Le patrimoine paléontologique

Des trésors du fond des temps

AMBASSADE DE FRANCE EN ROUMANIE
Service de Coopération et d'Action Culturelle

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Marketing Palaeoanthropology: The Rise of Yellow Science

Corrigenda

Figure 16 is from *Télérama*, not the *Nouvel Observateur* : apologies to both revues.

References. Ann Gibbons' book title is *The First Human*, not *The First Family* : apologies for this slip.

MARKETING PALAEOANTHROPOLOGY: THE RISE OF YELLOW SCIENCE

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Abstract. This contribution looks at aspects of the history of the mediatisation of palaeoanthropology, especially its relationships to yellow press tactics, and examines some of the disadvantages that access to this kind of mass circulation has brought.

Key words. Palaeoanthropology, mediatisation, yellow press, scientific journals, palaeocelebrities

> "*Enormous rewards in terms of fame, money, and power await the* ***finder*** *of the fossil judged by both the scientific world and the* ***public*** *to be the earliest ancestor of modern humans.*"
>
> **Mary Bowman-Kruhm, 2005**

If this is so, then why aren't Bernard Ngeneo, Tom Gray, Justus Erus and Djimdoumalbaye Ahounta enormously famous, rich and powerful? Has the scientific community and the public been well informed so that they can judge properly? How has all this fame, money and power benefited Science in the countries where the fossils were found? How has it affected Science at large?

INTRODUCTION

Diffusion of knowledge is one of the many duties and pleasures of a scientist. The general public supports research programmes via government funding, and it therefore has the right to know the results of work carried out by recipients of its tax contributions. For the long term health of scientific endeavour in a country,

popularisation of research findings and diffusion of knowledge to society at large are therefore as essential as publishing in scientific journals.

Ways and means of diffusing knowledge and popularising research results are many and varied. Traditionally, the press (Newspapers, Radio, TV) have played an important, if not always successful, role. Films, museum displays, books and other outlets have a long pedigree, and perhaps a more accurate impact, as more thought and consideration generally go into preparing contributions for such outlets than is spent on newspaper announcements which tend to be composed hurriedly by journalists who don't always grasp the points being made by the scientists that they interview, followed by editorial decisions made as daily or weekly deadlines are rapidly approaching, and who are constantly deciding whether the news will help "sell" the newspaper (Simpson, 2010).

The newest, and possibly the most democratic way of diffusing knowledge is the internet. There are several highly professional blogs which deal with anthropology, which are written in readily accessible language by experts in the domain. Wikipedia plays an increasingly important role in diffusing knowledge about human origins. These new technological developments have not rendered the traditional publicity outlets obsolete, but they are becoming more and more indispensable as alternative and attractive sources of information and knowledge about the scientific debate that goes on behind the scenes. However, the internet is also used to disseminate propaganda of various sorts, partly by scientists with a weather eye to publicity, but more often by Creation Scientists and Intelligent Designers, whose messages are so patently anti-scientific that they do little harm to science.

Because all societies have their Origin Myths, human evolution researchers experience pressures and motivations which most other scientists don't. Scientists, by definition, do not ascribe to myth and dogma, yet, ironically, it is almost universal that those who study human evolution believe that humans evolved, itself a dogmatic notion. Perhaps because human evolution is so close to us, many announcements about human origins have been presented to the public in the same way that advertisements are (bigger, better, older, more complete, more exciting). Multiple motivations can be seen in many public announcements about human evolution, in particular those relevant to fame, ego and funding. Eye-catching press releases, seductive iconography, catchy buzz words and high-octane claims (Fig. 1) have all been used in the past, not always with the diffusion of accurate information to the general public foremost in the mind. Yellow science has been born. Celebrity is one thing, Evangelism is another: neither can function in the modern world without the mass media.

Celebrity palaeoanthropology has been a fact of life for over half a Century. Its role has not been overly concerned with diffusing accurate science to the general public, but more to do with maintaining and enhancing the power base of

FIGURE 1. Examples of eye-catching, but contradictory and scientifically dubious, headlines gleaned from newspapers by the French journalist Robert Clarke (2001).

carefully selected individuals whose job it is to ensure continuous access to fossil sites in Africa for scientists from countries which have few palaeoanthropology resources of their own (Africa is well endowed with such resources, which is why it has been the main target for such activity). Since the independence of several African countries half a century ago, local scientists have in too many instances been completely marginalised by such polities, while foreigners have benefited enormously.

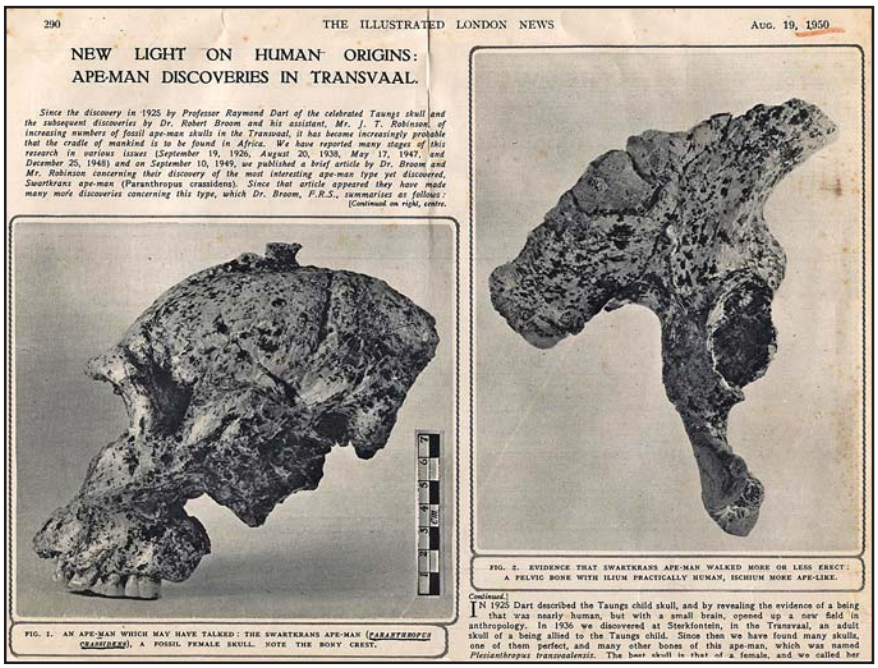
Palaeocelebrity and palaeoevangelism have harmed and hampered palaeontological enterprise in both the short and long term; African scientists, in particular, have been marginalised from enjoying the benefits of their natural resources. Furthermore, in a mutually beneficial arrangement, the celebrity phenomenon in palaeoanthropology has at the same time encouraged, and has largely been due

to, the rise of lobbies which increasingly control access to scientific funding, to recruitment, to promotion and access to publication outlets with high impact factors, and this has caused a congealing of ideas, especially in the New World. These lobbies are generally keen on metascience data, such as the Science Citation Index (SCI) and the Journal Impact Factor (JIF), as it aids them in their efforts to control recruitment and promotion of individual scientists and teams and access to funds. Controlling access to journals with high impact factors is an important weapon in the arsenal of these lobbies. The most virulent lobbies are those associated with the most revered journals, such as *Science*, *Nature* and the *Proceedings of the National Academy of Science* (*PNAS*). Similar lobbies which fostered the Global Warming movement, prevented counter-views from being published in *Nature* and *Science* (Allègre & de Montvalon, 2010).

An unfortunate element of the lobby syndrome has been the rise of palaeoanthropology teams who hinder scientific debate by withholding data that is necessary for other scientists to verify or refute their interpretations. Such behaviour is profoundly anti-scientific: it impedes informed debate.

In the mid 1950s, there was a change of focus, principally in America, when mediatising palaeoanthropology. The focus shifted from the fossil and science (Fig. 2) to the personality. This was done to create an aura of importance and fame about a person who was then expected to act on behalf of select American teams to ensure unhindered, long term access to Africa's fossil resources, funding guaranteed, of course. For the planned exploitation to work smoothly, the person being lionised was preferably a resident of the African country in which Americans wished to carry out research and other activities. His or her job was to act as a facilitator, intervening between selected American teams and local government agencies to ensure access to fossils, fossil sites, and other resources and requirements in that country, and to keep away rivals, including those from the country in which the fossils occur. The reward was fame and fortune; the drawback intellectual slavery and ignominy. Palaeocelebrity and palaeoevangelism were born. Yellow press science was the tool to achieve it. Advancement of science played second fiddle to the quest for fame, fortune and power. Scientific debate was replaced by propaganda and slanted announcements to the media.

The fact that most such palaeocelebrities had already entered philosopause and were ever on the look-out for ways to enhance their prestige, meant that they were easily manipulated: the fame counted more than the science. Increasing use was made of sound-bite science – short, snappy, entertaining items which would be easy to digest, and which required little thought to understand, became the order of the day. Sound-bite science wasn't confined to newspapers; it spread to the "Big Three" science journals which traditionally publish short articles in which little detail can be provided on account of the limited page space allotted each paper.



290 THE ILLUSTRATED LONDON NEWS AUG. 19, 1950

NEW LIGHT ON HUMAN ORIGINS: APE-MAN DISCOVERIES IN TRANSVAAL.

Since the discovery in 1925 by Professor Raymond Dart of the celebrated Taungs skull and the subsequent discoveries by Dr. Robert Broom and his assistant, Mr. J. T. Robinson, of increasing numbers of fossil ape-man skulls in the Transvaal, it has become increasingly probable that the cradle of mankind is to be found in Africa. We have reported many stages of this research in various issues (September 19, 1926, August 20, 1938, May 17, 1947, and December 25, 1948) and on September 10, 1949, we published a brief article by Dr. Broom and Mr. Robinson concerning their discovery of the most interesting ape-man type yet discovered, Swartkrans ape-man (Paranthropus crassidens). Since that article appeared they have made many more discoveries concerning this type, which Dr. Broom, F.R.S., summarises as follows: [Continued on right, centre.

FIG. 1. AN APE-MAN WHICH MAY HAVE TALKED: THE SWARTKRANS APE-MAN (PARANTHROPUS CRASSIDENS), A FOSSIL FEMALE SKULL. NOTE THE BONY CREST.

FIG. 2. EVIDENCE THAT SWARTKRANS APE-MAN WALKED MORE OR LESS ERECT: A PELVIC BONE WITH ILIUM PRACTICALLY HUMAN, ISCHIUM MORE APE-LIKE.

Continued.

IN 1925 Dart described the Taungs child skull, and by revealing the evidence of a being that was nearly human, but with a small brain, opened up a new field in anthropology. In 1936 we discovered at Sterkfontein, in the Transvaal, an adult skull of a being allied to the Taungs child. Since then we have found many skulls, one of them perfect, and many other bones of this ape-man, which was named *Plesianthropus transvaalensis*. The best skull is that of a female, and we called her

FIGURE 2. Dissemination to the general public of the discovery of a skull and hip bone of an australopithecine from South Africa by *Illustrated London News* of August 19, 1950. The focus is on the fossils; the personality behind the find is acknowledged in the text. It is difficult for creation scientists to respond to this kind of announcement. By 1959, the focus of the press had in general shifted to the personality, with the fossil relegated to second place. This change gave creationists the opportunity to engage substandard scientists in polemic.

There were three unforeseen consequences caused by this change of emphasis. At a risible level, it led to a rise in popularity of « Creation Science » in the 1960s and 1970s, followed by the « Intelligent Design » movement in more recent times. This is because it is difficult to argue against an inanimate fossil or a well supported scientific idea, but it is much easier to engage a flesh-and-blood person in polemic, especially if his message to the mass media is propaganda and the personality poorly educated. Although "Creation Science" and "Intelligent Design" ideologies are anti-scientific, it is a fact that palaeoevangelists and other palaeocelebrities who pretend to disseminate science, have frequently provided fuel for creationist agendas. Even a cursory browse on the internet will reveal this.

A second, and much more serious outcome of the palaeocelebrity phenomenon is that, in African countries endowed with the most fossils, the possibility of undertaking human evolution research has been denied to citizens, who are neither encouraged to participate in the scientific work, nor to contribute to the

diffusion of knowledge that flows from it, despite the fact that most fossils relevant to the study of human origins originate from their land. In Kenya, the law relating to antiquities was redrafted to include provisos that researchers wishing to carry out research on its rich fossil record had to have the requisite training and adequate funds – provisos which effectively cut out all citizens of the country. Their role has generally been confined to the technical level and below, limited to finding important specimens that ultimately enrich the boss, increase his power base, and which provide ample raw material for American students to enhance their career possibilities with a nice PhD thesis on African fossils under their belts.

But, ironically, the palaeoanthropology lobbies that intended to benefit the most by unilaterally exploiting the fossil resources of African countries by appointing their Mr Fix-it in each country, have catalysed an enfeeblement of the quality of their own palaeoanthropological output. They have become victims of their own manoeuvres. Some of these lobbies, which are well supported by US government funds, are, scientifically speaking, thirty years behind the times compared to palaeoanthropologists in other countries.

It is long past the time that African palaeoanthropologists were empowered to study fossils from their homelands on a basis equal to that enjoyed by foreign scientists for the past 50 years. Given the right kind of encouragement, they will certainly do a better job.

INDIVIDUALS, SOCIETIES AND SCIENCE

A spirit of scientific enquiry resides in the mind of every cogent being, just as a sense of spirituality is present in all of us. We all ask questions and search for answers, especially when we are young, but by the time we become adults, social pressures often extinguish science and encourage acceptance of dogma. Different people experience philosopause at different stages of their lives: some continue to keep a spirit of scientific enquiry active in their minds until they become old or die, others allow it to wither and perish in their youth. But where Science, with a capital "S", differs from the simple asking of questions and proposing of answers, is that the questions and answers must be made available to society at large in such a way that other members of society can debate them, not just in the present, but also in the future. Science is therefore a social phenomenon which cannot be efficiently undertaken without a permanent record being made of the questions and answers, which are freely accessible to anyone at any time.

Historically, the most widespread and successful medium for advancing scientific debate has been science journals; scientists have their words printed as they themselves intended. Books also have a long pedigree. Mass media outlets, in contrast, are motivated by profit, with all the attendant risks that journalists and editors

may massage the science in order to maximise sales. The same profit motive lays the mass media open to manipulation by unscrupulous individuals and to mutually beneficial understandings between journalists and scientists.

