

CHAPTER 3

Paradigms in Collision

The Far-Reaching Controversy Over the Samoan Researches of Margaret Mead and its Significance for the Human Sciences

In September of 1983, Victor Turner, a gifted British social anthropologist who had become Professor of Anthropology in the University of Virginia, published an historic essay entitled 'Body, Brain and Culture'. I say 'historic' because it was Victor Turner's last essay, and because in it, drawing on the researches of the evolutionary neuroscientist Paul MacLean, Turner radically questioned the principal assumption that he and other anthropologists of the 20th century had been 'taught to hallow' the assumption that 'all human behavior is the result of social conditioning'.

Earlier that year, Harvard University Press had published a book of mine in which I presented a refutation of Margaret Mead's long-accepted apparent proof of this same assumption in her book of 1928, *Coming of Age in Samoa*. In it, citing the researches of MacLean and others, I argued for the adoption by anthropology and of all the human sciences of an interactionist paradigm in which both biology and culture are taken into account. Since then there has been a steadily increasing recognition of the virtues of this new paradigm, and, there are clear signs that the human sciences are undergoing a paradigm shift.

According to Marxist doctrine it is 'social existence' that determines 'human consciousness', and by the Bolsheviks of Soviet Russia it was fervently believed that under communism, human nature would radically

and permanently change. By the early 1930s American observers who had visited Russia were claiming that this had already begun to happen: 'mental hygiene', it was said, was 'inherent in the social organization'.

We have now witnessed the collapse of communism, and have heard Gorbachev admit to the world at large that the experience of history has allowed the Russian people to say 'in a decisive fashion' that the Communist 'model' has 'failed'. As it had to fail, I would suppose, because of, among other things, the false assumption about human nature on which it was based.

We live in revolutionary times, and especially for those with an interest in the scientific understanding of human nature.

The assumption that 'all human behavior is the result of social conditioning' may be traced back to the eminent British philosopher John Locke. It was in an essay written in about 1660, long before there was any understanding of evolution and the brain, that John Locke, then in his late twenties, first promulgated the wholly unevolutionary doctrine that humans are born *tabula rasa*, 'empty tablets capable of receiving all sorts of imprints but have none stamped on them by nature'.

It was this doctrine, as Marvin Harris acknowledges, that at the beginning of this century became the principal assumption of the founders of cultural and social anthropology, and to be very widely accepted by the pundits of the day.

In 1915, Franz Boas's foremost student, Alfred Kroeber, had declared in the *American Anthropologist*, in attempting to establish that culture is *sui generis*, that 'heredity cannot be allowed to have acted any part in history'.

It was to make an empirical testing of this assumption that in mid-1925 Professor Franz Boas of Columbia University sent his 23-year-old student Margaret Mead to the Samoan Islands to undertake 'a study in heredity and environment based on an investigation of the phenomenon of adolescence among primitive and civilized peoples'.

The idea was that if an instance could be found that was an exception to a supposed universal phenomenon, that is the turbulence of adolescence, then this would prove that the phenomenon in question was entirely due to cultural forces.

Margaret Mead arrived on the island of Ta'ū, where her researches were to be carried out, on 9 November 1925 and left in mid-April 1926 with not more than a total of some 12 weeks having been devoted to the actual investigation of Boas's problem.

In 1928 in her *Coming of Age in Samoa*, which became the anthropological bestseller of all time, Mead concluded, in complete accord with Lockean doctrine, that 'we cannot make any explanations' of the 'disturbances' of adolescence other than in terms of the 'social environment', which, she claimed, shaped 'the individual within its bounds' in an 'absolute' way. 'Human nature' was, she declared, 'the rawest, most undifferentiated of raw material.'

These Lockean pronouncements were very much in accord with the spirit of the age. In 1930, Mead's extreme environmentalist conclusion, which had been accepted without question by Franz Boas, the venerated leader of American anthropology, was incorporated in the *Encyclopedia of the Social Sciences*, and Boas himself, in this same *Encyclopedia*, in discussing human personality, declared 'genetic element' to be 'altogether irrelevant as compared with the powerful influence of the environment'.

By the mid-1930s then, with virtually universal credence being given to Mead's Samoan researches, the notion, derived ultimately from Locke, that 'all human behavior is the result of social conditioning' had become markedly dominant in anthropology as well as in other of the social sciences.

If Mead's conclusion of 1928 had been correct it would have been the most important conclusion of 20th-century anthropology. It is now known that Mead's long-influential conclusion is wholly false. In 1983 I was able to demonstrate in detail that Mead's extreme conclusion is very definitely not supported by the relevant ethnographic evidence. And, since then, there have been even more significant developments.

