 facilitator, 177–80
 format for, 180
 in post-colonial societies, 145–6
 priority areas for, 174–5
 suggestions for planning and
 conducting (in general), 180–3
 suggestions for planning and
 conducting (specific), creating
 cognitive dissonance, 183–5;
 handling feedback, 188;
 identifying and describing
 primary assumptions, 187;
 identifying and describing
 secondary assumptions, 186–7;
 insoluble problems, 185–6;
 testing, 187–8
 translation (of myth), 154–60
 true, 57
- Unbounded, *see apeiron*
 unconscious, the, 76
 understanding, definition of, 29, 76
 unexpected outcomes, 31
 universal formative elements of
 thought, 47–8, 51, 106–7
 definition of, 29
 universal intuitions, theory of, 153
 universities, 167, 171–4
 and transformative learning
 exercises, 175–6
 Upanishad, Mundaka, 157
 urbanisation, 133
 Uttarakhand Environmental
 Education Centre
 location, x
 school environmental education
 courses, 14–20, 41, 192–4
 teacher orientation workshops,
 18–19
 transformative learning exercises,
 174–5, 176–7, 179, 183–5
 Uttarakhand, location, x, 120
- values, 121–2
see also Dharma
 van Harmelen, U., 198
- Vedic agricultural science,
 151–2, 153
 Vedic culture, 128–9, 155
 Vedic worldview, 139–40, 155–61
 verbal thought, 72–3
 village ecosystem, 122–4
 village, 122–4
see also community
 Virmani, S. M., 153
 Viswanathan, S., 9
 vulgar, the, 55–6, 57
- waffle, 13
 Wane, N. N., 139, 196
 web metaphor, *see* law as imposed
 Western cultural model, 26, 119
see also global, cultural model,
 negative fallout from
 Whitehead, A. N.
 actual occasions, 7, 88–9, 108–9, *see*
also actual entities
 adequate (worldview), 29–30, 50–1
 associations, 89
 causation, 92–3, *see also* laws of
 nature
 coherence (in a worldview), 29–30,
 50–1, 81
 dogmatism, 3, 112
 enhancement (or perceptions),
 60–1
 final real things, 95
 god, 90
 knowing the world, 93–4
 laws of nature, 63, 65–6, 69
 life, 93
 logical (worldview), 29–30, 50–1
 materialism, 6–7
 mind, 113
 on Newton's contribution to world
 thought, 81
 objective time and space, 57
 person, the, 94–5
 philosophy of organism, 7–8, 87–95
 primary attributes of physical
 bodies, 6–7, 52–3
Process and Reality, 87
 progress theory of history, 7–8, 195
 scholarship, 5
 Scholastic and Hellenistic ages, 3

Whitehead, A. N. – *continued*

- speculative assumptions, 4
- speculative philosophy, 50–1, 170
- subjective time and space, 90–2, 112
- togetherness of all actual entities, 90
- vacuous material existence, 6–7, 49

world, 88–9, 118

- mechanistic conception of, 26
- organismic conception of, 26
- Potential, a, 106–7
- what is the world like, 48
- see also* bringing forth a world

worldview

- alternative, 111–12
- of contemporary global culture, 26, 48–9
- definition of, 28, 31
- inherited, 40, 145–6
- materialist, 48–9
- mechanistic, 26, 48–9
- transformation of, 32–3, 34
- Vedic, 160–1

Zimmer, H., 72–3, 105