Prior to the invention of writing, science as we know it today was simply not possible. There was no permanent record of what had been discussed, making it impossible to know the precise contents of the debates that had been going on, and it was not possible to leave a durable record of the current state of affairs. The invention of writing was a major step forward, but because only a tiny minority of people could read and write, for thousands of years writing provided a way for a few to control the masses, mainly through the invention of organised religion. Thus, ideas became "graven in stone", debate was discouraged and dogma became the order of the day.

From the invention of writing until the development of the printing press, science, in the modern sense of the term, was extraordinarily difficult to undertake. We lived in the "Dark Ages". Nevertheless, some individuals and some societies managed to make headway, but slowly, and often with obstacles placed in their path by political or religious authorities. In any case, throughout this long period, diffusion of scientific knowledge and debate was slow and laborious, with copies of findings and debates having to be hand copied (often with mistakes) and distributed by primitive and generally haphazard distribution networks. Slow replication methods ensured that few copies were made, and inefficient distribution meant that most people never saw a scientific treatise. Most of the scientific tracts written during this lengthy period are known by only a few manuscripts, some only by fragments of manuscripts, and some only in translations. Much scientific thought from this period has been irrevocably lost.

All this changed dramatically with Gutenberg's invention, which made it possible to print multiple, identical copies of a tract in an extremely efficient and rapid way. Science, as practiced world-wide today, had become possible, even though for a long time, distribution networks remained primitive. Many people scattered over the globe could read identical copies of a scientific idea or debate, and could in their turn comment on it in print with an equal chance of having their ideas read and discussed by others, not just in the short term, but also decades and centuries later. The scientific journal was at last possible. Prior to the printing press, the exchange of scientific ideas was done in isolation or by letter or by physically travelling to meet like-minded people for discussions. After the printing press, the entire process of scientific enquiry changed. People were potentially no longer subservient to dogma, but, if they wished, had the possibility of actively debating an issue and disseminating the results to a wide audience, so that others could consider the proposals, findings and hypotheses, and in their turn participate in the debate and,

by so doing, contribute to the advancement of science. The impact on society was profound and widespread. Most authorities didn't like it.

Scientists started a movement which is one of the rare human endeavours in which readers are invited, as a matter of course, to criticise a colleague's output on equal terms without hindrance or rancour, either immediately while the author is alive or after a hundred years when he is dead. The focus had shifted from the individual to the scientific idea. The quality of the idea is what matters, not the colour of the author's skin, his or her religious leanings, political persuasion, socio-economic standing, celebrity status, language group, age or gender. This change of focus empowered scientific debate. In this sense, science is the ultimate world-wide "democracy" which is why many authoritarian individuals and groups do their utmost to frustrate it. And, this is why individuals and lobbies that impede the scientific process are behaving in a profoundly anti-scientific way.

From Hrdlička to Simons: isolating palaeoanthropology from palaeontology

Until the early 1920s palaeoanthropology was a subdiscipline of palaeontology. Fossil primates were studied by people who had wide experience in many mammal groups, and therefore interpreted them like they would any other group of fossil mammals. Individual variation and sexual dimorphism didn't pose strange difficulties to such people.

But in America, Alès Hrdlička, a physical anthropologist and founder of the American Journal of Physical Anthropology, decided that it would be easier to obtain funding for palaeoanthropology through anthropology departments than it was through palaeontology and geology departments at US universities and museums, where competition from other palaeontologists was strong (dinosaurs in particular, but a host of other organisms as well). The solution was simple: shift palaeoanthropology to anthropology departments where the only competition for funds would come from a few social anthropologists. The stage was set for the isolation of palaeoanthropology from mainstream palaeontology and its essential partner, geology, with predictable deleterious effects in the long term (Fig. 3).

One of the earliest manifestations of the decline was the idiosyncratic way that variation in fossil primate samples was interpreted. Under the new set-up, fossil hominids were usually studied by human anatomists based at hospitals or medical schools or by students who had studied in anthropology departments. These people, although thoroughly knowledgeable about human anatomy, rarely knew anything about other mammals. Humans are rather unusual primates. We walk on two legs, not four, we have big brains, our vertebral column has two curves to it, we mature late, we live a long time, we suffer degenerative bone diseases in old age, we wear shoes which distort the foot bones, we eat foods that rot the teeth, necessitating visits to the dentist, but above all, we are much less dimorphic in

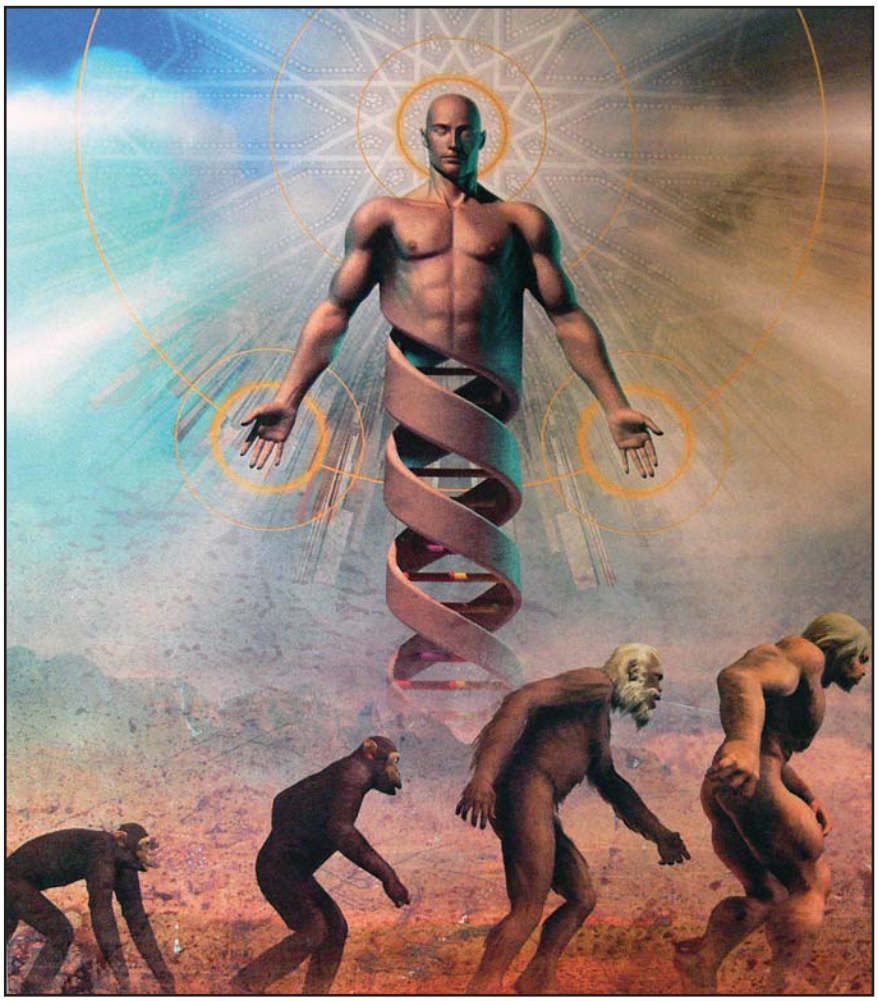


FIGURE 3. In this cover of *Wired Magazine*, artist Kenn Brown contrasts two theories of human origins. The lower panel is based on phylogenies commonly published by palaeoanthropologists, above is a version based on "Intelligent Design". The "scientific" scenario is just as mythical as the other: it starts out with a terrestrial quadruped that gradually stands up and progresses inevitably towards perfection without any side branches or dead ends, culminating in a perfect specimen of a muscle-bound, sun-tanned, Californian male, a fine example of "yellow science".

canine shape and less bimodal in canine dimensions than most ape species are. So people whose only basis for comparison is the human skeleton are at a disadvantage when studying and interpreting fossil hominoids and other primates. This bias soon showed up in scientific papers when G. Edward Lewis, to provide just one example, interpreted fossil apes that he had found in India in the early 1930s as early human ancestors. He also identified a pig tooth as a hominoid, naming a

new genus and species for it (*Adaetontherium incognitum*). We don't need to get into the debate about *Hesperopithecus* to provide an even more telling example, nor do we need to discuss Piltdown, which was played out before Hrdlička's move to divorce palaeoanthropology from palaeontology had occurred to him.

By the 1960s Elwyn Simons and David Pilbeam were classifying Miocene hominoid fossils from Africa, Europe and Asia into two groups – Pongids (*Dryopithecus*) and Hominids (*Ramapithecus*). *Ramapithecus* was hailed as the long sought ancestor of humans; it was considered to have reached a new and distinctive adaptive plateau, foreshadowing the human condition, and was envisaged as possibly utilising stone tools. All this postulation was accompanied by intense press exposure that ensured fame and influence for the two scientists.

The duo were in part reacting to the discovery of *Zinjanthropus* in Tanzania in 1959, being publicised by Louis Leakey, who rode a popular wave of world-wide interest with great panache, which assured him lifelong celebrity. But some people felt that American stage lights ought to shine on Americans, not Kenyans. To swing the stage lights back to America (in fact Pilbeam was British, but was based in America) something sensational was needed to divert the public interest their way. What better bait than early hominids millions of years older than *Zinjanthropus*? Dusting off a few fossils from the Indian Subcontinent collected in the 1930s by G. Edward Lewis, Simons & Pilbeam updated his *Ramapithecus* story, and launched into a long and persistent publicity campaign about early human evolution. Leakey responded to *Ramapithecus* by announcing his own, even older, human ancestor, *Kenyapithecus*, which projected him even further into the stratosphere of publicity. He eventually claimed to have found direct human ancestors in early Miocene deposits more than 20 million years old and stone tools 14 million years old, on which basis he claimed, in all seriousness, that *Kenyapithecus* was a social animal living the community-based life that was the hallmark of humans (Pickford, 1997). Although there had been scattered precursors of dubious palaeoanthropology, this was the exchange that effectively gave birth to the tide of "yellow science" which curses palaeoanthropology to this day.

The press war that this rivalry sparked eventually settled the score in favour of Louis Leakey, despite the fact that he was wrong about *Kenyapithecus*. But both Simons and Pilbeam came out of the tussle quite well, their influence in high places in American academia assured. But Simons and Pilbeam were as wrong about *Ramapithecus* as Louis Leakey was about *Kenyapithecus*: they had neglected to take into account, just as G. Edward Lewis had done in 1934, and as Louis Leakey did with *Kenyapithecus*, the fact that apes are sexually dimorphic. What all three palaeocelebrities had done was separate the female fossil apes from the males, and classify them in different zoological families, males in Pongidae, females in Hominidae, an error so basic that palaeontologists learn it in Biology 101, if they are not already aware of it from observing their family members or animals in a zoo.

The unmasking of the ape status of *Ramapithecus* and *Kenyapithecus* did not dislodge any of the three from their high perches, although a few jokes circulated at the time: No wonder dryopithecines went extinct, the females shifted off to another family ... and ... Females became human 10 million years before males did – an observation much enjoyed by supporters of the women's liberation movement which was in full swing in America at that time. The cynical lesson that emerged from this episode was that, "If you want to get ahead in academia in America, yellow science is the way to go".

Despite their abysmal science, the *Ramapithecus* press exposure of the 1960s and 1970s enabled both Simons and Pilbeam to establish power in high places at universities and government agencies from where they could influence recruitment, promotion and access to funding. Pilbeam, in particular, managed to place quite a number of incompetent people (several from Britain) in anthropology and human anatomy departments at universities in the eastern US, all of whom were expected to join and work for the lobby that he gathered around him. Elwyn Simons trained many students, some of whom are now senior members of palaeoanthropology lobbies, but ceased contributing to science ages ago – they underwent philosopause early, but nevertheless rose to senior positions thanks to their loyalty to the lobby. Working for the lobby takes most of their time.

In this instance, due to America's peculiar fascination with celebrities, no matter how created and out of what raw material, poor science disseminated via the mass media was rewarding to those purveying it. In America, a sow's ear really can be turned into a silk purse if it is glossily packaged and advertised persistently enough.

RICHARD LEAKEY & DON JOHANSON: YELLOW PRESS SCIENCE FULL STEAM AHEAD

By 1970, Louis Leakey was old and frail (he died in 1972). Lobbies in America who counted on him for access to fossils and fossil sites in East Africa needed a replacement who could be relied upon to continue with the same policy. Louis Leakey's son, Richard was the natural choice, but having left school at an early age it was difficult for university educated colleagues to take him seriously. He objected about the way that professional palaeontologists spoke down to him (in fact they were for the most time only engaging in scientific debate, but he took this essential ingredient of science to be a personal affront to his ego). So he began surrounding himself with weak-willed scientists, using access to fossil hominids and fossil sites in Kenya as the incentive to keep them in line (Walker & Shipman, 1996). He needed a secure and influential base in America, and what better way of doing this than ensuring that he became a celebrity as his father had done before him.

A brace of Americans was intent on filling the celebrity vacuum created by Louis Leakey's death. The most prominent was Don Johanson, who was to keep himself and "Lucy" from Ethiopia in the public mind for ages. As Mary Bowman-Kruhm (2005) explained, "*The selection of its popular name was both brilliant and serendipitous.... Easy to remember and easy to fit into a headline or sound bite, Lucy was a diamond-studded choice of name and made Johanson a glowing star in the paleo-sky. Americans were happy to embrace one of their own as the new superstar of paleoanthropology*". But it was Tom Gray, a student on the team, who found the first bits of the Lucy skeleton, not Don Johanson. What happened to Tom Gray? He faded into obscurity while everyone was watching the rising star.

" *« OLDEST » FRAGMENT OF MAN DISPUTED*

Who'll win the battle of the bones?

CLAIM THAT 600,000-YEAR-OLD SKULL IS « MISSING LINK »

OLDEST SKULL IS CLUE TO 'MISSING LINK'

Skull find dashes theory

Reconstructed: OUR BRAINY ANCESTOR, No 1470

Man-like fossil may be oldest by 10 million years

Human link goes back 20m years

LUCY OF ETHIOPIA
Four Million Year Old Creature Of Controversy

UC scientist challenges Leakey theories

Expedition leader claims discovery of oldest-known hominoid
Found – a man who may be 15 million years old

Le plus vieil hominidé jamais trouvé à 7 millions d'années,
Toumaï, un nouvel ancêtre
*Sa découverte en Afrique centrale remet en cause la théorie***"**

A small sample of palaeoanthropology headlines from the newspapers of the world

Richard Leakey sensed danger, especially from Johanson, so, with the support of his contacts and apostles in America, he made a spectacular announcement, KNM ER 1470, a 2.6 million year old skull from Lake Turkana, Kenya, which he attributed to *Homo*. Again, let Mary Bowman-Kruhm (2005) tell the story "*Reporters and photographers mobbed Richard .... 1470 did for Richard what Zinj did for Louis*". By purveying yellow science to the press, Richard Leakey had effectively secured the celebrity status in America that was so crucial to his future.