It had long been a major mystery that Mead's account of Samoan sexual behaviour, on which her conclusion of 1928 rests, is radically at odds with the reports of all other ethnographers.

This mystery was solved in 1987 when Fa'apua'a Fa'amua, who is listed in *Coming of Age in Samoa* as one of her principal informants, came forward to confess that in March of 1926, as a prank, she and her friend Fofoa had

completely hoaxed Margaret Mead by telling her, when she questioned them, the antithesis of the truth about Samoan sexual behaviour and values.

In Samoa the playing of such pranks, which they call *taufā'ase'e*, is commonplace. Margaret Mead had arrived in Samoa with the preconception, which she had acquired from a fellow anthropologist in Hawaii, that the Samoans, being Polynesians, were sexually promiscuous. In fact, in Samoa at that time, female virginity was very highly valued, as in their *taupou* system, and they had an exceedingly strict sexual morality. And so when Mead put to Fa'apua'a, who was herself a *taupou* or ceremonial virgin, the supposition that she was promiscuous, she and Fafao, with sidelong glances and pinching one another, set about hoaxing her. They had no idea, says Fa'apua'a, that Margaret Mead was an author and that their wild untruths would be published as facts in an immensely influential book.

After Fa'apua'a's testimony had been carefully checked by Leulu Felisi Va'a of the National University of Samoa, detailed accounts of what transpired between Mead and her Samoan informants have been published in the *American Anthropologist* and in *Visual Anthropology Review*, both of these being publications of the American Anthropological Association, and a sworn deposition by Fa'apua'a Fa'amu has been lodged with the American Anthropological Association in Washington DC.

We are here dealing with one of the most spectacular events of the intellectual history of the 20th century. Margaret Mead, we now know, was grossly hoaxed by her Samoan informants, and Mead, in her turn, by convincing others of the 'genuineness' of her account of Samoa, completely misinformed and misled virtually the entire anthropological establishment, as well as the intelligentsia at large, including such sharp-minded sceptics as Bertrand Russell and H.L. Mencken.

That a Polynesian prank should have produced such a result in centres of higher learning throughout the Western world is deeply comic. But, behind the comedy there is a chastening reality. It is now apparent that for decade after decade in countless textbooks, and in university and college lecture rooms throughout the Western world, students were misinformed, about an issue of fundamental human importance, by professors who by placing credence in Mead's conclusion of 1928 had themselves become cognitively deluded.

Never can giggly fibs have had such far-reaching consequences in the groves of Academe.

Yet, the playing of pranks on inquisitive Europeans has long been an endearing characteristic of Polynesians. In the late 18th century, for example, when in Western Polynesia, Labillardière, a 'natural philosopher' of the French Enlightenment, set about the recording of Tongan terms for numerals. This he single-mindedly continued until he reached the improbable total of one thousand, million, million. He then communicated his findings to the Academy of Sciences in Paris, not realising that the Tongan phrases he had assiduously recorded, were, for the most part, a string of ribald obscenities.

The concept of the paradigm, as used by Thomas Kuhn in his classic essay of 1962, *The Structure of Scientific Revolutions*, refers to a ruling idea which gives rise to a coherent tradition of research. This clearly applies to the idea that 'all human behavior is the result of social conditioning' which, as Victor Turner noted in 1983, he and other anthropologists of the 20th century had been 'taught to hallow'.

It is this Lockean paradigm that, from about 1983 onwards, has been in collision with a quite different interactionist paradigm in which recognition is given to biological as well as to cultural variables.

I say 'in collision' advisedly, for the protracted controversy over my now fully vindicated refutation has revealed striking evidence of the extraordinary hold that a paradigm can have over its devotees, and of the highly emotional way in which a new paradigm, which is at odds with one of their most hallowed assumptions, is actively opposed and resisted by these devotees.

In his book of 1976 *The Selfish Gene*, Richard Dawkins coined the word *meme* to refer to any element of human cultural transmission, including ideas and beliefs. And in 1985 in *The Fabric of Mind*, Richard Bergland introduced the term *mismeme* to refer to any persistent error in the history of human thought, as, for example, Plato's mistaken notion that semen is generated in the brain, a mismeme that is illustrated in an anatomical drawing by Leonardo da Vinci, now in the Royal Library at Windsor, that dates from 1493, some 1,840 years after Plato's death in 347 BC. Some mismemes, it is evident, have a long shelf life.

