

Hiram Caton

The Biology Battlefield

A reply to A. G. Wheeler

DR WHEELER's phillipic in the January-February 1987 issue of *Quadrant* is an impassioned plea to the reasonable folk down south to assist the northerly comrades embattled by religious obscurantism and political repression. He conjures an image of this two-headed menace foisting specious biology on Queensland secondary students, to the detriment of higher learning. Such is the crux of his case for the importance of the evolution controversy in Queensland.

This view of the matter is a little narrow. The Queensland donnybrook is interesting because it exemplifies the combination of conservative politics and evangelical revival that has made so great an impression in North America. There evangelicals, joined on some issues by Catholics, have thrown down the gauntlet to what they call "secular humanism," challenging it in courts, schools, and elections. They have suffered defeats, notably on abortion and in their efforts to install the creation idea in science classrooms.

Australian evangelicals are beginning to respond to these rhythms. There is a substantial exchange of ideas and preaching between Australian and American churches. It is increasingly accepted that Christians must become political if they are successfully to combat well entrenched humanism. Another idea gaining ground is that the cardinal doctrine of the humanist church, the evolution of man from animal origins, is false as theology and unproved as science.

The vanguard of the opposition to evolution is a religious group dedicated to the defence of the literal sense of Genesis. This is the Creation Science Foundation. It is not exactly a church. It is a lay brotherhood which defines its ministry as preaching the creation message to Christians. The political content of their ministry is that the evolution doctrine taught in secondary schools is not neutral science, but the founding doctrine of a rival religion, humanism. Creationists have

been hammering away at this point for about fifteen years, whiteanting trust of the science mandarins among a broad public: there are 50 million evangelicals in the US.

Humanists responded quickly to these disruptions. From about 1975, the publication of the American Humanist Association, *The Humanist*, targeted the evangelical movement as the enemy and closely followed its progress. In 1977, the Association organised about one hundred scientists and academics to sign a credo affirming that evolution is a "principle of science", not, as religious critics say, a scientific myth or metaphysics. It rallied the many clergymen to join the fight. In the years following, the science establishment deemed Creationist propaganda to be sufficiently serious to warrant a statement from the National Academy of Science, followed by a host of rejoinders in tertiary textbooks, science education journals, and premier science journals, not to mention the media. Meanwhile humanists brought suits in two states against laws requiring that creation be taught in public schools along with the evolution story. The suits were successful, and *The Humanist* crowed over the battered opposition.

But it had the ring of empty victory. Press attention to the controversies must on balance favour the religious. Discredit that might accrue through exposure of the controversy was nothing lost, since fundamentalists were long ago cast into the wilderness by the intellectual establishment. On the other hand, the retrial of Darwin at this late date tended to spread doubt about the credibility of institutional science among publics increasingly suspicious of experts and of the benevolent effects of science. Moreover, the indications were that the evangelicals would not accept the court decisions as authoritative; for they regard the courts, the media and the academies as redoubts of humanism. The courts legalised abortion, but the pro-life movement began its big growth after legalisation brought the medical liquidation to 1.5 million per year. Thus it was on the cards for creationism to draw strength from the adverse legal decisions.

The contest in Queensland features these same antagonists. The creationist ministry in Australia headquarters in Brisbane. From 1973, creation, catastrophism, and spontaneous generation were made part of the science syllabus along with evolution. But in 1982, the Board of Secondary School Studies decided to delete

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unorthodox science from the syllabus; from 1983 this was done. At the same time, the Queensland Humanist Association, allied with the Australian Skeptics (cloned from the American Humanist Association with the assistance of Phillip Adams), teachers' unions, and sundry individuals in the schools establishment, commenced what has now become a massive campaign to discredit creationism, the Foundation, and the Minister for Education, Mr Lin Powell.