The fly in the ointment was that at the time of the announcement, it was already known that the skull was that of an australopithecine and that its age was close to 1.8 million years, and not 2.6 million. Prior to the announcement of 1470, Alan Walker tried to argue that Richard Leakey should not falsify the 1470 skull, upon which he was peremptorily excluded from the Leakey team. Walker took a deep breath, decided to compromise his science and rejoined on the grounds that he wanted to be associated with future discoveries in the country. He lamely explained in his book "The Wisdom of Bones" (Walker & Shipman, 1996) that science is team work and that sometimes compromises had to be made.

As an australopithecine aged 1.8 million years, 1470 was not so newsworthy – Zinj from Tanzania was this age, and had already served its purpose in making Louis Leakey a household name in America. It took 11 years for Richard Leakey to admit publicly that the younger geological age of KNM ER 1470 was the right one, despite the fact that it was he who collected the date samples from an older level (Fitch *et al.*, 1996), and it took 30 years for a more correct version of its anatomy to be published (Bromage *et al.*, 2008), but neither of these events was covered seriously by the press. Correcting such errors is not considered newsworthy enough.

It was eventually established that Richard Leakey had sampled a volcanic ash at Koobi Fora, older than the level from which KNM ER 1470 had been collected, which he sent to Cambridge University for analysis. The analyses carried out by Jack Miller were excellent, but the reported collection site was incorrect. When this information was published in a scientific journal (Fitch *et al.*, 1996), the press predictably remained tight-lipped. The anatomy eventually got straightened out, but only after Alan Walker wrote in his book denouncing Richard Leakey's repositioning of the face relative to the brain case (Walker & Shipman, 1996) and Tim Bromage's scientific analysis of the fossil (Bromage *et al.*, 2008). The press remained silent: yellow science sells newspapers better than accurate science does. Myth had become immensely more powerful than science.

The quest for celebrity status continues to this day, not only in America, but also in France. The hoop-la that accompanied the announcements of Toumaï (*Sahelanthropus*) from Chad is a classic. Michel Brunet, who is usually credited by the press with the discovery, was in France at the moment it was found. Predictably, the official announcement was made in *Nature*, with the manuscript sent to journalists

under embargo. Michel Brunet quickly rose to star status. The yellow press frenzy assured it. The film that followed a couple of years later is notable for the idiosyncratic ideas expressed in it, and the book written by the palaeo-star is replete with country kitchen science, and a barrage of hyperbole (Brunet, 2006).

In order to weaken interpretations by other scientists that Toumaï was more closely related to gorillas than to humans, members of Brunet's team attempted to use ridicule rather than scientific debate to convince people of the validity of their claims. Patrick Vignaud, a senior member of Brunet's team, and co-author of many of the papers on Chadian fossils, gave public talks which were posted on the internet, to the effect that Toumaï could not be a "paléogorillette" because its brow ridges were far too big for a female ape (Fig. 4), that its teeth were human-like rather than gorilla-like (Fig. 5) among other characters. The scientific basis for his points of view is extremely weak.

But there was sand in the Vaseline. In order to ensure that the stage lights shone on him and him alone, Michel Brunet used his political connections in France, and his influence in the corridors of the Ministry of Foreign Affairs to sideline (indeed, to punish) Alain Beauvilain, the French scientist based in Chad who had led the small group that found the Toumaï skull. Instead of encouraging Beauvilain to go and

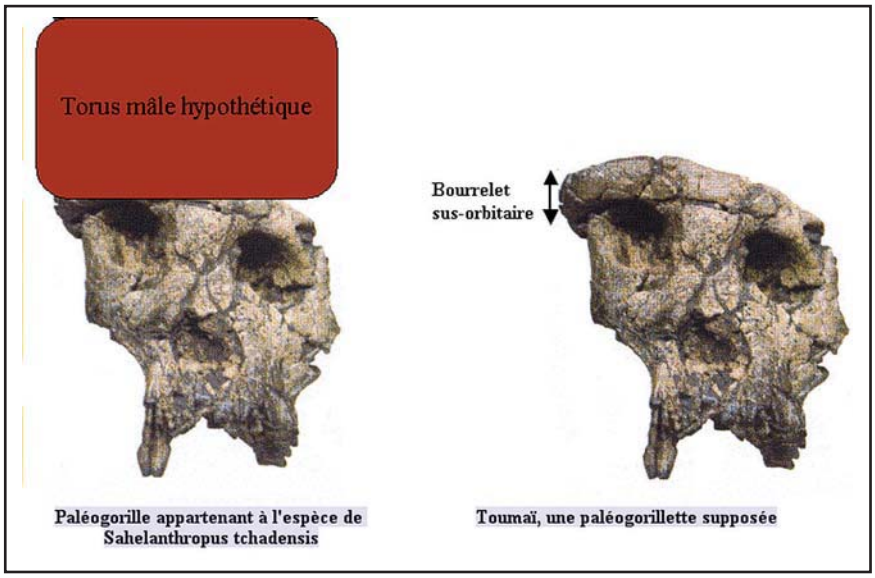


FIGURE 4. Exaggeration as a method of scientific debate rarely works, as in this case which is based on an incorrect rendering of the kind of variation that typifies male and female gorillas. Patrick Vignaud (Michel Brunet's right hand man) claimed to have studied 800 gorilla skulls which showed that males possess brow ridges five times taller than those of females. This is nonsense, as there is a large overlap in brow ridge dimensions, with some females having more robust ridges than many male individuals. Apart from this, where did Vignaud study 800 gorilla skulls?

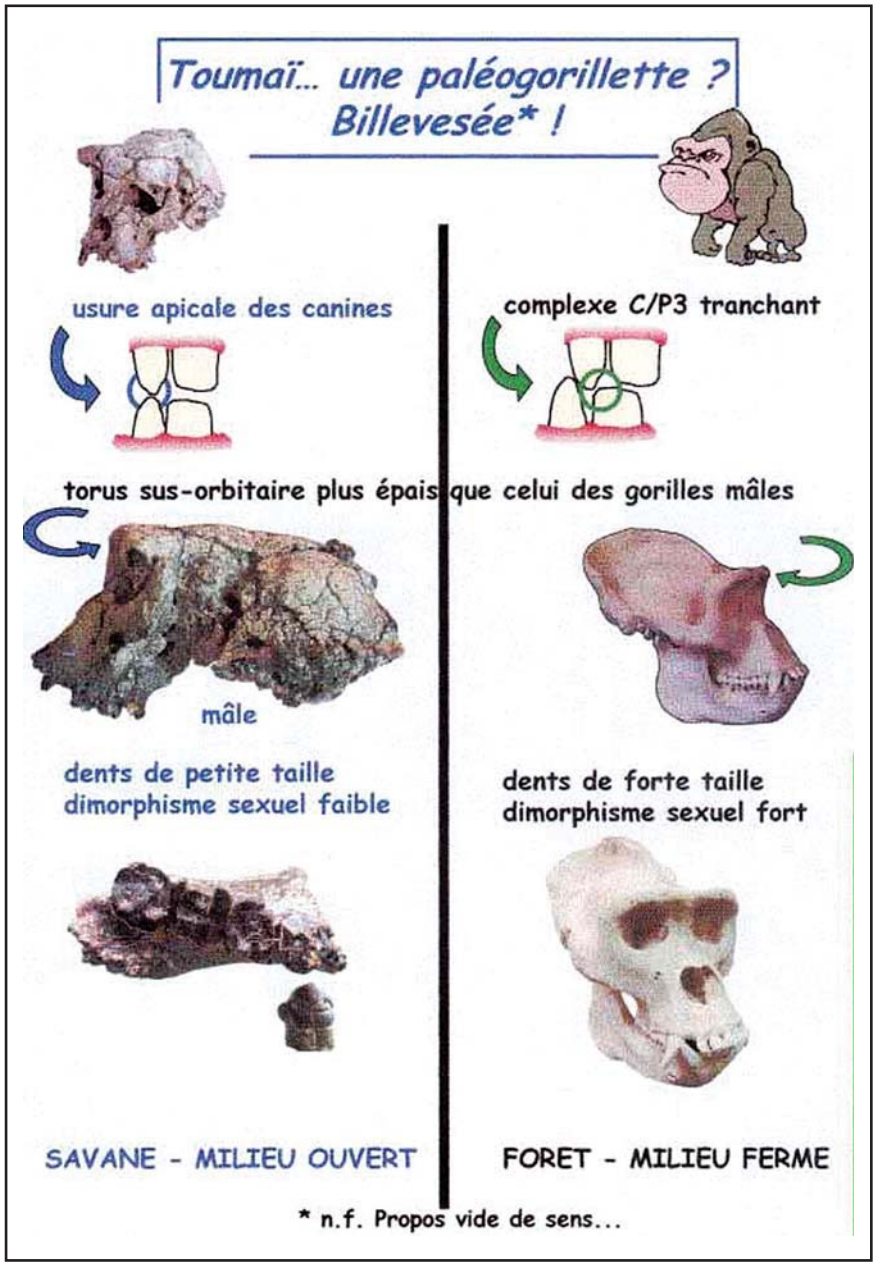


FIGURE 5. Misplaced humour often backfires, as in this presentation by Patrick Vignaud, a member of Michel Brunet's team, garnered from the internet. The orientation of the skulls is idiosyncratic, and the fact that there is only one specimen of a skull of *Sahelanthropus tchadensis* prevents Brunet's team from concluding that the degree of sexual dimorphism in the species is feeble.

find more fossils, Brunet had him repatriated to France against his will, where he would be as far from the fossil beds as Brunet was when the skull was found. This was a strange way to behave, considering that Beauvilain and his small team had collected more than 80% of the fossils being studied at the University of Poitiers and had mapped 95% of the fossil sites. The outcome is that nine years after Toumaï, no new fossil hominoids have been found in the Chadian desert.

A few years later, a hominoid femur from the Toumaï site was identified in the laboratory at the University of Poitiers by a student (Aude Bergerat) and a professor (Roberto Macchiarelli). Aude Bergerat was studying the taphonomy of the mammal fossils from the Toumaï site for her thesis. Within a couple of days of recognising the femur, her thesis plans lay in tatters, shredded by her supervisor. Her sin? Having asked the professor who had taught her taphonomy when she was an undergraduate, for his opinion about the fossil. Macchiarelli immediately recognised it as a hominoid femur with affinities to gorillas. Found within 30 cm of the skull of Toumaï, it could well represent the same individual. Macchiarelli was dragged before a university tribunal on a charge of interfering with the palaeocelebrity's research project (he responded by stating the obvious: he was employed by the university to respond to questions posed by students, and he didn't intend to stop merely because another professor felt possessive about a fossil) – the student was hounded out of the university. Many people would like to know why. The ascent of Michel Brunet was accompanied by the demise of a) the French leader of the field team which found the skull in the Chadian desert, and b) the student who was responsible for recognising the femur in the laboratory at Poitiers. At this rate it's a good thing the skeleton wasn't more complete.

Photographs of Toumaï taken by Alain Beauvilain, moments after the discovery of the skull, reveal that it lay close to a rectangle of an assortment of bones, some of which had been aligned parallel to the edges of the rectangle (Fig. 6). The area surrounding the immediate vicinity of the rectangle was devoid of bones, but in the far background of the image one can observe a random scatter of fossils, as is usual in the Chadian Desert. Alain Beauvilain interpreted this unnatural arrangement of fossils as an attempt by someone, perhaps a pious camel herder, to recreate a burial. The person or maybe a group of people, may have noticed the skull, thought someone had died there and decided, as is the custom in the region, to provide the defunct with a dignified burial. Bones were gathered from the vicinity, arranged in a shallow grave, humerus to the north, femur to the south, vertebrae down the middle and the skull and jaw to the east, then covered them over with sand and departed. The wind continued to shift the desert sand and gradually uncovered the artificial assemblage of bones, which was then discovered by Alain Beauvilain and his small team of Chadians in 2001. Most of the bones in the rectangle belong to antelopes, equids and suids, but the skull, a lower jaw and a femur belong to a hominoid.

FIGURE 6. The rectangular concentration of fossils which contained the skull and lower jaw of Toumaï, mixed in with bones and jaws of antelopes, suids and equids. The femur associated with *Sahelanthropus* is the longest bone in the image. Note that the sand has been trampled only on the near side of the rectangle. The shadows indicates that the photo was taken early in the morning. Photo Alain Beauvilain.

Michel Brunet's team have insisted that Toumaï was found in situ in the Miocene sediment deposits, associated with a fauna that securely dates the skull to 7 million years. The artificial aspect of Toumaï's grave proves that the skull was not in primary context at the moment of discovery. So does the fact that the skull was lying on loose sand and that both sides of it have been abraded and polished by wind driven sand. Do the associated faunal remains support the age of 7 million years? In a word, No!

Among the commonest fossils in the deposits where *Sahelanthropus* was found, are anthracotheres. These are often described as being hippo-like, but in fact their entire skeleton and dentition is radically different from those of hippos. Anthracotheres are interesting for determining the age of strata because, in Africa, there was a lineage that increased in size with the passage of geological time. Where they are abundant, the remains of this lineage (*Afromeryx-Libycosaurus*) can be used for biochronology, the science of determining the age of strata using fossils. The abundant remains of *Libycosaurus* found near Toumaï belong to two species, clearly demonstrated by Fabrice Lihoreau in his PhD Thesis. The smaller species indicates an age of about 10 million years (it is common at Beglia in Tunisia which spans the period 12-10 Ma). The large species is common at Sahabi, Libya,

in late Miocene and basal Pliocene strata (6-5 million years). The Toros-Menalla area exposes strata of both ages, liberating fossils onto the surface as the sediments are deflated by the wind. With which species was Toumaï associated? No-one currently knows, but it might be possible to find out if the field notes are precise enough. Fossil elephants are also useful for biochronology, so what do they reveal? The assemblage described by Hassan Taisso Mackaye, a Chadian palaeontologist, indicate that the vicinity of the Toumaï discovery yielded proboscideans that range in age from about 7 to about 4 million years, perhaps even younger for some of the highly evolved specimens of *Anancus*. Suids are even more useful for biochronology, but despite them being fairly common in the deposits they have not been analysed. Rodents would be useful, but neither have they been published, although specimens were apparently collected right at the Toumaï burial site.