In the light of our present knowledge, it is now evident that Dr Mead's ostensibly scientific conclusion in *Coming of Age in Samoa* is, in fact, a miasm that persisted at the centre of the belief system of cultural anthropology for some 55 years.

And this means that we are afforded a rare and valuable opportunity for studying what happens when a miasm that has become the hallowed dogma of an academic discipline is decisively disproved.

I was, of course, in writing my refutation well aware of how difficult it is to alter deeply entrenched beliefs, but I supposed, quite naively as it turned out, that if I presented sufficiently cogent evidence, it would be critically examined and, if free from error, rationally accepted.

I therefore subjected my facts to the most rigorous scrutiny and then made a special trip to Samoa to have them checked by Samoan scholars.

In 1983, soon after its publication, a Professor of Anthropology in the University of California wrote to me saying: 'the case you make "suffers" from being lucid as well as extremely powerful, so that the only responses possible are to accept it, or to confuse the issues one way or another'.

And, this poignant dilemma was greatly exacerbated by the circumstance that quite without warning my case was made known, on 31 January 1983, not only to anthropologists but to the world at large in an article on the front page of the *New York Times*, by an astute journalist, who had secured an advance copy of my book from Harvard University Press. And soon, it was on the front pages of newspapers throughout the world and on the covers of magazines like *Time*, *Discover* and *Life*.

In one of his essays Francis Bacon describes how, after he had slain the Sphinx, Oedipus placed its dead body on a donkey and carried it, in triumph, into Thebes. This, Bacon comments, was a 'pretty' conclusion, for 'there is nothing so subtle and abstruse, but that when it is once thoroughly understood and published to the world, even a dull wit can carry it'.

What happened in 1983 was that the body of yet another Sphinx was brought within the city walls, and a genteel silence about an intrinsically dubious anthropological supposition was broken once and for all.

Ian Jarvie, a leading philosopher of the social sciences, has argued that cultural anthropologists make up a tribe 'held together by a cult'. This cult is the cult of culture. Thus, Alfred Kroeber, in an article in *The American Mercury* in 1928, declared that 'the important thing about anthropology is not the science but an attitude of mind'.

And, this attitude of mind principally involved acceptance of the assumption that 'all human behavior is the result of social conditioning', the assumption that Mead was believed to have triumphantly validated in *Coming of Age in Samoa*.

And so, when Margaret Mead returned to New York from New Guinea in 1929, she found herself being feted as she participated in symposia with celebrities such as Havelock Ellis, Bertrand Russell and J.B. Watson, most of whom were older than her own father.

From this dreamlike beginning in the late 1920s, Margaret Mead, who was certainly a most remarkable human being, went on to become, in the words of her biographer Jane Howard, 'indisputably the most publically celebrated scientist in America'.

Fame, in Rilke's words, is 'but the sum of the misunderstandings' that cluster about a name. There is, however, as T.H. Huxley once noted, 'a tendency to idolatry in the human mind', and so Margaret Mead became, as Howard has described, 'an American ikon'.

In a leaflet of the American Museum of Natural History, she is said to have been 'the mother of *all* humanity'. And when I was in America in 1987 I came across a reference to her in *The Chicago Tribune* as having been 'earth-mother to the cosmos'.

She thus came to be viewed, during the last decades of her life, as an omniscient, wonder-working matriarch.

In the 1960s, one of the jokes then circulating in America was that when Dr Mead called on the oracle at Delphi, she addressed the age-old sibyl saying: 'Hullo there, is there anything you'd like to know?'

And, by the 1970s, she had become, in the words of a Professor of Anthropology of the University of California, 'the Mother-Goddess of American Anthropology'.

Then, in 1983, without warning and for all to witness, the Meadian reverie about Samoa was shattered. For American anthropologists, this was, as Theodore Schwartz has termed it, 'a seismic event', and, as they surveyed the fallen masonry, the embarrassment of those whose beliefs had been so rudely shaken quickly turned to fury against the antipodean antichrist who had so desecrated their *sanctum sanctorum*. And, in no time at all, as Harriot Jardine of the Denver Museum of Natural History has recorded, there were many who 'seemed willing to tear Freeman limb from limb'.

At the time, my dismemberment must have seemed a most laudable tribal project, but, as those involved should have realised, anger is a wind that blows out the lamp of the mind, and the events that followed, seen in the light of what we now know about Mead's Samoan researches, have become uproariously comic, and sadly, a demonstration that cultural anthropology as practised by some professional anthropologists is a pre-scientific ideology in which hallowed doctrine lords it over empirical realities.

Jane Howard, Mead's biographer, reports her as having told a conference of anthropologists: 'We are a family and will not have differences of opinion before strangers.'