In January of last year, the Skeptics issued *Creationism: An Australian Perspective*, which strongly criticised the creationist position and abused the Foundation. In April, Professor Rhondda E. Jones, entomologist at James Cook University, chose the occasion of her public lecture at Griffith University to present the findings of her survey of entering Queensland university students, which she interpreted as establishing that certain categories of students who had been exposed to creationist views were muddled about evolution. Her opinions were amplified by the Queensland press and were written into a five column story printed in *The Australian Higher Education* page. In April and May, the controversy, which had flared intermittently in newspaper letters columns, burst into the *Sunday Mail*, where five academics plus the Education Minister exchanged volleys. Since then the Foundation and Mr Powell have been under continuous attack through local media, and through *Search*, published by the Australia and New Zealand Association for the Advancement of Science.

Dr Wheeler is a member of the Australian Skeptics, and the submission of his essay to *Quadrant* may be read as a bid to recruit the sympathies of the conservative intelligentsia against the Creationists. My objective is to explain why Queensland conservatives support the Creation Science Foundation.

Are Creationists Cranks?

Wheeler seeks to discredit Creationists by laying down a barrage of charges suggesting that the Foundation's directors are shady characters and cranks. He detects scandal in the circumstance that the Foundation raises funds; and even more scandal in its investment losses.

This is ordinary street fighting. Most religious groups raise funds through gift-giving of the faithful, and some have lost money, particularly when they don't know that the advice of investment firms is about as safe as a casino. The Foundation members are in my experience gentle, thoughtful, sincere, and less opinionated than some academics. One is emeritus professor of pediatrics at the University of Queensland. Several others teach biology in universities. Another holds a doctorate in geology and works in the mining industry. Another practises law. Several others taught science in secondary schools before going full time with the Foundation. They pray, regularly inspect their conscience, and make good neighbours. While their opinions are distinctive, Queensland Creationists are not cranks.

If the aspersions are baseless, there remains Dr Wheeler's accusation that the Foundation acts mischievously by sabotaging tertiary biology instruction. Is that happening? I doubt it.

In stating that evolution is the backbone of tertiary

biology teaching, Wheeler confounds the global theoretical significance usually ascribed to evolution with actual course content. This is apparent on inspection of the syllabus issued by the Queensland Board of Secondary School Studies. Out of a total of 135 hours recommended for biology topics, only 10 hours, or 7 per cent, are expected to be devoted to evolution. The subject is not presented in a broad way likely to raise philosophical issues. Instead the syllabus focuses on speciation, which is treated as an extension of previous work on genetics. This abstract approach can scarcely be said to familiarise students with the main lines of evolutionary biology.

We find a similar pattern on examining tertiary general biology texts. A widely used book, William T. Keeton's *Biological Sciences*, devotes less than 10% of the text to evolutionary topics. If all Queensland students entered university firmly persuaded of creation, those beliefs would bear only marginally on what they are required to learn about genetics, physiology, cell biology, zoology, and ecology.

Professor Jones' survey of 600 students entering Griffith and James Cook science and education curricula is the evidence now cited to prove that creationism hinders learning, particularly among students who are or were religious. In these groups she discerned "an appalling residue of confusion" in that they allowed contradictory statements to stand side by side. From this she and the evolution lobby conclude that creationism ought not to be taught in the schools.

Several lapses from the methodology of the survey design open Jones' study to the objection that it produced a preconceived result. One bias is that while the survey is designed to reveal inconsistencies between creation/evolution accounts, no attempt was made to detect inconsistencies *within* the evolutionary account. It is quite possible, then, that students who consistently gave textbook evolutionary answers concerning origins are just as muddled, but on different topics, as those who mingled creationist with evolutionary answers. This is more than a hypothetical case, since, as we will see, evolution is a confused subject.

Apart from objections to the survey design, Jones' findings do not support the conclusions given out to the press; for they show no correlation between muddledness and exposure to the creation model, nor between consistency and exposure exclusively to evolutionary theory. This is acknowledged by Jones when she writes that

this response pattern [of consistent answers] appeared to be totally unaffected by whether or not students had been taught evolution or creationism in secondary science classes.