In order to convince doubters that Toumaï really is 7 million years old, Brunet arranged for the deposits to be dated by a new technique "Be10" (Beryllium 10). The method is experimental, unproven, and usually produces a scatter of ages. In short, it is unreliable, even if the fossils being dated occur in situ in the sediments being analysed. In this case they weren't. The Be10 paper was accompanied by a faunal list which accords with the date of 7 Ma. But what has happened to the small species of anthracothere? It has been absorbed into the big species as females, producing a unique degree of dimorphism unknown among artiodactyls. What has happened to the young-looking proboscideans? They were simply omitted from the list. The names of suids are mentioned, but the fossils themselves have not been described. In brief, the Toumaï remains could be any age between about 10 million and about 4 million years old.

The Be10 paper is notable for a procedure that neophyte scientists are taught to recognise and avoid at school – the perils of circular argument. The Be10 method needs an external calibration point in order to set the clock. The analyses themselves don't yield an absolute age, unlike K-Ar and Ar-Ar methods which do. So Brunet and his team calibrated the Chadian Be10 clock using the faunal age of 7 million years that they had previously published for the Chadian fossils. How surprising therefore, that having set the Be10 clock using an age of 7 Ma, the outcome was an age for the fossils of 7 Ma. The wonder is that the *PNAS* referees didn't see that the snake was devouring its own tail.

THE UNEASY RELATIONSHIP BETWEEN THE PRESS AND SCIENCE: IS FOLLOWING THE YELLOW PRESS ROAD, THE SOLUTION?

From its inception, the press has been used by interest groups to disseminate dogma and misinformation. The first book printed on Gutenberg's press was the Bible. Soon, publicity tracts and eventually news sheets were being disseminated by

people who realised the potential of the press for making a profit while influencing the masses and, in short order, propaganda was the diet of the day in many towns and countries. The invention of internet has taken the "democratisation" of science to new levels by making it extremely easy for people to gain access to scientific ideas and to contribute to scientific debate. But it has also simplified the dissemination of dogma and propaganda.

Throughout history there have been people and groups of people who have wished to manipulate and influence others by whatever means available, ranging from harsh coercion to subtle propaganda, with opposition discouraged at various levels of violence ranging from repression of free speech and bloodshed to hindering the dissemination of opposing viewpoints. This phenomenon is still with us today. Western propaganda in the lead-up to the Second Bush War is a classic in the genre (Simpson, 2010, discussed the 'spin' employed by Tony Blair in the lead-up to the war). Science is the only outlet that encourages other people to think about what is being disseminated and to invite them, without hindrance, to comment on it in a logical, impassioned and reasonable way. All the other outlets are "sense unique" because they discourage debate and, because of that, they are potentially dangerous for society. In a sense, science is the only real democracy, because it is the only human endeavour that routinely invites criticism of its ideas. This is the real strength of science.

On the down side, because science is practiced by a relatively small sector of society (in some countries there are few practising scientists, in some they are actively discouraged, in others they are simply forgotten) print runs of scientific papers have historically tended to be limited.

> *The International Committee for Zoological Nomenclature rules that, in order to establish the validity of a genus or species name, at least 50 identical copies of the article in which the names are proposed, should be printed and made available for sale. The copies need not even be sold for the names to be valid.*

Limited print runs have meant that diffusion of scientific ideas by science journals usually has a restricted direct impact on the population at large (relatively few people read scientific journals), and this is why the diffusion of science to the general public via more readily accessible outlets is so important. Many science journals print fewer than 500 copies (usually in order to minimise costs, not only of printing, but also of diffusing the journals once printed). Some print thousands, but none publish as many copies as daily newspapers do, even in medium-sized towns. Add to this the fact that newspapers and magazines appear daily to weekly, whereas a few science journals are published once a week, some once a month, or quarterly and many only annually, and one is in the presence of a huge difference in audience outreach. Which explains why scientists who wish to attain a wider

readership employ newspapers and other mass information diffusion outlets, such as television, to put across their messages. A disadvantage of mass printed news outlets such as newspapers is their impermanent nature; here today, gone tomorrow. Radio and television are even more transient; here now, unobtainable in five minutes. In contrast, science journals are carefully stocked in libraries where they can be consulted hundreds of years after their publication. Celebrities who rely on mass press outlets therefore have to keep appearing in newspapers and on television (Figs. 7, 8 and 9); otherwise they risk dropping off the screen and out of the public consciousness, quelle horreur.

Newspaper journalists, editors and owners have many non-scientific pressures upon them. The newspaper has to make a profit in order to keep running. Press moghuls are often power brokers and usually have a political agenda which they disseminate in their newspapers (Simpson, 2010). The science that reaches the newspapers must either help sell the newspaper (that is, it must entertain rather than just inform) or must be in accord with the political agenda of the editors and owners. If not, it has little chance of being accepted for publication. Add to this the rush and bustle of news gathering on a daily or weekly basis, journalists and copy editors harried by approaching deadlines, and owners shouting for increased sales, and one has all the ingredients for chaos. It is little wonder that many announcements about science in newspapers contain errors, sometimes serious, sometimes funny, but usually tragic for science.

For the first half of the 20th Century, when palaeoanthropological discoveries reached the pages of the press, apart from occasional slip-ups, the accounts were usually sober, well considered articles, often written by scientists, or by journalists who had been well briefed by scientists knowledgeable in the domain. A special relationship between palaeoanthropology and the "yellow press" did not develop until the second half of the century. The "yellow press", well summarised by Simpson (2010), is a term that originated in America, "*to describe the attention-grabbing, scandal-mongering, rabble-rousing, exaggerated, often misleading, but always lively form of journalism pioneered by Joseph Pulitzer and William Randolph Hearst in America, and C. Arthur Pearson and Cecil Harmsworth in Britain*". From the late 1950s, the increasing use of "yellow" journalism to market fossil finds led to a strange situation in which scientific integrity came into conflict with the aims and methods of the "yellow press". In most cases the tactics of the "yellow press" won, with scientists themselves often providing the scoop – every journalist's dream – the exaggeration, the attention-grabbing headline, the misleading iconography, and even on occasion the scandal. If this tendency had remained at the level of the newspaper, the damage to science might have been limited, but it didn't. The temptation to exaggerate and mislead found its way into scientific papers, at times creating the "false facts" that so worried Darwin (1871).

Chicago Tribune, Thursday, April 2, 1981 Section 2

Tempo

An old fossil named Lucy turns a young scientist into a star

You're squatting in that blazing sun, and you fit these two bones together, and suddenly it hits you: That's not a monkey — it's a human being!
— Donald Johanson

By Peter Gorner

AS A GRADUATE student, Donald Johanson left Chicago a decade ago for the sun-baked badlands of Ethiopia and came back a scientist. A few more trips have made him a superstar.

Penniless but bright and gutsy, Johanson was determined to join an elite, fiercely competitive fraternity — those who hunt the fossils of earliest man. Lacking any clout, he discovered to his amazement that he possessed something much more important: The gift for finding astonishing things. And the things Don Johanson has found are shaking the human family tree to its roots.

"I've become superstitious," he admits, grinning. "Those of us who look for fossils of human ancestors have to be. The fossils are extremely rare and many distinguished paleoanthropologists have gone a lifetime without finding a single one. I'm lucky — I know it, and don't try to hide it. Some mornings in the field I just awake with a special feeling that I've learned to heed. That could be the day something terrific might happen."

JOHANSON'S TERRIFIC things have come from the Afar Valley, a remote Ethiopian desert hellhole he has made famous. Since 1974, his team has unearthed the fossilized bones of more than 60 creatures apparently belonging to a protohuman species previously unknown to science.

"Most people, unless they're creationists or fundamentalists," Johanson explains, "believe in evolution, whether they know the details or not. Essentially, we're finding that our roots grow much deeper than we'd imagined.

"For instance, if I could put a business suit on Neanderthal Man and teach him to use a CTA token, he'd ride the subway and nobody would notice. He'd look a little heavier-boned, with a slightly primitive face, but he was Homo sapiens — man the wise; man who is aware that he's man. He'd fit in today, even though he hasn't been seen for 60,000 years.

"Before him, about 1.5 million years ago, was a less-advanced type, Homo erectus. Put him on a subway and he'd draw a few suspicious looks. He was a tough fellow with a smaller brain, thicker jaw, heavier brow, and powerful physique. I'd say he was too small to play pro football, but he'd have been devastating at hockey.

"Before erectus came a really primitive type, Homo habilis, or 'Handy Man,' the tool-user, about 2 million years ago. He's the one Louis Leakey discovered at Olduvai Gorge in Tanzania. No matter how I dressed him, though, people would move to the end of the subway car.

"THEN IF WE went back in time a long way, we'd finally get to Lucy — even Paris fashions wouldn't have helped Lucy. If she stepped aboard a subway, the pas-

Lucy in the subway with Hominids

FIGURE 7. In North America, competition to become the acknowledged "star" of palaeoanthropology led to some extraordinary publicity, which had little to do with science, but much to do about celebrity. The "yellow press" appeared to encourage this type of publicity, but it eventually led to diminishment of the quality of science in the country. By 1990, Johanson had faded into relative obscurity (from the *Chicago Tribune*, 2nd April, 1981).

> *"False facts are highly injurious to the progress of Science, for they often endure long, but false views, if supported by some evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness."*
>
> **Charles Darwin (1871)**
> *The Descent of Man*

Telegraph

OLDEST SKULL IS CLUE TO 'MISSING LINK'

By Dr ANTHONY MICHAELIS, Science Correspondent

A SKULL estimated to be 2·6 million years old, the oldest so far discovered and possibly part of the "missing link" between ape and man, has been found by Mr Richard Leakey, Director of the National Museum of Kenya.

Mr Leakey explained in London yesterday how a Kenyan, Mr Ngeneo, discovered hundreds of skull fragments projecting from the side of a rock-strewn hill, and how these pieces were carefully collected and pieced together into what "is almost certainly the oldest complete skull of early man."

While Mr Leakey, son of the pioneer anthropologist Dr Louis Leakey, who died last month, was speaking in London a simultaneous announcement of his discovery was being made in Washington.

"The search must now begin for the common ancestor of man and ape," Mr Leakey said. "I

News round-up

NO CUTS IN COMMERCIAL RADIO RENT

POTENTIAL applicants for licences to run

Mr Richard Leakey, director of the National Museum of Kenya, holding a skull, estimated to be 2½ million years old, which was pieced together from hundreds of fragments found near Lake Rudolf in Kenya.

FIGURE 8. In this iconography from the *Telegraph*, note the curved pipe which, for many people who read detective stories, provides an association of ideas between the image and the words in the headlines - "clue", "missing link", "skull" and "oldest". The intention was to promote the idea that the personality in the image is a detective, and has found something important. Note the chiselled facial features.

FIGURE 9. Famous, but fictional detective Sherlock Holmes with lean facial features and his trademark curved pipe: a creation of Arthur Conan Doyle.

Because of this imbalance between the power of scientific integrity and that of the "yellow press", a few scientists and research teams decided to "join the side that is winning the battle". They have compromised their science, and have produced "yellow press releases" to hand out to journalists at press conferences. Having done so, some didn't stop there, but on occasion carried the exaggeration and falsity into their scientific papers. In theory, press releases are supposed to convey accurate scientific information in an accessible way to journalists who can then recast the information in their own writing style. But, recent experience has shown that many press releases are hyped up by the scientists themselves in order to make the announcements more attractive to journalists. A further tactic employed to gain the attention of journalists, but usually only used by the "Top Three" science journals (*Nature*, *Science*, *PNAS*) is to release the contents of a scientific paper to journalists under embargo, usually 48 hours before it is due to be published in the scientific journal. This is supposed to give journalists adequate time to do some background research while preparing their news articles, but one effect is to give lots of journalists the impression that they have each been given a scoop, thereby assuring wide coverage of the "embargoed item". Background research includes interviewing scientists in the same domain to garner their opinions, as well as clicking on internet to scan the latest blogs, Wikipedia and other sources of information.

Whilst all this is quite understandable from the point of view of a harried journalist troubled by looming deadlines, it has given rise to the unfortunate tendency that palaeoanthropology articles published in journals other than the "Big Three", are usually considered to be unworthy of press attention, no matter what their merit or scientific interest. Thus, rubbish that is accepted by *Science* or *Nature* has a good chance of appearing in the popular press, whereas a highly important article published in *Human Evolution*, or *Anthropologie* for example, has no chance whatsoever. Powerful palaeoanthropology lobbies know this, and they have traditionally focussed their attention on controlling access to the "Big Three", by being represented on editorial boards and committees, and by nominating suitable referees. Other scientists know this too, and many have given up trying to publish in the "Big Three": their manuscripts get rejected as a matter of course, no matter what the quality or interest value of the contribution is, so why waste time and effort submitting to such outlets?

> *"But boring though it may be to dwell on the subject, the fact remains that 90 per cent of national newspaper circulation are controlled by five men: Rupert Murdoch, Conrad Black, David Montgomery, and My Lords Hollick and Rothermere. Two are foreigners. All are rich and anti-union – a combination that notoriously restricts the range of events they allow to be covered. All, with the exception of Rothermere, have squeezed news and used their papers as cash cows. Freedom of the press means freedom for these gentlemen to do what they want. They, and their counterparts in television, have changed journalism from a trade that encouraged reporters to*

develop specialist knowledge to a kind of feudal system with a few over-paid managers, columnists and newscasters at the top and a mass of casual, pressured and often ignorant serfs underneath.
... the subjectivity of our age has subverted the belief that there are events of importance that can – indeed, must – be reported. You do not have to strain too hard to grasp the connection between Baudrillard's claim that the Gulf War did not happen and Murdoch's boast that it did not matter that the Hitler Diaries were fake because newspapers were in 'the entertainment business."

Nick Cohen
New Statesman, June 1998

Although newspapers and other mass press outlets can, and do, play an important part in diffusing science, they are routinely abused and manipulated by a few unscrupulous individuals and groups. The danger is that announcements of scientific discoveries can be distorted in order to make them more acceptable to news outlets, or to enhance the scientist's image in the eyes of the public, more than to inform people about the real meaning of the discoveries. The chances of the same news outlets publishing a rectification of false information diffused by them are vanishingly small, and the manipulators know it. The dice are loaded in the favour of propaganda. The disease of yellow press science appears to have no remedy. Those purveying it have no interest in ceasing their activities: those trying to stop it are never heard.