What then was to be done about a refutation that had emanated from within the anthropological family?

It could not — as the values of science require — be accepted, or even taken seriously, for this would have been to acknowledge that the tribe had, for more than 50 years, been venerating a mismeme.

And so, infuriated by what had happened, some American anthropologists turned to rhetorically restoring the mystical aura of their totemic mother and the popular repute of her long-acclaimed *magnum opus* while, at the same time, doing everything imaginable to discredit me.

This onslaught, which began in February 1983, and was sustained over many months, was flagrantly *ad hominem*. As Lord Devlin, a British Lord Justice of Appeal, has observed: 'To discredit without proof is to smear', and the obvious object of this *ad hominem* onslaught was so to smear me with repugnant untruths as to destroy the credibility of my distressing refutation.

Anyone who seriously questions the pronouncements of a mother-goddess is obviously of unsound mind. Thus I was said to be ‘crazy’, to be ‘fueled by accumulated venom’; to ‘throw nothing but spit balls’; to have sought to bribe Samoan academics, and — most imaginatively of all — to have ‘attacked a missionary with an axe’!

At first, this outpouring of spleen was a bit difficult to take. I fully realised, however, that while it was intended to intimidate and unnerve me, those who were resorting to these excesses had no arguments of any substance with which to rebut my refutation. I soon, therefore, came to regard it as both puerile and comic that such grossly *ad hominem* tactics were being resorted to by PhDs, no less, in what was already being called the greatest controversy in the history of anthropology.

1983, you will remember, was the year in which Australia won the America’s Cup. Not long after this euphoric victory I received a note from a distinguished Harvard professor that read: ‘The word around here is that with Freeman and the loss of the Americas Cup happening in less than a year it may be necessary to start screening visitors from Australia more carefully.’

This, at the height of the onslaught I have just been describing, amused me greatly, and in October 1983, I ended a letter to an irate female member of the American Anthropological Association, who in a massive manuscript had abused me up hill and down dale, in these words:

Incidentally, I have been told that the American yacht ‘Liberty’ that was so convincingly outsailed by ‘Australia II’ was designed by a cultural determinist. I don’t think this can be true, however, for although ‘Liberty’ was hulk-like at times, she was not really as bad as all that. With every good wish — to employ a selection of the epithets in your manuscript — from your simplistic, facile, odd, foolish, weak, slippery, deceptive, specious, flawed, superficial, devious, sloppy, unprofessional, naive, absurd, blatant, evasive and ridiculous colleague.

Derek Freeman

It was a letter to which she never replied, though thereafter she did moderate her participation in the frightfulness of the tribal reaction to my refutation.

This frightfulness reached its apogee in Chicago in November of 1983 when, during the 82nd annual meeting of the American Anthropological Association, a special session devoted to the evaluation of my refutation, and attended by a thousand or more, was held.

The session began conventionally enough, but when the general discussion began, it degenerated into a delirium of vilification. One eye-witness has described it as 'a sort of grotesque feeding frenzy'; another wrote to me saying 'I felt I was in a room with ... people ready to lynch you'.

And, at the annual business meeting of the American Anthropological Association later that day a motion denouncing my refutation as 'unscientific' was moved, put to the vote and passed.

It is to this happening that I particularly want to direct attention, because of the understanding it provides about what, following Kroeber, I shall call 'the anthropological attitude of mind'.

As well as being cultural determinists most cultural anthropologists also adhere to a related doctrine known as cultural relativism. According to this doctrine all knowledge is relative to the culture in which it is generated, and this applies even to the truth. I shall call this the tribal theory of truth.

It is this relativist anthropological attitude that gives rise to the highly unscientific notion that the scientific status of propositions can be settled by a show of hands at a tribal get-together.

In logic this is known as the *consensus gentium* fallacy. It is a fallacy that lies at the heart of the reaction to my refutation by the American Anthropological Association, a reaction, I would note, that is also a striking instance of what Irving Janis has called 'group think'. Commenting on this reaction Sir Karl Popper wrote to me as follows:

Many sociologists, and almost all sociologists of science, believe in a relativist theory of truth. That is, truth is what the experts believe, or what the majority of the participants in a culture believe. Holding a view like this your opponents could not admit that you were right. How could you be, when all their colleagues thought like they did? In fact, they could *prove* that you were wrong simply by taking a vote at a meeting of experts. That clearly settled it. And your facts? They meant nothing if sufficiently many experts ignored them, or distorted them, or misinterpreted them.