To underscore this point it may be noted that students who had been taught nothing at all about evolution were also able to give consistent answers.

What about the muddled class of students? Again there was no correlation between exposure to the creation model and confusion. The significant correlation was between students classified as "lapsed" from religious belief and who in addition had been exposed to both creation and evolution models. Here confusion was rife.

What does this mean? Professor Jones acknowledged "two . . . possible interpretations" — that science teaching does not encourage critical thinking or that creationism confuses lapsed students. Investigator bias shows clearly in the limits set to possible explanations. It is possible that lapsed students are confused not by creationism but by evolution. Or perhaps lapsed students are prone to all manner of confusion.

Jones' interpretation assumes that muddled views about creation and evolution are a hindrance to tertiary instruction or to learning. This is a very strong assumption. To test it, one would need to exclude what in scientific methodology is called "the null hypothesis", which in this case is that muddledness on entry to tertiary studies has no effect on student success. This would require measuring the success rates of the muddled vs. unmuddled students by a longitudinal study of successive student cohorts. This elementary requirement on hypothesis testing was set aside in order that the Creationists might be swatted now, once again, in the name of science. Oh dear! And yet Professor Jones' study is the evidence against teaching creation now being cited in school controversies in New South Wales.

Since it proves no such thing, one is left with impressions. My impression from speaking with tertiary biology instructors is that obstinacy inspired by creation beliefs is rare and ranks well down the scale of worrisome items, far behind the nuisance of late assessment submissions and poor class attendance. I personally have never encountered resistance in my courses; but I would welcome it as likely to generate interest.

Jones' findings are deficient also in that they are presented in vacuo, without comparative reference. Professor S.A. Barnett, emeritus in zoology at the ANU, has studied the pedagogy of orthodox tertiary biology instruction for some time. Several years ago I collaborated with him on a questionnaire devised to reveal whether advanced students in zoology had reflected on basic methodological and substantive orthodoxies. A simple questionnaire was administered to 61 upper level and postgraduate students. Three independent markers rated nearly half of the sample as unable to produce lucid statements about orthodox positions. The best responses came from students able to state the case for clashing points of view. This result was concordant with similar studies made elsewhere.

For all these reasons I believe that the Queensland evolution lobby has got the pedagogy argument back to front. Why should we academics not welcome critical examinations of our dogmas? Does the stridency of our rebuttals betray absence of the impartiality that we purport to inculcate in students? Are we perhaps apprehensive about flawed evidence for our dogmas?

"But," someone will object, "Creationism isn't merely wrong; it's a grotesque populist rebellion against science." Very well: one could not wish for a better reason to get down to basics.

This is not our first experience with populist rebellion. Waves of it, borne by media hype and the drug experience, swept through academe in the 'sixties and 'seventies. It is my distinct recollection that regiments of

academics grovelled like lapdogs before the self-righteous political and ecological wisdom of student mobs.

Ah, but that was Left-wing populism, wasn't it? Conservative populism, by contrast, is deemed to be Luddite, crackpot, repressive, reactionary.

In weighing the force of this appeal, readers should bear in mind the precise situation. Creationism is *not* in the Queensland school syllabus. This means that it is not approved instruction. Schools or teachers wishing to teach the creation model may do so only by submitting a curriculum variation request. The evolution lobby seeks to obscure this fact by citing Mr Powell's instruction to school principals, which requires that evolution be taught "as theory rather than as fact", and that handling of the subject should be "balanced". The instruction specifically leaves the interpretation of "balance" to principals and teachers. While teachers are admonished not to treat religious beliefs about origins with contempt, no particular belief is prescribed. The conditions of the instruction would be fulfilled by teachers who presented competing scientific theories of evolution.