Widely disseminated announcements during the early 1970s concerning the discovery of KNM ER 1470 (an australopithecine skull initially incorrectly interpreted by its discoverers to be a primitive *Homo*) were deeply flawed, not only from the point of view of the anatomy of the fossil skull which was deliberately falsified to make it appear more human-like (Walker & Shipman 1996) but also because of its supposed great age, which was also incorrect (Fitch *et al.*, 1996). After a decade, other scientists rectified the age of the fossil (from 2.6 to 1.8 million years) – news outlets took no notice whatsoever – and after three decades the anatomy was rectified (Bromage *et al.*, 2008) (Fig. 10) – again without invoking the slightest interest on the part of the press. A clear bias was present – propaganda that sold newspapers got wide dissemination, whereas good science that would not necessarily sell papers did not.

"*After 1470 threw Richard onto the world stage, he remained there by writing best-selling books and making lecture tours that, like his father's, led to funding*".....

"Johanson had not succeeded in unseating Richard from his perch atop the world of paleoanthropology although newspaper and magazine articles, especially those in America, helped by building up a rivalry between the two. Johanson was usually cast as David and the Leakeys, past and present, as Family Goliath."

Mary Bowman-Kruhm, 2005

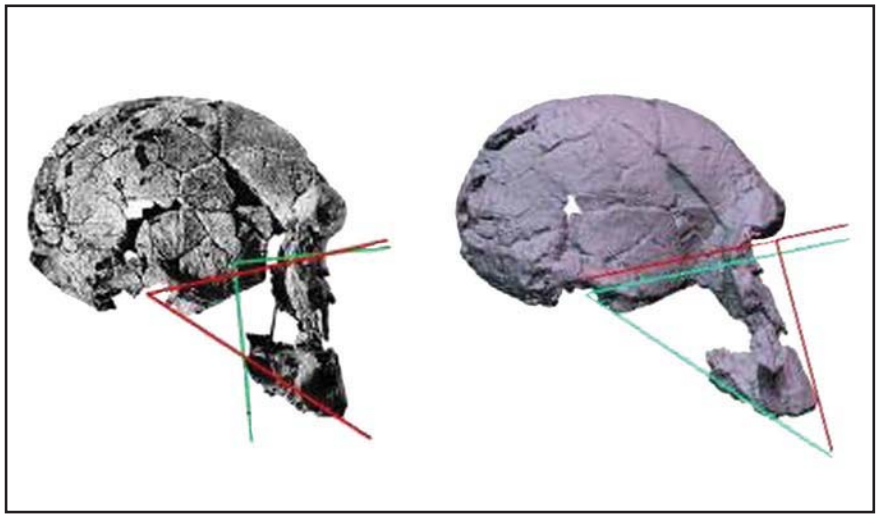


FIGURE 10. The left image is of a false reconstruction of KNM ER 1470. It was widely disseminated in the 1970s and ensured the growth of Richard Leakey's influence in North America, where Donald Johanson was busy trying to establish his own claim to celebrity. The image on the right shows an alternative but less scientifically faulty reconstruction published 30 years later which received almost no publicity at all. In fact the right image was itself misleading to the extent that the brain box had not been oriented at the same angle as that in the left image. Clockwise rotation of the right image by about 5° (as in this version of the reconstruction) aligns the two brain boxes correctly, which reduces the exaggerated impression of prognathism that the right image originally gave (modified from Bromage *et al.*, 2008).

The parallel rise of palaeoanthropology lobbies and poor science practice

Because science is a self-criticising endeavour, in which debate is essential, it is unsettling to find that some colleagues deliberately withhold information in order to limit or to frustrate criticism and debate. One recent case concerns the formal description of fossils from Ethiopia identified as *Ardipithecus ramidus*, accompanied by claims that this species represents a new and distinctive adaptive plateau in hominoid evolution (White *et al.*, 2009) (Fig. 11) (for a similar claim about the adaptive plateau, but this time with *Ramapithecus punjabicus* as the contender for human ancestry, readers are referred to the publication by Simons & Pilbeam, 1965, p. 140, one of the most influential and most misleading palaeoanthropological publications of its decade). The concept of a series of adaptive plateaux in human evolution is basically creationist, harking back to the ladder of beings popularised by Aristotle, because it has overtones of human ancestors ascending successive steps towards the pedestal of perfection. It failed with *Ramapithecus* in 1965, and it fails with *Ardipithecus* in 2009.

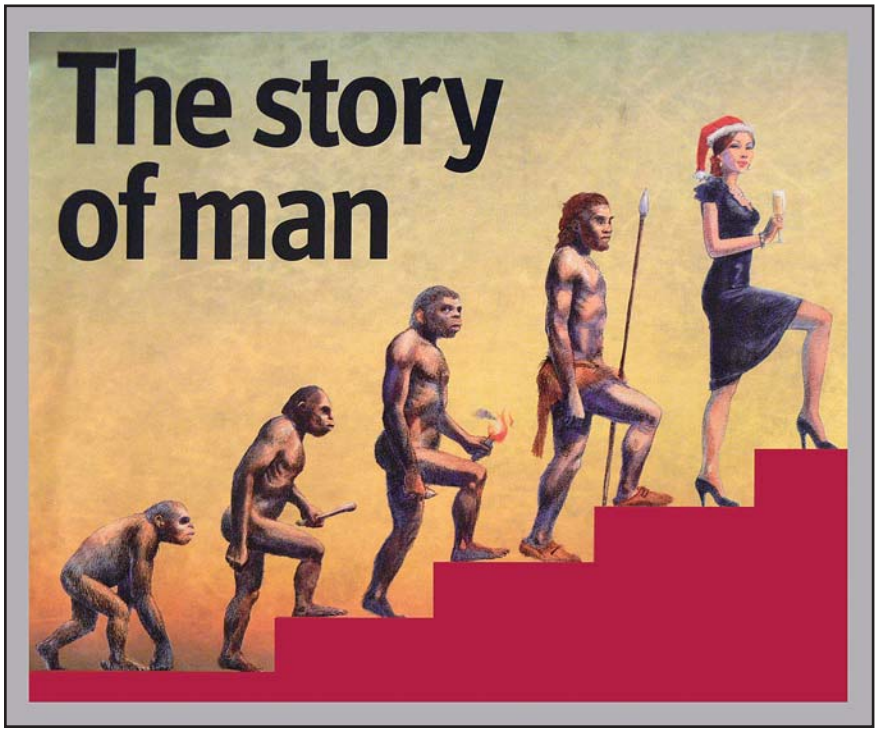


FIGURE 11. Human evolution depicted as progress through a succession of adaptive plateaux leading upwards, step-like, towards perfection. In this interpretation something like *Ardipithecus ramidus* is shown about to step up onto the first adaptive plateau. In 1965, *Ramapithecus* was in this favoured position. There are strong overtones of creationism and punctuated equilibrium in such a scenario. Amusing, but barely scientific, yet based on scientific publications and press releases prepared by palaeoanthropologists (front cover of *The Economist*).

In the case of *Ardipithecus*, the authors published 170 pages in *Science* on the geological context, site exploitation, anatomy and interpretations of *Ardipithecus* fossils, without providing measurements of the dentition. Curiously, there is a table listing the fossil teeth that could be measured, but no measurements are provided. It is therefore impossible for other scientists to check on the summary statistics published by the team, or to test their hypotheses concerning variation and dimorphism in the sample. Informed debate about the fossils has been rendered impossible. Science has become the victim of scientists.

Withholding information is anti-scientific, and unfortunately, rather common in palaeoanthropology. The fact that the lengthy series of papers on *Ardipithecus ramidus* was published by the official outlet of the American Association for the Advancement of Science, makes the omission that much less understandable to other palaeoanthropologists. As John Hawks wrote in his Blog, this reduces the

journal "*Science*" to the level of a "rinky-dink" publication, a sentiment with which many palaeoanthropologists would be inclined to agree, given the generally poor level of palaeoanthropology articles that it has published over the past 30 years. The same could be said about *Nature* and the *Proceedings of the National Academy of Science*, both of which have been under the control of, or have been heavily influenced by, the same palaeoanthropology lobbies for several decades, and which have published some real boners in their time. Remember "Mitochondrial Eve?" The phenomenon is not confined to palaeoanthropology, but concerns other areas of science too : "Cold Fusion" , "Water Memory" and "Global Warming" were all given space in *Nature*, as was the notorious "Pluvial Theory" of the 1920s to 1950s (Pickford, 1997) which resulted in so much damage to the fossil record relevant to the study of human evolution.

Lobbies not only have a pernicious effect on society, they almost inevitably end up retarding the advancement of science in the countries where they are active, and even internationally. The concepts behind the interpretations of *Ardipithecus ramidus* (4.2 Ma, Ethiopia) published in 2009 could have come straight out of the late 1960s and early 1970s. The basic ideas expressed in the various articles had, by that time, congealed in the minds of the senior members of the team, only to resurface four decades later to be applied to different fossils. The peculiar, idiosyncratic, way of interpreting morphological and metric variation is the same, the ideological view of an ancestor leading straight towards humans is the same, the concept of a new, distinctive adaptive plateau is the same, and the role of sex and hidden oestrus in human evolution has only changed to the extent that one of its detractors in the 1970s (Tim White) has now been converted to the cause. In short, the authors have not advanced in their basic ideas one iota, despite the wealth of fossil hominoids that have been found during the past 40 years. Consequently, in terms of its ideas, this team is about 30 years behind the times compared with palaeoanthropologists in the Old World. This is one of the consequences of allowing lobbies to take over control of science.

In contrast, the iconography of *Ardipithecus ramidus* released to the mass media did change over the past 15 years, even if its interpretation as a basal member of the human lineage did not. In 1994, when there were few fragments of the species available, the widely disseminated reconstructions showed it as a stooped over, crouching, but semi-upright creature with human-like feet and hands, but with bent chimpanzee-like knee and hip joints, slouched shoulders and an australopithecine-like head. Now that a partial skeleton is available, recent iconography reveals that *Ardipithecus ramidus* possesses ape-like feet and hands, an ape-like skull, but fully erect human-like hip and knee joints, squared off, almost soldierly, shoulders and a ramrod-like, vertical spine, reminiscent of Adolf Schultz's comparison of ape and human bodies (Schultz, 1956).

Comparative iconography of the *Ardipithecus* images is revealing (Fig. 12). Between 1994 and 2009, all the parts of the skeleton which are now well known, have become more ape-like, whereas the parts of the skeleton that are still poorly known, or are severely crushed, have become more human-like. Thus, the absence of evidence about knee, hip and shoulder morphology, and the vertebral column, has allowed the artist free reign with the imagination to depict *A. ramidus* as a direct human ancestor (Fig. 13). Future discoveries are predicted to show that the knees, hips and shoulders of *A. ramidus* were also more chimp-like than human-like.

Even though the raw measurements of *Ardipithecus ramidus* have not been made available to colleagues, close examination of the publications reveals that, far from being a basal member of the human lineage, *A. ramidus* has a high probability of being a derived member of the chimpanzee clade. The authors themselves point out that all five of the mandibles in which molar wear can be assessed,

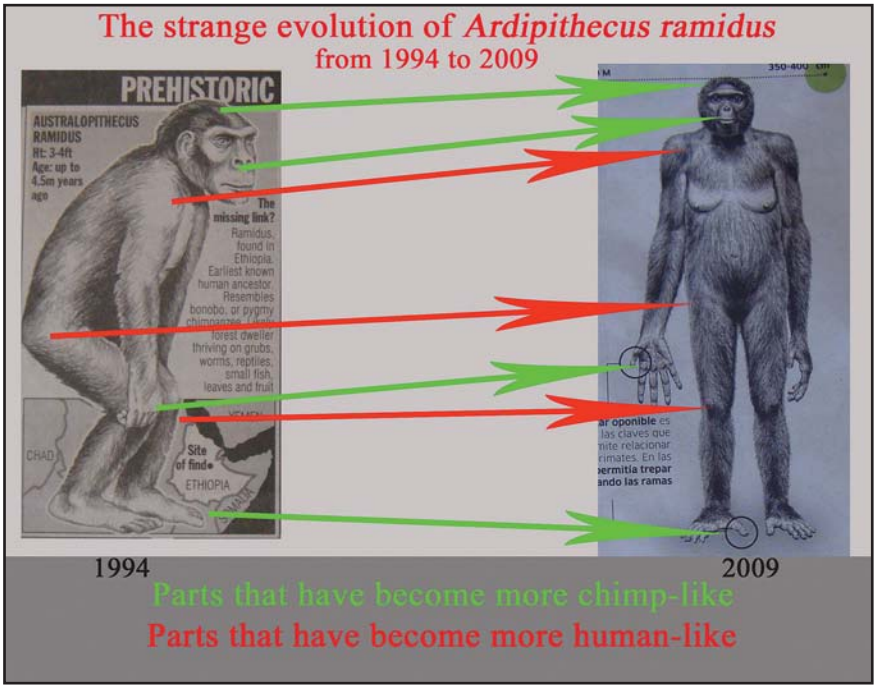


FIGURE 12. Comparative iconography of *Ardipithecus ramidus*, 1994 and 2009 renderings. Despite the much improved fossil representation of this species, it is still interpreted by its describers as a human ancestor, even though the best preserved parts of the skeleton (hands, feet, skull, teeth) are undoubtedly more chimp-like than originally thought in 1994. The 2009 reconstruction shows more human-like knees, hips and shoulders than the 1994 one, but this is only possible because these are the parts which are poorly represented as fossils, with the joints either missing altogether, or badly crushed (see Fig. 13).

FIGURE 13. Artist's reconstruction of *Ardipithecus ramidus*, 2009 version. Note that the most human-like parts of the rendering (knees, hips, shoulders and spine) are the parts that are the least well represented by fossils (red stars in the layout of the skeleton) thus allowing a much freer interpretation than the better fossil representation of the hands, feet, skull and dentition which are all chimpanzee-like (*El Pais*, 2nd October, 2009).

show that there is little differential wear on them (the three molars show almost the same degree of wear). Most, if not all Miocene apes, australopithecines and humans show, in contrast, a differential wear gradient of the molars (the first molar is moderately to deeply worn even before the third molar has erupted, as for example in 6 million year old *Ororin* from Kenya). Chimpanzees, however, are, in this respect, like *Ardipithecus ramidus*.