This is a succinct account of what indeed happened, and it is now evident that the phrenetic reactions of November 1983 were desperate gestures of denial in a futile attempt to conjure me and my perturbing refutation right out of tribal consciousness.

In this the zealots in question have signally failed, for with the publication in the *American Anthropologist* and elsewhere of an authenticated account of how Margaret Mead was hoaxed by her Samoan informants, the controversy over my refutation is, in effect, over, and there are now moves afoot to rescind the motion of 1983 that so compromised the scholarly reputation of the American Anthropological Association.

As Darwin once remarked: 'It's dogged as does it', and it is indeed true that, with perseverance, the truth *will* out.

There remains, however, the perturbing phenomenon of paradigm hold: that is the way in which belief impels many individuals to cling adamantly to a paradigm which has been shown to be completely inadequate, and to attempt, as in the case of one of Mead's supporters, to defend hallowed doctrine by the outright fabrication of 'evidence'.

Garret Hardin has described beliefs as being 'silently built into the psyche so firmly that questioning them becomes quite literally unthinkable'.

And Paul MacLean, whose *magnum opus*, *The Triune Brain in Evolution*, was published in 1990, is of the view that it is our primitive limbic brain that 'provides the feeling of conviction and belief that we attach to our ideas whether they be true or false'.

This phylogenetically given propensity to believe, which is so evident in religion and politics, is something, it is important to realise, to which scientists and scholars are also prone, and which is ever liable to lead them into misconception and error.

For, while the truth is independent of belief, in that anything that is believed can be false, belief is not independent of the truth, for what is believed may be either true or false, and when it is false, it is nonetheless firmly believed to be true.

We humans then, given our evolutionary history, are fallible, language-dependent animals, peculiarly prone to the forming of misconceptions. Or, as Alexander Pope put it in his Essay of 1734: 'Sole judge of truth, in endless error hurled.'

We now know that Mead's conclusion of 1928 was in error.

Is there then, in 1991, any scientific justification for clinging, as many still do, to the Lockean doctrine that 'all human behavior is the result of social conditioning'?

The years since Boas, Mead and others proclaimed this doctrine in the late 1920s have witnessed the blossoming of evolutionary disciplines such as ethology, primatology and molecular biology, with 'the fact of evolution' during this same period having become, in the words of Stephen Jay Gould, 'as sturdy as any claim in science'.

'Light will he throw,' Darwin wrote at the end of *The Origin of Species*, 'on the origin of man and his history,' and in 1863, in his book *Man's Place in Nature*, T.H. Huxley showed 'that no absolute structural line of demarcation ... can be drawn between the animal world and ourselves'.

Scientific research during the years since the publication of Huxley's *Man's Place in Nature* has conclusively established the fact of evolution, and the fact that we humans are indeed part of the natural order.

And this being so, it is from this crucial realisation that *all* our thinking about human problems must begin. And we must, in attempting to solve them, be evolution-minded.

This realisation has been immensely strengthened by the rise of molecular biology following the discovery in 1953 by Crick and Watson of the structure of DNA.

A decade or so after this discovery, molecular geneticists began to realise that the chemicals of which plants and animals are composed might provide 'clocks' by which to measure genetic distances and to date times of evolutionary divergence. The now-flourishing *Journal of Molecular Evolution* began publication in 1971.

The principal method of measuring changes in DNA structure consists in mixing the DNA from two species and then measuring by how many degrees of temperature the melting point of the hybrid DNA is reduced below the melting point of pure DNA from a single species.

Sibley and Ahlquist of Yale University first applied this method to the taxonomy of birds, examining no fewer than 1,700 species. Then, in the 1980s, they applied this by then fully tested method to the order of primates to which we humans belong.

Their results show that humans differ from chimpanzees in only 1.6 per cent of their DNA. The remaining 98.4 per cent of our genes we share with chimpanzees. For example, our haemoglobin, the oxygen-carrying protein that gives blood its red colour, is identical in all 287 units.

This means that we are more closely related genetically to chimpanzees than are chiff-chaffs to willow warblers that differ by 2.6 per cent, yet are placed in the same genus.

There are thus, if we follow the principles of cladistics and basic taxonomy on genetic distance or time of divergence, sound grounds for including humans in the same genus with the two existing species of chimpanzee — the common chimpanzee of Tanzania and the so-called pigmy chimpanzee of Zaire — as does Jared Diamond, a Professor of Physiology in the University of California, in his book published earlier this year *The Rise and Fall of the Third Chimpanzee*, by which he means us.