In their eagerness to embarrass creationists, the evolution lobby has been willing to falsify these facts. In a report published by the leading British science journal *Nature*, zoologist Dr Tony Thulborn stated that Mr Powell had "ordered the teaching of creationism in state high schools"; that "creation is officially included in the school science curriculum"; and that Powell intends to specify "exactly how [teachers] should present creationism in the classroom". These assertions are entirely fictional.

Human Origins

No evolutionary dogma is more firmly implanted in the public consciousness than the belief that our species evolved from anthropoid apes and ultimately from the primitive living matter. This belief is founded on several considerations mentioned by Dr Wheeler, such as morphological homologies and the fact that DNA is the universal life molecule. However, homologies and DNA are compatible with the creationist model, which interprets them as strong evidence of design. We require therefore specific evidence of "missing links" between *Homo sapiens* and anthropoid ancestors.

The earliest of these finds was Neanderthal man (1857). For many decades he was regarded as a degenerate type of *Homo sapiens*, or else as another species altogether, owing to the curvature of four leg bones and the unusual shape of vertebra. His large brain capacity, 250 cc. greater than modern man, was an enigma. This interpretation was contested by a few authorities, who maintained that the unusual bone shapes might be the effect of rickets. The matter was settled in 1957 when the specimen was diagnosed to have been an ordinary human being who suffered from osteo-arthritis. But for five generations, experts and the public alike believed that Neanderthal was evidence of man's primate origins. The public probably still believe that Neanderthal was sub-human.

The discovery of Piltdown Man in 1912 was sensational because it entirely satisfied the expectation of what the missing link ought to be: a large brain combined with

ape features. Piltdown had a very human skullcap but ape-like jaw. In the midst of the Eureka jubilation, some authorities, notably Sir Arthur Keith, expressed reservations that the jaw was not merely ape-like, but was that of a chimpanzee. However, in the absence of the missing chin, Keith's caution could not be determined with certainty, and his reservations were set aside so that the world might have the missing link it craved. In 1952, the jaw and skullcap were tested by the fluoride method and were determined to be of widely different ages. Closer inspection showed that both fragments had been treated to make them appear very old. Piltdown was reclassified from missing link to hoax without an appropriate public explanation of how it was that the experts could foist this phony evidence on the public for 40 years. At the height of the Scopes trial, anthropologists found a fossil that was dubbed "Nebraska man". To be sure, it was only a tooth; but it was a sensational find in the atmosphere of the trial. The tooth was later determined to belong to a pig.

The stunning discovery of recent years was Donald Johanson's cornucopia of mammal and hominid fossils found in the Afar valley of Ethiopia in 1978. Among the bones were 40% of the skeletal remains of a young woman dubbed "Lucy" (*Australopithecus afarensis*). The pelvis indicates upright gait, but the brain is small and radio carbon dates her to 3 million years BC. The Afar fossil is the oldest known apparent hominid. But is it in the line leading to *Homo sapiens*? Is it a subspecies of the Leakeys' Laetoli fossils (*Homo habilis*), or a distinct species? Is it, indeed, not hominid at all but a sibling of the rare pygmy chimpanzee? Fierce contention rages over what the evolution lobby blandly calls "details". Notice that what is at stake in this particular detail is whether a line leading to *Homo sapiens* can be constructed at all.

Similar contentions surround all other hominid fossils. A century and a quarter after Darwin, the hominid line has not been securely established. What we see darkly through bits of broken bones is perhaps one or more hominids intermediate between ape and man in that they had upright gait, teeth resembling the human more than the ape, but the ape chin and brain size. The presentation of this evidence through artist impressions of hominids and reconstructed skulls or skeletons makes it appear that human evolution passes in review. That effect is probably not unintended. But reconstructions are generated from fragments — a tooth, a mandible, a skull cap, a vertebra. Anthropologist Birger Bohlin even did a series of paintings of Peking Man on the basis of a single tooth.