Compared to almost all other known apes, extant chimpanzees (both bonobos and common chimps) have mesio-distally elongated incisor rows (orang-utans also show this feature, but developed it in parallel to chimpanzees). Most hominoids, both extant and fossil (including humans) have lower incisor cutting edges that are about 60% of the length of the molar row (Fig. 14) (Pickford, 2004). Australopithecines in contrast possess incisal edges that are far shorter than the length of the molar row. Although it is not possible to provide an accurate assessment of the incisor-molar relationship for *Ardipithecus*, on account of the absence of published measurements, examination of the illustrations reveals the likelihood that the low-

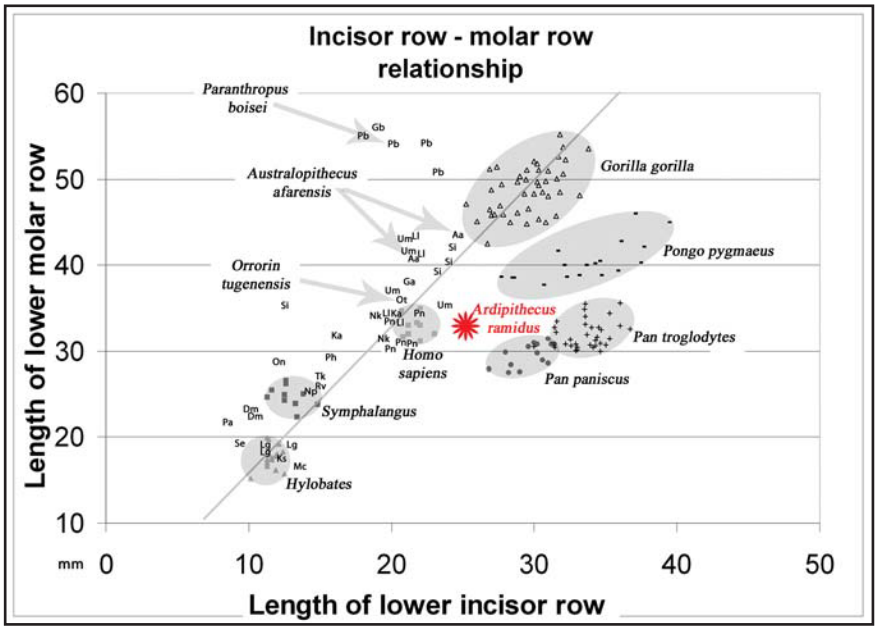


FIGURE 14. Length of cutting edge of lower incisors versus length of lower molar row in hominoids. *Pongo* and chimpanzees have elongated incisors relative to molar row length, whereas robust australopithecines and *Gigantopithecus* have fore-shortened incisal edges. The majority of hominoid species, including humans and *Orrorin*, lie about a regression line sloping at ca 66°. *Ardipithecus ramidus* plots beneath the regression line, and not far from bonobos and common chimps.

er incisor cutting edge is relatively long compared to the length of the molar row (Fig. 14). Measurements estimated from the illustrations indicate that the incisor-molar ratio in *A. ramidus* plots closer to the bonobo and the common chimpanzee than to any other hominoid, humans included. It plots far from the i-m ratio of australopithecines, making it extremely unlikely that *Ardipithecus* is their ancestor, and even less likely that *Ardipithecus* gave rise to humans via an australopithecine intermediate stage, because such a scenario would require an evolutionary yo-yo, starting with a much elongated incisive edge (*A. ramidus*), evolving to a much fore-shortened one (*Australopithecus*), and then returning to a normal one (*Homo*) as in the majority of apes and humans.

Add to this the chimp-like feet and hands of *A. ramidus* (the thumb in particular shows derived chimpanzee-like reduction of the terminal phalanx, in strong contrast to the thumb of 6 Ma *Orrorin* from Kenya, which is human-like), the ape-like skull (assuming that the reconstruction is valid), and dentition, then it is difficult to escape the conclusion that *Ardipithecus ramidus* is more likely to represent a proto-chimpanzee than a proto-human, or for that matter, a proto-australopithecine.

The same cannot be said of *Ardipithecus kadabba* (5.7 Ma), which, in its known parts is more like *Orrorin tugenensis* (the *A. kadabba* hypodigm probably contains remains of two taxa, one like *Orrorin*, the other ape-like).

Reluctance to share data in a freely scientific way is not unusual in palaeoanthropology (Fig. 15). Such behaviour is not confined to America, but also occurs from time to time in Europe. The CEREGE scientific meeting in France, in June, 2006, which was meant to celebrate the 30th anniversary of the discovery of "Lucy" (*Australopithecus afarensis*) was unfortunate for the lack of the sharing ethic on the part of some of the attendees. Two teams, one from France, the other from California, adopted an exceedingly aggressive attitude towards other teams that interpreted fossils in a different way from them, and they refused to share their data with those colleagues. It is strange, therefore, to find colleagues with such an anti-scientific attitude fêted in newspapers and weeklies as champions of science.

FIGURE 15. Presentations at the June, 2006, CEREGE meeting meant to celebrate the 30th anniversary of the discovery of "Lucy" provided an opportunity for some scientists not to share their data with colleagues.

Michel Brunet proudly admitted on radio, that "*Very, very few people have had the privilege of seeing Toumaï*" (I am summarising what he said in French). Among those is Jacques Chirac, at the time President of France, but many palaeoanthropologists who have wanted to examine the fossil (or even a good cast of it) have had their requests routinely rebuffed. So what happened to the free exchange of ideas, the vitality of debate, the advancement of science? There has been published debate about *Sahelanthropus*, during which several scientists in America and Europe have pointed out how and why Toumaï is more likely to represent a proto-gorilloid than a hominid. Michel Brunet ignores the scientific papers but instead is fond of saying "*Palaeoanthropology is a jungle, full of predators*" (Brunet pers. comm. Cluj, 2009) and of explaining why he only responds to articles published in journals with high impact factors. Anything that appears in regular scientific journals is considered by him to be unworthy of comment – to other scientists his unwillingness to enter the debate is unfathomable. Pickford (2005) demonstrated that there were serious reservations concerning the orientation of the foramen magnum in *Sahelanthropus* and of its comparisons with other apes, a finding that indicates that this genus of hominoid was probably not a biped. Despite this demonstration, Brunet has not refuted Pickford's results, yet he continues to utilise and publicise his own undebated ideas (Brunet, 2010) as though the entire world is in agreement with him. The matter is important, as it is widely viewed as the only substantive argument that has been put forward by Brunet and his team in support of the bipedality of *Sahelanthropus* (see for example Schaefer, 2010).

The fossil discoveries linked in the popular press to these celebrities, are usually important, but in most instances the focus has shifted from the fossil discovery to personalities (Fig. 16) – in the case of *Sahelanthropus*, the person fêted (Michel Brunet) was not in Chad at the time the fossil was found, although most newspaper coverage gives this impression (Fig. 17). The small team of dedicated field researchers who made the *Sahelanthropus* discovery have faded into obscurity, their French team leader unwillingly repatriated to France, where he would be unable to make any similar discoveries.

Almost unknown to the general public is the fact that the *Sahelanthropus* paper in *Nature* acknowledges discussions with Lubaka – reputedly the name of Tim White's cat. Not only that, but one of the multitude of co-authors is a Chadian chauffeur who is unable to read and write. More extraordinary still, is that, thanks to his co-authorship of a paper in *Nature*, the chauffeur has a higher SCI than many experienced and professional palaeoanthropologists.

FIGURE 16. Michel Brunet on camel back in Libya. Richard Leakey had similar images taken of himself in the Turkana Basin, but he avoided having the camera and sound equipment intrude into the image so that the Lawrence of Arabia atmosphere would not be spoiled (from *Le Nouvel Observateur*).

FIGURE 17. Top row - Cutting from *Le Nouvel Observateur*, January, 2010, celebrating the decade's greatest advances in science. Michel Brunet was in France at the time of discovery. The term "palaeoanthropologist" has had to be considerably modified to accommodate Michel Brunet in it. The fossil was not exhumed, since it was lying on the surface of the desert. The interpretation of the fossil as undoubtedly the first biped and ancestor of all the hominids is far from being accepted by the majority of palaeoanthropologists. In addition the age of 7 million years is not secure. Apart from that, *Le Nouvel Observateur* should be congratulated on its dissemination of the discovery of an important fossil in Chad in 2002, although its scientific name *Sahelanthropus* would have been preferable to its nick-name. Bottom row – Diverse aspects of the Toumaï phenomenon, left: promoting air travel, centre: L'Espace Toumaï in Poitiers, and right: recognition of Michel Brunet's contribution to Science, University of Poitiers.

THE SIMULTANEOUS GROWTH OF PALAEOCELEBRITIES, SCIENCE LOBBIES, THE SCIENCE CITATION INDEX (SCI) AND THE JOURNAL IMPACT FACTOR (JIF)

Ever since the Russians sent the Sputnik into space ahead of American attempts to do the same thing, Americans have been paranoid about lagging behind the rest of the world in science. An outcome of this paranoia has been the development of a method of measuring the quality of the scientific output of individuals and laboratories so that a score can be kept of American science performance against that of other countries. The premise behind this initiative was that a scientific article that is cited often must be better than a paper that is rarely or never cited. Gregor Mendel must be turning in his grave – his SCI was zero until four decades after his death.

Judging the quality of a scientific paper is a difficult thing for bureaucrats to do, hence the notion that citation of a paper by scientific peers might provide a means of assessing the scientific merits of a publication. Secretaries (few of whom have any serious scientific expertise) could easily scan the reference list at the end of scientific articles, count how many times each article is cited and thereby provide a measure of metascientific data concerning the author or the laboratory that published the article. Thus was born the Science Citation Index (SCI). The same procedure was applied to journals, which has resulted in the creation of the Journal Impact Factor (JIF). Increasingly in western societies, principally in America, but sadly, also in the Old World, the SCI and the JIF, are being used to assess the quality of scientific output of individuals, laboratories and journals. Few people have paused to ask whether the SCI and the JIF provide an accurate measure of the quality of science, or whether they merely record the number of times an individual, a team or a journal has been cited by another individual, team or journal. Indeed, because it is easier to criticise a poorly written scientific paper, or one with weak arguments, such papers tend to obtain a higher SCI score than a well constructed, well documented and well argued paper which is difficult to comment on, although easy to accept because of the excellence of its scientific content. In such cases the SCI yields a higher score for poor papers than for meritorious ones. Apart from these weaknesses, the SCI and JIF are calculated by searching only a limited sample of journals – most journals from third world countries are not surveyed, many from the developed world are ignored, and books, conference proceedings and the like, never figure in the calculations. Charles Darwin rarely published in what would today be scored as journals with a high-ranking JIF. His books on evolution would not be included in the samples. One can barely envisage a less credible method of assessing scientific merit.

The focus on the SCI and the JIF has given rise to two phenomena – A) selective citation (auto-citation, lobby-citation, and non-citation of the work of rivals), and B)

selective submission (overloading journals that enjoy a high-ranking JIF with large quantities of submissions). Both phenomena are nefarious to science, but both are exploited by lobbies to increase their influence.

Under normal circumstances, scientists who are devoted to the advancement of science cite all papers relevant to the subject being discussed. But under the SCI and the JIF banner, the temptation to drive up an author's or a team's SCI has given rise to the absurd (and counter-productive) situation whereby important references that have been published by rivals tend to be omitted from the bibliography (in order not to boost their SCI), whereas papers of marginal interest to the debate are cited in order to augment the SCI of authors or teams belonging to the same lobby. Similarly, the flood of submissions to high-ranking journals by scientists and laboratories anxious to increase their SCI, makes it easier for lobby members who sit on editorial and refereeing committees to recommend to editors the rejection of manuscripts submitted by rivals, sometimes on flimsy grounds such as shortage of page space, or that the contents are not original, are of marginal interest or run counter to established views, whereas they can promote papers by members of the same lobby, regardless of the scientific merits of the paper.

The outcome of this activity is that the SCI and the JIF rarely reflect the realities of scientific debate, and almost never do they provide an accurate measure of the quality of the science being published. All that the SCI and the JIF do is fuzzily measure quantities which bear little or no relevance to quality.

It is therefore bizarre, to say the least, to find that government agencies, universities, research institutes and museums often based recruitment and promotion decisions on such patently inaccurate (and irrelevant) metascientific data, although recent research reveals that the practice is becoming less common (Abbott *et al.*, 2010). All that it facilitated was the recruitment, promotion or funding of people who belong to lobbies. Nefariously, a defective SCI of a candidate is manna to lobbies that are thus enabled to stress, in all honesty, that the candidate should not be recruited on account of his defective SCI score. In such cases the SCI thereby imperils the recruitment, promotion and funding of scientists who perform excellent science but who do not wish, for one reason or another, to inflate their SCI or to compromise their science by agglutinating to lobbies.

Although fewer and fewer institutions base recruitment on scientometric data (Abbott *et al.*, 2010) it is clear that publishing in the "Big Three" (*Nature*, *Science*, *PNAS*) can lead to press interest, which can significantly improve a candidate's chances of being recruited. Thus even though the candidate's SCI may no longer be taken into account directly by recruiting committees, it sneaks in via the back door thanks to well-timed press exposure.

At their worst, lobbies end up full of weak-willed, like-minded people, who chant the same old tantra for years on end. This is one reason why some sectors of

American palaeoanthropology are 30 years behind palaeoanthropologists in some European countries. Throughout this period, American palaeoanthropology has been largely dominated by three lobbies (two on the east coast, one on the west) which control access to high ranking journals, who sit on funding, recruitment and promotion committees, and government advisory boards, and who ensure that rivals are unable to do the same. As a result many excellent scientists and teams of scientists, with which America is relatively well endowed, have been marginalised by such lobbies, or have had their activities curtailed or hampered due to lack of funds or recruitment possibilities.

Overall, therefore, preoccupation with the SCI and the JIF in America, and increasingly in Europe, has had the opposite effect to that hoped for. It has fostered the growth of lobbies which in the medium and long term have eroded American science even more than was the case during the cold war. The failure to include many journals from Russia, Eastern European countries, India and China in the SCI surveys (don't even think of including African journals in the count), has blinded the authorities to the fact that all these countries are actively engaged in science, and, for better or for worse, are publishing the results. The focus of the SCI and the JIF is predominantly on journals published in English and other major languages, which has drawn attention away from journals that publish in other languages, thereby increasing the bias that existed during the sputnik era, which ironically was the motive for America to invent the SCI in the first place. The ways that the SCI and the JIF were implemented has thus been self defeating, and in retrospect, both of them have had a negative influence on the advancement of science in America.