Molecular biology and evolutionary genetics thus indicate that the human and chimpanzee evolutionary lines diverged as recently as six to eight million years ago, and the fact that we share 98.4 per cent of our genes with these evolutionary cousins of ours establishes that while the differences between humans and chimpanzees are conspicuous and substantial, they are not as profound as was once thought, and that as Jane Goodall concludes in her recently published account of her 30 years of research among the chimpanzees of Gombe, ‘similarities in the brain and central nervous system have led to the emergence of similar intellectual abilities, sensibilities and emotions’.

What can also be said is that we humans, like our chimpanzee cousins, far from being empty tablets at birth, are born with a phylogenetically given primate nature, components of which remain with us throughout our lives beneath all of the conventional behaviours that we acquire by learning from other members of the society to which we belong.

This realisation is already having a profound effect in the behavioural sciences, as in the researches of John Bowlby and others on attachment behaviour and the primary bond. As Bowlby himself has put it: ‘once we postulate the presence within the organism of an attachment behavioral system regarded as the product of evolution and having protection as its biological function, many of the puzzles that have perplexed students of human relationships are found to be solvable’.

The human genome project, which involves the efforts of hundreds of scientists around the world to 'read' the entire library of genetic information stored in the 23 pairs of human chromosomes, has been accompanied by an acceleration of research on a wide range of human conditions, such as Huntington's chorea, motor neurone disease and William's syndrome, all of which are gene-linked, and which, in varying degrees, have behavioural components. Indeed, scarcely a month passes without some new linkage being announced.

Again, since it was set up at the University of Minnesota in 1979, the Minnesota Study of Twins Reared Apart (which means that the interaction of heredity and environment can be studied in fine detail) has done research on over 100 sets of such monozygotic twins.

In a report on this research, published in *Science* in October 1990, Thomas Bouchard and his colleagues conclude that 'for almost every behavioral trait so far studied ... an important fraction of the variation among people turns out to be associated with genetic variation'.

In another report published in 1990 in the *Journal of Personality*, Bouchard and McGue conclude that 'most behavioral genetic studies of personality suggest that genetic factors account for about 50% of the variance,' and that from recent research, mainly published during the 1980s and early 1990s, 'there is now a large and consistent body of evidence that supports the influence of genetic factors upon personality'.

The evidence, taken as a whole, is, they state, 'overwhelming', and so much so that 'the interesting scientific question is no longer whether or not genetic factors influence behavioral traits like personality, but rather how environmental factors combine and interact to influence behavioral differences among individuals'.

Of the fact that environmental variables are crucially important there can be no doubt. Professor Marian Diamond in her recent book *Enriching Heredity* has shown that providing an enriched environment by 'allowing rats to interact with toys in their cages produced anatomical changes in the cerebral cortex'.

While Judy Dunn and Robert Plomin, both of whom are Professors of Human Development at Pennsylvania State University, have shown in a book published in 1990 that it is differences in experiences, or in non-shared environment, that significantly account for the differences between siblings reared in the same family.

Modern research has then decisively established that heredity and environment interact to modify behaviour at every stage of development, and in the words of Robert Plomin, ‘in the quantitative genetics sense that genetic effects depend upon the environment, and *vice versa*’.

This means, of course, that Mead’s extreme environmentalist conclusion of 1928 cannot conceivably have been correct. And it also means that all of the human sciences, if they are to remain in touch with scientific understanding, must consign the ‘empty tablets’ of John Locke and Margaret Mead to the trash cans of human error, and adopt instead a fully interactionist paradigm.

On 17 July 1990 the President of the USA proclaimed the 1990s to be ‘The Decade of the Brain’. This decade was, fittingly, ushered in by the publication in 1990 of Paul MacLean’s epoch-making book *The Triune Brain in Evolution*. Paul MacLean has shown that the primate brain contains three basic phylogenetically given formations: the reptilian, the palaeomammalian and the neomammalian, which, both anatomically and biochemically, reflect an ancestral relationship to reptiles, early mammals and late mammals.

Our highly complex brain, in other words, is a living palimpsest of our evolutionary history. The principal feature of the palaeomammalian brain is the limbic system which is primarily concerned with visceral processes and the emotions. It is in this phylogenetically ancient part of our brains, which is virtually identical to the limbic system of our primate cousins, the chimpanzees, and which evolved long before the emergence of cultural adaptations, that our basic human nature is physiologically programmed.

Yet, even more important are the frontal lobes of our brains which have been described as ‘the neocortex of the limbic system’ and which as Paul MacLean and others have shown, are the seat of consciousness and of the highest human faculties, such as foresight and concern for the consequences and meaning of events, and, most importantly, of the human capacity for making choices.