A major obstacle to a reliable reconstruction of human evolution is the great variability in the skeletons of modern men and apes, which is so considerable that features commonly classified as ape occasionally occur in humans. Another obstacle is the extreme paucity of the evidence. The entire collection of hominid remains could be spread thinly on a billiard table. (Thus the inhouse quip, "There are more people working on fossil primates than there are fossil primates.") The paucity of evidence means that standard statistical methods of analysis cannot be brought to bear on the sophisticated methods of morphological measurement, simply because the samples

are so few. This should but doesn't prevent scientists inferring sexual dimorphism, age of death, age of molar dentation eruption and other details from fragments.

These peculiarities make human paleontology a field rife with speculation. Reflecting upon what he called the "sloppy" and "personal" character of his field, paleoanthropologist David Pilbeam explained that this is

because much is at stake, for there are glittering prizes in the form of fame and publicity. And there is more general pressure too for answers to cosmic questions, a hunger that sometimes makes paleoanthropologists priests of a new kind of secular theology.¹

This is well said. To leave one's mark on paleoanthropology, skill to score world headlines seems to be essential. Certainly Dubois, Dart, Broom, the Leakeys and Johanson carefully calculated press releases of discoveries. Their relics from the past make an impression because they are confirming tokens of the evolutionary theology. But the temper of contemporary paleoanthropology is conveyed in the admission by John Gribbon and Jeremy Cheras that "there is plenty of room for doubt and debate over the traditional, and now establishment view of what exactly the human species evolved from... the standard picture owes more to imagination than to evidence."² Compare this with the line taken by the Queensland evolution lobby: "... the fossil evidence for human evolution is very substantial, very consistent, and thoroughly convincing."³ If this is what we teach in Queensland universities, our students are likely to be in an awful muddle about evolution... and badly behind the research frontier.

Darwinian Dilemmas

The persuasive power of *The Origin of the Species* lies in Darwin's precocious observation of physical and behavioural traits, and his ability to explain them as adaptations. Adaptation was said to occur through natural selection, meaning that contingencies of habitat operate on chance variations thrown up by the inheritance material, preserving those variations conducive to survival. Other variations are discarded. This bare tautology is given empirical meaning by two postulates: that species evolve gradually by accumulation of "infinitesimally small" variations; and that the inheritance material is of such nature that it can produce the observed variation by the stipulated means. Much of the subsequent glory and misery of Darwin's theory is latent in these concepts.

It is commonly believed that the fossil record comprises the unanswerable proof of Darwinian evolution. Darwin and his contemporaries knew better. The gradualism supposed by his theory required that the record show innumerable transitional forms connecting orders, classes, phyla and kingdoms; but no trace of them could be found. Entirely novel biological structures, such as the avian lung and the amniotic egg, appeared to leap into existence, in all their complexity, without passing through the slow process of accumulated modifications. Extinctions also occurred suddenly. More troubling still, the record showed that, once in existence, species endured for many millions of years without change.

Darwin maintained that the record was imperfect, implying that subsequent investigation would turn up the missing links. His critics, for their part, decried his evasion of evidence. This was the beginning of 125 years of scholastic contention between Darwinians and a variety of saltation or "leaps" interpretations of evolution.

Between 1900 and 1935, saltationism dominated. Its ascendancy was based upon Mendelian genetics and chromosome theory, which showed the inheritance material to be of a particulate or unit character — the opposite of the "blending" property Darwin had supposed. By a stroke of luck, empirical evidence for saltation came to hand in the discovery of the first observed speciation. This was in polyploid plants, which under certain circumstances double or triple their chromosomes in one generation. Thus it transpired that the first observed speciation was not gradual but instantaneous, and occurred without any selection pressure at all. The fossil record, genetics, and speciation evidence all pointed away from Darwin.

With the development of population genetics in the early 'thirties, the pendulum swung back. Population genetics is an elaborate mathematical tool kit perfectly adapted to gradualism, for it enables one to model accumulative populational effects of changes in gene frequencies. For the next forty years, research elaborated a vast edifice of microevolutionary mechanisms and processes — nearly all of them hypothetical. Macroevolution was forgotten or assumed to be merely the cumulative effect of microevolution, and saltationism was pariah. In this phase evolutionary doctrine became dogmatic and intolerant because Julian Huxley and other field leaders pressed evolution into service of the humanist church.