The rest of the world is beginning to wake up to the fallacy of the SCI. When a young American researcher applies to carry out research in an African country, he would be well advised to leave out of his Curriculum Vitae information that he has published X papers in journals with a high ranking JIF. What this means to arbitration committees in some countries is that the person concerned belongs to a lobby intent on unilaterally exploiting the resources of that country. It does not necessarily signify that he is an excellent researcher, only that he may be well connected politically in his homeland.

In the meanwhile, anti-scientific enterprises in America have flourished, largely fuelled by the antics of palaeoevangelists and their lobbies, and facilitated by access to internet. One might well ponder whether the palaeoanthropology lobbies aren't in reality covert agents working for the enfeeblement of science in America, collaborating hand in glove with creation scientists and intelligent designers. All three groups are undermining American science; only the means of doing so differ.

In all these activities, access to the mass media is crucial, and this is provided by its various guises - newspapers, radio, television, books and the internet. The first three are relatively easy for lobbies to control, being by nature strongly hierarchical

and centralised in structure and thus readily accessible to manipulation, a weakness that was found out too late by the Incas. The fourth and fifth are the scientist's wild cards, particularly the fifth which is the Achilles' heel of lobbies and personality cults. More and more, the signal going out to people who want to know about human origins is "Don't rely on newspapers to learn about human origins. Go to the scientific journals and internet, but approach the latter with discrimination". Some Blogs are excellent, as are articles in Wikipedia, although treatment of a subject in Wikipedia can vary enormously depending on the language. The French entry on *Sahelanthropus* (Toumaï) is excellent, well-balanced and informative and provides a clear résumé of the debate about the skull. In contrast, the English version is poorly presented.

Has American science been well served by the palaeoanthropology lobbies? In short, No! A few privileged lobby members have been assured long term access to fossil sites in African countries, but the overall level of palaeoanthropology has spiralled downwards. *Ramapithecus*, *Kenyapithecus*, KNM ER 1470, *Kenyanthropus* and *Ardipithecus* provide the proof. Have source countries been well served by palaeoanthropology lobbies? Again, the answer is, in most cases, NO!! Kenya is a prime example: more than two generations after independence, foreign domination of its palaeontological resources is firmly established and shows no signs of weakening. Kenyans have been discouraged from getting involved in any meaningful way in the exploitation, study and publication of hominoid fossils found in their homeland. For the past five years, the few Kenyans who have been permitted to study fossil sites in the Turkana Basin, northern Kenya, have had to arrange access through an institute based at a major east coast university in North America.

THE PERSONALITY CULT IN PALAEOANTHROPOLOGY

American palaeoanthropology lobbies have enormous influence with the popular press. Indeed, fame of the kind enjoyed by palaeocelebrities, is only possible through the actions of the media. Palaeocelebrities, like all celebrities (Figs. 18, 19 and 20), are a creation of the mass media, but in accepting to become celebrities, they become enslaved by their creators. America does not create celebrities without a reason (in the USA, there's no such thing as a free lunch). In the case of palaeoanthropology, the persons so chosen have been expected to act on behalf of America for the rest of their lives, ensuring access to fossils, fossil sites and other resources in the African countries where they live.

In America and Europe, there are close parallels between palaeocelebrities and political celebrities. Without the press, such people would not become "world-famous" or "world-renowned": their scientific output, on its own, would not merit such a description.

le wilderness, a new frontier

Michael Carey

ANCHORAGE, ALASKA Sarah Palin, a onetime beauty queen, a mother of five, the Republican candidate for vice president in 2008, and the former governor of Alaska, has a new incarnation: author.

Her memoir, "Going Rogue: An American Life," out today, is already a best seller. In what was trumpeted as a "world exclusive," Ms. Palin sat down with Oprah Winfrey on Monday to discuss the controversies in which she has been a participant — among them, the dismal Katie Couric interview, her conflicts with the McCain campaign and her difficult relationship with Levi Johnston, the father of her grandson. Her book tour promises the hoopla of a presidential campaign.

As people continue to be fascinated with Ms. Palin, here is what continues to fascinate Alaskans: how a woman who takes pride in calling herself a homemaker from Wasilla brought celebrity culture to the Last Frontier.

No other Alaskan can match her stardom. Only hockey fans recognize Scott Gomez (formerly of the New York Rangers, now of the Montreal Canadiens). The four-time Iditarod Trail Sled Dog Race champion, Susan Butcher, died in 2006.

It all happened so fast.

In March 2008, I ran into Ms. Palin at the start of the Iditarod in Anchorage. She had no entourage, no security, only her daughter Piper — who wanted to go home. We chatted about her beautiful parka with its wolverine ruff.

Sometime around then, I also interviewed her on a radio call-in program. As we waited to go on air, I asked her where she got her long, round O's — as in her pronunciation of the name of her 2006 Democratic opponent in the governor's race, Tony Knowles, "Tooon-y Knoooowles." She leaned over and asked, with an air of confidentiality, "Do you think I should hire a voice coach?"

Her life changed when she was nominated for vice president, and ours did too. Reporters descended on our state. Hundreds, perhaps thousands, of Alaskans were interviewed. Few of us previously understood just how exhaustively the American news media would follow a celebrity story. The Exxon Valdez oil spill of 1989 drew plenty of national journalists, but far more came to cover Ms. Palin. Sometimes her fame was contagious: young Levi Johnston has become a tabloid figure quoted authoritatively on the Palin family's private life.

Ms. Palin exposed Alaskans to a larger universe. We learned how celebrity is created through images, words, legends and, in a few cases, outright fabrication.

Several times after the 2008 Republican convention, I had a variation of the following experience in restaurants, bars and waiting rooms. Someone sitting nearby would blurt out "Look!" and point upward as if having seen an apparition. There she would be on a television screen overhead — campaigning before a huge throng in Pennsylvania, North Carolina or somewhere else "Outside," as Alaskans call the rest of the country. In that "Look!" I heard a mixture of pride and amazement. Because there, right in front of us, was an Alaskan — a neighbor from down the road — standing on the biggest stage in the world.

But Ms. Palin's celebrity is unlikely to have a lasting effect on Alaskan politics. Her movement was not inheritable, not transferable. She did not reshape the state. When she still held office, her fame was mostly an annoyance to legislators who felt she was too busy pursuing national ambitions to talk to them. The 2010 gubernatorial race is likely to be a contest between candidates promising competent, meat-and-potatoes government to constituents who grew sick of their governor staring at them from magazine covers as they waited in the supermarket checkout line. For the time being, it appears that American celebrity culture will remain in the Lower 48.

For the record, I don't believe Sarah Palin will ever hold national office. She inspires many right-wing activists and enchants some members of the conservative news media, but the independents and moderates decisive to any presidential bid won't send her to Washington with "quitter" on her résumé. Still, she's likely to remain in the limelight for years to come.

If that makes you scream, don't scream at Alaskans. We only made her governor. America made her a celebrity.

MICHAEL CAREY *is a columnist for The Anchorage Daily News and the host of the public television program "Anch- Edition."*

FIGURE 18. The American press is adept at creating celebrity figures. Merit plays a minor role in the process as two paragraphs in this article by Michael Carey in the *New York Herald Tribune* concerning a would-be vice president of America, reveals: "*We learned how celebrity is created through images, words, legends and, in a few cases, outright fabrication*" and "*America made her a Celebrity*". The same could be said of palaeocelebrities, none of whom, from the point of view of science, really deserved the status that they have gratefully accepted and which they and their supporters ferociously defend.

Over the past 60 years, the palaeocelebrity phenomenon has had little to do with the quality of science being carried out by the few individuals who have achieved this status (Fig. 19). Almost universally, their press announcements have been massaged, some to such an extent that they border on, or achieve the status of, propaganda. For celebrities and their lobbies, important fossils provided the means to achieve fame, with the focus of the press being firmly directed onto the personality, the fossils and science dim in the background, or sometimes not present at all.

Several colleagues in America, who happened to be independent of the lobbies when they were young, published a lot of interesting results, often under difficult conditions, short of funds, and lack of tenure. A few joined lobbies in their middle age, and since then the quantity of interesting papers published by them has shot downwards, as has the originality of their research. They have secured

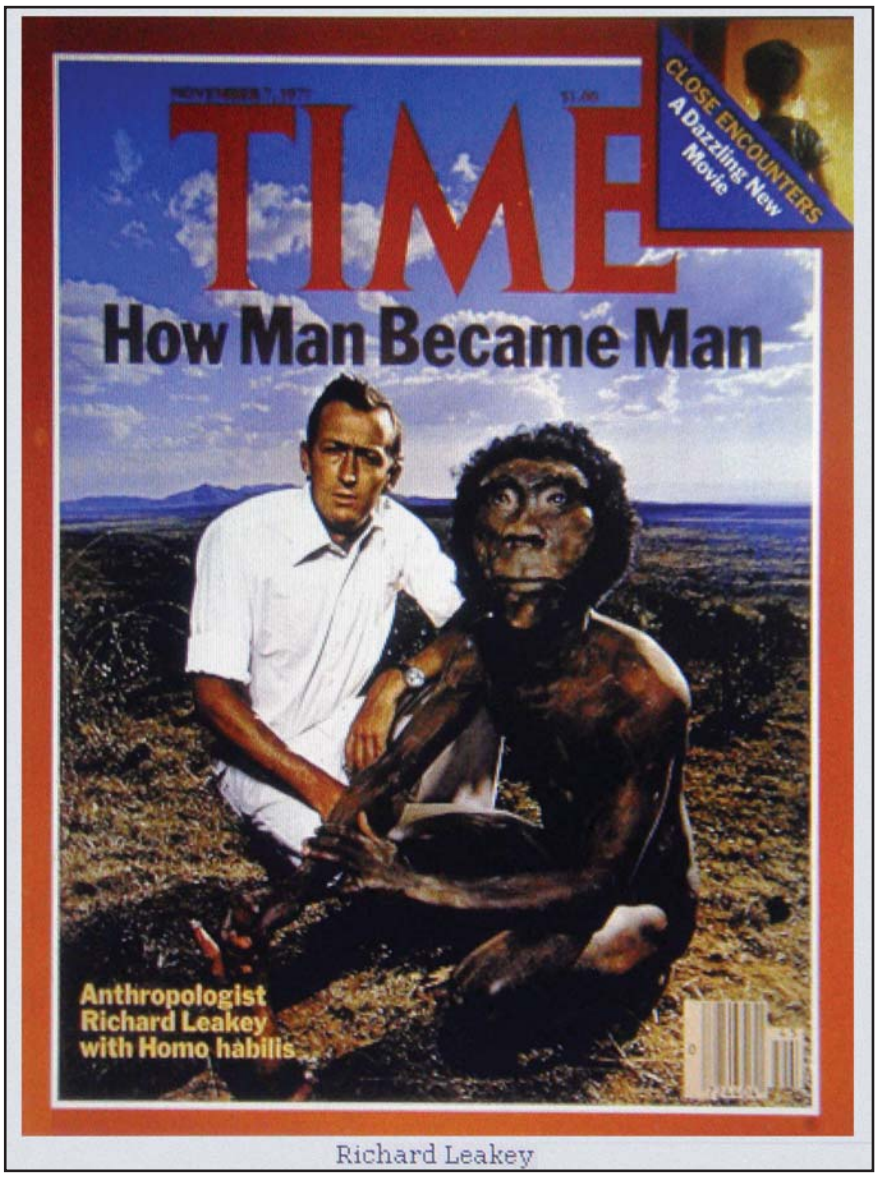


FIGURE 19. This cover of *Time Magazine* of November 7th, 1977, needs no comment.

FIGURE 20. Much of the publicity about palaeoanthropology during the 1980s and 1990s focussed on the social aspects of the discipline, rather than on the science. In this article from the *Sunday Times* of 19th March, 1995, the press is promoting the view that palaeoanthropology is a battleground over funds: not far from the mark, as it transpires, but of little interest to the science of palaeoanthropology. Don Johanson, with the skulls in front of him was gradually fading into obscurity, having enjoyed a few years as the super-star of American palaeoanthropology.

their future at the cost of entering philosopause, a price that many genuine scientists would find impossible to pay. Because such people now belong to lobbies they can carry out research in Kenya, for example, but seldom seem to publish the results. The energy and motivation to publish has dwindled – they can advance administratively because of their lobby connections, but they do need to devote time to lobby-related activities, such as sitting on committees, arbitrating scientific articles, and raising funds, all of which eats into their research time.

But not all important hominid fossils lead to their discoverers becoming celebrities. Indeed, usually the opposite is the case – those established in influential lobbies with good connections to the press fight tooth and nail to minimise the discoveries of other teams and individuals. Some researchers have even been jailed for their efforts, but in general the attacks have taken place in the press with innuendos about research being done without permits, or whilst "poaching" on other people's sites, or that the circumstances of the discovery were unfortunate, or assertions that the researcher is a "maverick" (as it happens, a compliment for a scientist who doesn't subscribe to dogma) or that he has "stolen" the fossils from the country, or illegally exported them. Lobbies can be extremely inventive when their interests are at stake.

By this means, people who have had a history of disseminating substandard science or even sheer propaganda via the press and television, have, with the aid of their lobbies, risen to the stratosphere of celebrity, and have become enormously influential in scientific and other circles, predominantly because they are useful politically, clearing the way for lobbies to control fossil and other resources in African countries. Secondarily the propaganda has helped sell more newspapers and bump up viewer counts, always welcome news to newspaper owners and TV moghuls (Simpson, 2010).

Those people who do not wish to compromise their science and scientific integrity, tend to avoid such lobbies, but by doing so they run the risk of having their scientific activities exposed to harassment of diverse kinds, as a Japanese palaeontology team found out to its cost. French and Austrian teams have also been targeted, and so, ironically, have some American ones. One such hazard that such free-minded scientists may encounter is "poaching". Submission to a high ranking journal of a manuscript describing the discovery of a new fossiliferous locality, for example in Niger or Egypt or Thailand, has a good chance that the submission will be refereed by a member of a lobby, who may then alert members of his lobby well in advance of the publication date, so that they can exploit the site before the original researcher can do so. Ideas expressed in funding applications to foundations which delegate assessment of dossiers to scientific committees, run the same danger if lobby members sit on the committees.