As long ago as 1933, H.S. Jennings, the American microbiologist, observed that ‘life is a continuous process of selecting one line of action and rejecting another’, and that this applies to all animals, including one-celled organisms. And, J.Z. Young in his article on biological choice in *The Oxford Companion to the Mind* has noted that ‘the continuity of life

is ensured by a continuous series of selections among sets of possible alternatives', and that it is 'an essential of any living thing that it must make such repeated decisions'.

The making of choices is thus one of the crucially significant biologically given capacities of members of the human species, and so becomes a quite fundamental element in any interactionist paradigm. And, this is a conclusion, as I know from my correspondence with them, with which eminent evolutionary biologists like E.O. Wilson and Richard Dawkins are very much in agreement.

Cultural anthropologists have long claimed that it is the differences between cultures — which are often of a striking kind — that necessitate explanation in purely cultural terms. Accordingly, as by Kroeber, culture is said to be *sui generis* and uniquely human.

The researches of recent years have clearly demonstrated the inadequacy of these cultural determinist assumptions. John Tyler Bonner, of Princeton University, in his book *The Evolution of Culture in Animals*, has demonstrated the existence, in animal species other than *Homo sapiens*, of rudimentary cultural adaptations based on choice behaviour.

This particularly applies to the chimpanzee, and we are obviously dealing with an evolutionary continuity.

Noam Chomsky, as did Kroeber, has long argued that language in general and grammar in particular were the result of a sudden mutation in the human species. In a landmark study published in 1990 Drs Greenfield and Savage-Rumbaugh have demonstrated in their researches on the pigmy chimpanzee, Kanzi, that his 'capacity for grammatical rules (including arbitrary ones) ... shows grammar as an area of evolutionary continuity'.

Cultural adaptations, it is now evident, are made possible by the evolutionary emergence of what Ernst Mayr has termed open programs of behaviour resulting from the gradual opening up of a genetic program to permit 'the incorporation of personally acquired information to an ever greater extent'.

And, within an open program of behaviour, a choice is made between two or more responses to produce what Bonner calls 'multiple choice behavior'.

The emergence of culture in the course of evolution is now viewed, therefore, as 'a new niche that arose from the experimentation of animals with multiple choice behavior', and it is to this evolutionary innovation that the rise of cultural adaptations in the human species is to be traced.

Furthermore, in the light of the researches of the last half-century or so, there is now no mystery regarding the primordial origin of human culture. From prehistoric archaeology and paleoanthropology we know that cultural achievements are the products of human imagination and choice, and we can trace the course of their development beyond the horizon of recorded history to a time when our ancestors had a culture little more elaborate than that of existing chimpanzee groups.

Yet, we can also be sure, in evolutionary terms, that these hominids, from whom we are descended, possessed a phylogenetically given nature, just as do chimpanzees.

From this it follows that all human cultures, past and present, are the historical creations of human populations, all of whose members possessed, as they still possess, a phylogenetically given primate nature; and further, that this primate nature, which is principally programmed in the limbic systems of their palaeomammalian brains, is ever present, in all human groups, co-existing with their cultural institutions.

It is this peculiarly human situation which accounts for the rush and turmoil of human history.

And, once this is understood, it becomes apparent that cultural adaptations can only be adequately understood with reference to the phylogenetically given human nature, from which, by the exercise of human choice, they have sprung.

Again, it is only in this context that human universals can be accounted for. As long ago as 1945, C.P. Murdock listed and discussed the 'numerous and diverse elements' that are common to all known cultures. And, in an important book published in 1991, entitled *Human Universals*, Donald Brown has demonstrated that human universals indeed exist, and that 'human biology and evolutionary psychology are the key to the understanding of these universals'.

The first international conference on human ethology was held just 14 years ago. Since then this new discipline has forged ahead and Professor Eibl-Eibesfeldt has published his monumental *Human Ethology*, which Robert Provine has described as 'a handbook of human nature'.

This it indeed is, for it demonstrates in meticulous detail an encyclopedic range of behaviours that are to be found in very many different human populations, and which, there is every reason to suppose, are species-specific.

These are empirical data that social and cultural anthropologists can no longer readily ignore.

It is also evident, from the ethological evidence, that there are not a few species-specific forms of human behaviour that ante-date the conventions of culture. And so, as John Tooby and Leda Cosmides have remarked: 'the assertion that culture explains the whole of human variation may be taken seriously when there are reports of war parties of women raiding surrounding settlements to capture men as husbands'.

In an influential paper entitled 'The impact of the concept of culture on the concept of man', first published in 1965, Clifford Geertz declared: 'there is no such thing as human nature independent of culture'. This is most certainly the case.