This "synthetic theory" is the brand of evolutionism that Dr Wheeler and the Skeptics defend. Alas, today it is the smoking ruin remaining after many hot battles raging through a half dozen sciences. Fashion now favours saltationism, renamed "punctuated equilibrium".

The vehemence of this latest uproar is not due to a stunning piece of new evidence. On the contrary, the debates are remarkable for the fidelity with which they rehearse the same points made by Darwin and his critics, albeit now expressed in new idioms. The vehemence is due to the fact that for four decades the majordomos of the synthetic theory suppressed discussion, ostracised dissenters, and ruled conflicting evidence out of court. It was the Stalinist era of science.

The new evolutionary story goes something like this. It is acknowledged that synthetic theory consolidated the description of microevolution, e.g., the variation in domestic sheep mentioned by Dr Wheeler. But this is small change; and no amount of it will ever accumulate into an explanation of macroevolution, which in the much expanded fossil record still appears to occur by leaps. The fossil evidence is said not to be imperfect, but a reliable testimony that the links were never there: the evolution that counts isn't gradual. The new research program calls for recovering all the difficulties swept

under the carpet by synthetic theory, and searching for mechanisms of rapid evolution. The ferment in evolutionary biology, then, does not stem from the tumult of unexpected new knowledge, but from recognition that after a century and a quarter of intensive investigation, the central problems of evolution remain enigmas. At this point agnosticism sets in, and from this quarter we hear the chilling judgment of the Sydney scientist Michael Denton that "ultimately the Darwinian theory of evolution is no more nor less than the great cosmogenic myth of the twentieth century".⁴

When this is understood, Creationism as a popular revolt against establishment biology seems warranted. Creationists perceived that for a long time the establishment pretended — and as we see in the current dispute — still pretends to have demonstrated what no one knows. This pretence perverts the high and demanding office of science. The perversion has occurred because evolutionary theory was made to do service in cultural politics. Here we find the public significance of the evolution dispute.

Evolution describes origins in epic proportion and therefore rivals other stories of similar scope, for example, religious stories of origins. Julian Huxley and his humanist friends were explicit that the evolutionary story was to be sold to the public as the foundation of the new humanist theology. Evolution as cultural myth orients life and values on a human axis. The long evolutionary past removes the Judaeo-Christian God to an infinite distance and finally extinguishes Him in the belief that our species is the chance product of blind natural forces. We are on our own and consequently we may do what we will, free of ancient prohibitions and divinely-sanctioned codes.

This liberation doctrine is the basis of the most audacious politics ever attempted — the control of human evolution — and it is a salvation doctrine rivalling the Gospel. Creationists know this, as they also know that the evolution story continuously advertised to the public as science is unproved. That is why they contend with the science establishment.

NOTES

I wish to thank warmly Dr Wheeler and Dr Andrew Snelling of the Creation Science Foundation for cheerfully supplying me a number of requested references. — H.C.

- 1 David Pilbeam and J. Rimas Vaisnys, "Hypothesis Testing in Paleoanthropology," in *Paleoanthropology: Morphology and Paleoecology*, edited by Russell H. Tuttle (The Hague: Mouton, 1975), p.10.
- 2 John Gribbon and Jeremy Cherfas, *The Monkey Puzzle: Reshaping the Evolutionary Tree* (New York: Pantheon, 1982), 234-35.
- 3 Colin P. Groves, "Did Human Beings Evolve?," in *Creationism: An Australian Perspective*, edited by Martin Bridgstock and Ken Smith (Melbourne: Mark Plummer, 1986), 48.
- 4 Michael Denton, *Evolution: A Theory in Crisis* (New York: Adler and Alder, 1986), 358.