What can now be said in 1991 is that equally 'there is no such thing as culture independent of human nature'.

The time is thus conspicuously at hand, in all the human sciences, for a paradigm giving recognition of the radical importance of both the cultural and the biological (including choice) and of their interaction.

Instructive examples of studies conducted within such an interactionist paradigm have already begun to appear. Thus Michael Stoddart, the Professor of Zoology in the University of Tasmania, in his book *The Scented Ape*, published in 1990 by Cambridge University Press, presents an illuminating analysis of 'the biology and culture of human odour'. Professor Stoddart shows that the odours of incense that are pervasively used in cultural contexts, stimulate the human mind by unconsciously mimicking steroidal sex pheromones, just as the most preferred perfumes contain within them tiny traces of mammalian sex attractants. And so, as Professor Stoddart documents, human religious rites, in which the use

of incense is so common, are accompanied by 'a basic and thoroughly animal responsiveness in their adherents, even if that responsiveness is rooted in the unconscious'.

With the realisation that all human cultures have resulted from the exercise of human imagination and choice, our biologically given capacity for making choices becomes of enormous human significance. Indeed, there are grounds for renaming our species *Homo elegans*, the choosing primate.

As the researches of Benjamin Libet have shown, conscious choice is able either to enact or to inhibit intentions that arise unconsciously, and this means that by our very nature we are, inescapably, ethical animals, for we have in the frontal lobes of our brains a mechanism for either good or evil. Further, it is our phylogenetically given capacity to make choices that makes human history, even though choice is highly determinative, largely unpredictable.

The capacity to make choices is then, as Kierkegaard once remarked, 'the most tremendous thing' that has been granted to we humans. It is tremendous in Kierkegaardian terms, in that it gives us the power to imitate either god or devil, and even to outdo either. While the chimpanzee, in Jane Goodall's words, 'is neither capable of soaring to the same heights nor sinking to the same depths'.

It is in terms then both of our primate nature and of our phylogenetically given capacity to make choices that human history must be seen, and, once it is realised that all cultures have resulted from the exercise of human choice, they are obviously open to critical evaluation, which means an end to cultural relativism. It was this that Lionel Trilling had in mind when he wrote of 'a residue of human quality beyond the reach of cultural control' that 'serves to bring culture itself under criticism and keeps it from becoming absolute'.

In a credo published when he was 80, Franz Boas gave as the principal aim of anthropology, the recognising and breaking of the shackles that tradition has laid upon us. With this I am in whole-hearted agreement. What can now be said is that this is something which any well-informed individual can achieve for herself or himself.

And it is also apparent, as J.Z. Young has noted, that democratic social systems that allow freedom of choice 'may well prove to be at an advantage over those where choice is limited by convention or compulsion'.

Within the lifetimes of most of the members of this audience there has been an historic paradigm shift in the earth sciences. It occurred in the mid-1960s with a shift from 'fixism' to 'plate tectonics'. Niles Eldredge has recorded how in undergraduate courses at Columbia University in the early 1960s, plate tectonics was said to be nonsense, while by the time he had entered graduate school, it had become the 'new truth'.

The complaint of those who so adamantly opposed plate tectonics was that they would have to forget everything they had learnt, and start all over again.

This is indeed the case when a paradigm shift occurs in human understanding, and it will also have to happen when the human sciences abandon the Lockean assumption that all human behaviour is the result of social conditioning in favour of an evolutionarily based interactionist paradigm. There will be much to learn.

As I have already noted, and as is apparent in a list of key references, which I have prepared for those who may be interested, there are clear signs that a paradigm shift is currently in progress in the behavioural and human sciences. Just when it will be complete only time will tell.

As Max Planck once remarked, new scientific realisations do not triumph by convincing their opponents, but because those opponents eventually pass away, and a new generation takes their place.

From the letters I get from young anthropologists I have every confidence in the future, and I only hope I shall live long enough to witness a revolution in anthropology as radical as that which recently occurred in the earth sciences.

For this one may indeed rationally hope, for, in the words of Bertolt Brecht, 'truth is not the child of authority but the child of time', which, like Shiva, is both a destroyer and a creator.

Let me end, then, with words based on the final sentence in Stephen Jay Gould's recent book *Wonderful Life*. We humans are, it is evident, the offspring of evolution and must establish our own paths in this most

diverse and interesting of conceivable universes, which, although it is indifferent to our suffering, does offer us the boon, given to no other species, to thrive or to fail in our own chosen way.

It is then, up to us all, if we so choose, to make it a sapient way.

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