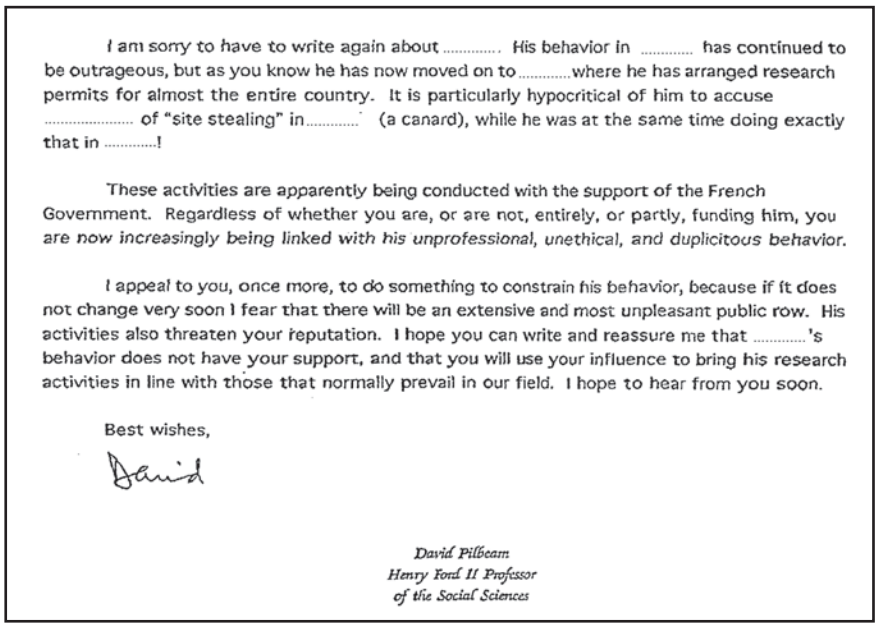
Likewise, unbelievable as though it may seem, some lobbies routinely "poach" fossil discoveries made by teams from other countries and publish the findings before the original discoverers have been able to do so. Since 1995, a team from France has done this at least three times to a Japanese team working in Thailand, aided and abetted by a Thai researcher trained by the lobby, who, as a matter of course, alerted its leader as to the movements and findings of the Japanese team. Her position in the sole institute in the country responsible for the curation of fossils was crucial to the lobby – the Japanese team had to declare fossils it had found to the institute, and lodge them there, thereby greatly facilitating the task of the mole in passing on information and providing early access to the fossils to her European lobby colleagues. Predictably, two of the papers published by the "poachers" concerned fossil Miocene hominoids, each time followed by extensive media coverage, which eventually culminated in a meeting with the president of France who had expressed a wish to see the important fossils "found" by his countrymen. Invertebrates and plants collected by the Japanese team were safe – their mediatic value is minimal. A fourth attempt at "poaching" was halted, but only because one of the referees of a paper on the "poached" fossils was aware of the real circumstances of the discovery and was able to alert the journal about the chicanery before the manuscript was accepted for publication. Had the Japanese team been affiliated with a powerful western lobby, this "poaching" would not have occurred.

Poaching by American lobbies is not confined to foreign targets. Americano-American rivalry can be virulent, as Dr John Kalb knows only too well. Founding co-leader of the International Afar Research Expedition, he was eventually forced to leave Ethiopia, accused of being a CIA agent by his colleagues, who, 20 years later, still enjoy unhindered access to fossil sites in the country (Kalb, 2001; Pickford, 2003). Austrian scientists carrying out palaeoanthropology research in Ethiopia have been harassed, their field camp attacked and tents torn down. The French, who were the first to identify the rich fossil deposits in the Hadar (Taieb, 1985), were eventually sidelined from the country, and only recently have a couple of young French researchers been able to go back to Ethiopia – by collaborating with the very team from the west coast of America that had had the others removed.

Palaeoanthropology lobbies spend a great deal of energy and ingenuity ensuring that their members sit on boards and committees that decide recruitment, promotion or funding. In one notorious case, the contents of a grant application to a European science foundation to carry out research on a fossiliferous area in an African country, was passed on to a lobby in America, which quickly organised a trip to the site by an American researcher (who was not herself made aware of the background) in order to establish "priority" to work on the site. In the meantime, the member of the lobby sitting on the committee that was evaluating the dossier ensured that the funding application would fail by selecting and briefing suitably malleable lobby members as referees. The result, predictably, was a politically inspired massacre of the project, replete with misinformation and half-truths, with almost no mention of the scientific content of the application.

It is not unknown for palaeoanthropology lobbies to influence government employees in African countries. In one instance, a junior and very inexperienced post-graduate palaeoanthropologist from a well known university in the Eastern States, with the support of her PhD Thesis supervisor, a prominent member of one of the eastern American palaeoanthropology cliques, rode rough-shod over an African country's National Council for Science and Technology, in order to displace a team from France that had been carrying out palaeontological research there for a number of years. The lobby, apparently working through the embassy, provided the incentive to a civil servant employed by the council to make decisions favourable to the US team, at the same time that two prominent members of the lobby wrote to the French team's patron instructing him to deny support to his team (Fig. 21), backed up by a threat to launch a nasty and sustained publicity campaign in the press against him if he didn't comply.

The French team that had been working in the country for several years had built up good relations with its African colleagues, who investigated and identified the mole at the council, but didn't inform him of the fact. They revealed the mechanisms being employed to favour the American team (one of the techniques



I am sorry to have to write again about ..... His behavior in ..... has continued to be outrageous, but as you know he has now moved on to .....where he has arranged research permits for almost the entire country. It is particularly hypocritical of him to accuse ..... of "site stealing" in..... (a canard), while he was at the same time doing exactly that in .....!

These activities are apparently being conducted with the support of the French Government. Regardless of whether you are, or are not, entirely, or partly, funding him, you are now increasingly being linked with his unprofessional, unethical, and duplicitous behavior.

I appeal to you, once more, to do something to constrain his behavior, because if it does not change very soon I fear that there will be an extensive and most unpleasant public row. His activities also threaten your reputation. I hope you can write and reassure me that .....'s behavior does not have your support, and that you will use your influence to bring his research activities in line with those that normally prevail in our field. I hope to hear from you soon.

Best wishes,

David

David Pilbeam
Henry Ford II Professor
of the Social Sciences

FIGURE 21. Part of a letter from David Pilbeam to a senior French scientist demanding action against a colleague, backed up with a threat to orchestrate an extensive and most unpleasant public row if he doesn't conform to the lobby's wish to prevent the colleague from carrying out research in two African countries, by starving him of funds. This letter is, unfortunately, rather typical of the east coast palaeoanthropology lobby, even if mild compared to some that have been sent. Pilbeam was aware of the fact that the colleague had been invited by the governments of those countries to undertake the research there, but then, why bother with what the natives want, when, in his mind, control should be exercised from the east coast of America?

used was to delay or "lose" the French team's applications so that 'priority' was given to the US team on the grounds that it had applied first). Acting on this information, the French team made its usual application for research clearance, but included two fictitious fossil sites in the project description, with suitable words about their palaeontological potential. Predictably, both sites were awarded to the American researcher on the grounds that she had applied to work there first. With this evidence in hand, the French team informed the director of the council who moved to have the mole neutralised. He was shifted to library administration where no decision making was involved. Meanwhile his children continued their education at an international school at tax-payer's expense.

Was the American researcher penalised for such manipulations? Not at all. Despite her ineptitude, she was rapidly promoted to Assistant Professor at a well known Mid-West University over the heads of more competent palaeoanthropologists, notwithstanding that she and her team had published a series of papers which revealed that

they could not tell the difference between a rodent and a galagid, or a palaeochoerid and a monkey. Indeed, she and her team interpreted a humerus of a rodent as that of a galagid (bush baby) and the femur from the same species of rodent as that of a lorisid (a slow loris). As though that weren't bad enough, she then went on to claim that these two fossils would throw light on the timing of the split between galagids and lorisids. The next paper concerned a maxilla with two teeth that she and her team attributed to a cercopithecid (Old World monkey) which is in fact that of a palaeochoerid (an Old World peccary-like suiform), in the meantime claiming that it was the oldest known monkey in the fossil record. This fossil was subsequently attributed by the same person to the Hippopotamidae. Prior to this she and her colleagues had published a new genus of hominoid which turned out to be a synonym of a well known species from Kenya, and she attributed postcranial bones to the species which belong to two different genera of hominoids. To add sauce to the dish, she included a fragment of scapula in the species, which belongs to an artiodactyl. So, how come that such an incompetent researcher could be promoted to a leading American University in the position of Assistant Professor, where she is responsible for the education of young scientists? The answer is "the lobby" and the press campaign organised by it at the strategic time. Had she not been an intimate and active member of an influential lobby she would not have had a snowflake's chance in a blast furnace of getting the position. One really has to ask whether the power of the lobby is good for American science.

USING THE POPULAR PRESS TO OBTAIN JOB SECURITY AND ENSURE FUNDING

Competition for salaried science posts in America is vicious; palaeoanthropology posts perhaps more than in most other disciplines. Under such circumstances, all tactics are fair play, but one of the strongest cards that a candidate can have when applying for a post is to have a recognisable name. This is where publicity is essential, and what better way to obtain it than to publish a paper in one of the "Big Three" science journals with all the attendant pre-publication distribution of the article to journalists under embargo, to ensure adequate press coverage? Belonging to a lobby that facilitates access to the journal at the optimal time is essential, otherwise don't bother, it's a waste of time and effort. Above all, don't count on scientific merit; in America, it appears to play only a minor role in recruitment decisions.

It is a well established dictum that "A week is a long time in politics". The same applies to science announcements in the press. The attention span of the public, especially that in America, is extremely short, usually less than a week. Google word searches reveal quite a consistent pattern – announcements of important discoveries produce a peak in key word searches for a day or two after the an-

nouncement, which drop back to background levels after five or six days. Subsequent publicity produces a similar peak, usually for a similar period of time. For this reason it is necessary to ensure that the publication of the candidate's paper occurs at just the right time, one or two months before the recruitment panel meets to decide on the suitability of candidates for the job (i.e. when they receive the dossiers to read in preparation for the meetings), followed by a second round of publicity ten days or two weeks before the panel meets. The quality of the science being advertised is of no consequence, the important thing is to have a name that is recognisable to the panel members who are concentrating on who should be recruited.

The same tactic applies to teams who are anxious to boost their chances of being funded by government and other research foundations. A good session of publicity towards the end of the year when committees are meeting to decide on how to slice up the funding cake and pondering on who should get the choicest wedges, can't hurt, especially if it is followed up a week later with a film release on television. Once again, the quality of the science being advertised is of little relevance, it is the press exposure that is essential.

Big Science Palaeoanthropology and the constant anxiety about funds

Scientists generally need funds to make advances in science, but there is never enough money to finance everyone. This means that whatever funds are made available for scientific research are the focus of competing claims. Heads of laboratories and individuals are constantly seeking ways to ensure success during the next round of grant applications. Raising funds is a chronophagic hassle that keeps scientists away from the laboratory bench or the research library. In most cases, researchers focus their energies on doing good science, in the hope that their applications for funds will be assessed on the basis of the solid science that they have performed during the preceding years. But such is not always the case. Some palaeoanthropologists and a few molecular anthropologists have earned themselves bad reputations (let us not enter into the murky world of climatologists who scare all and sundry with their grisly predictions of the hazards of global warming (Allègre & de Montvalon, 2010)). Massaged data, suitably slanted mediatic announcements, and compromised science are all par for the course for some people, all done with the intent of obtaining a disproportionately large slice of the funding cake.

The outcome can sometimes border on the ludicrous. The Black Eve hypothesis, in which mitochondria from women resident in California were analysed to produce a phylogeny of modern humans, is a case in point. The approach was biologically suspect, the algorithm used to analyse the data was one of many that produce mutually conflicting results, and the computer was instructed to search

for trees with Africans at the base. Surprise, therefore, that, out of the trillions of possible trees, the computer spat out a result with Africa at the base. More surprising still, was that such a classic circular argument would appear with great fanfare in *Nature*. Papers on similar subjects continued to be published for a while, but nowadays the analyses are done to amuse people about their possible ancestry to one of seven ur-women. Harmless fun, I suppose, but not serious science.

Similar levels of scientific absurdity have peppered the literature on climatic change. The science behind the dire consequences of "Global Warming" and other climatic horror scenarios has been less than objective (the "Big Science" of Allègre & de Montalvon, 2010). Data massaging has become common, selective data presentation is rampant and the preoccupation with fear is ever-present, accompanied by the installation of lobbies that prevent the publication of alternative scenarios. We should all be concerned with changes wrought to the environment by human activity. But channelling our energies and resources into poor science is not going to resolve the problems we have created. The great impact that humans have on the globe is basically one of demography. Politicians can hardly be expected to participate in such a debate with serious propositions, and some scientists know it: so let's all attack global warming, rather than look the real problem in the face. Above all, such people say, is "Give us money: we want to stop glaciers from melting". But throwing money at such a problem is not going to solve it – indeed throwing it to the wrong people may well exacerbate it.

Seeking money can become addictive. It expresses itself as an obsessive preoccupation with raising funds. Just as a compulsive gambler is drawn towards the gambling table or the slot machine, and an incurable alcoholic to the bottle, drachmanoiacs become dependent on the activity of seeking money (not having it – some extremely rich people who don't need to have more, are nevertheless constantly seeking more). Being awarded funds does not quench the fires; on the contrary, like a gambler who goes to the next slot machine after winning the jackpot, drachmanoiacs are driven to search for more money, no matter how much funding they obtain. The obsession can completely take over their waking and sleeping lives. Scientists severely affected by the syndrome no longer practice science (they become "fund-raisers"), their family relations can break down, in severe cases culminating in divorce. It remains to be determined whether people prone to compromise their families and science end up drachmanoiac, or whether the drachmanoia encourages their infidelities. Is it coincidental that all palaeoanthropologist celebrities have divorced and all have seriously compromised their science, not necessarily in that order? The sample is small, so perhaps it is just a coincidence, especially given the high rates of divorce in America and some European countries.

DIFFUSION OF PALAEOANTHROPOLOGY TO THE GENERAL PUBLIC AND THE MARGINALISATION OF SCIENTISTS IN SOURCE COUNTRIES

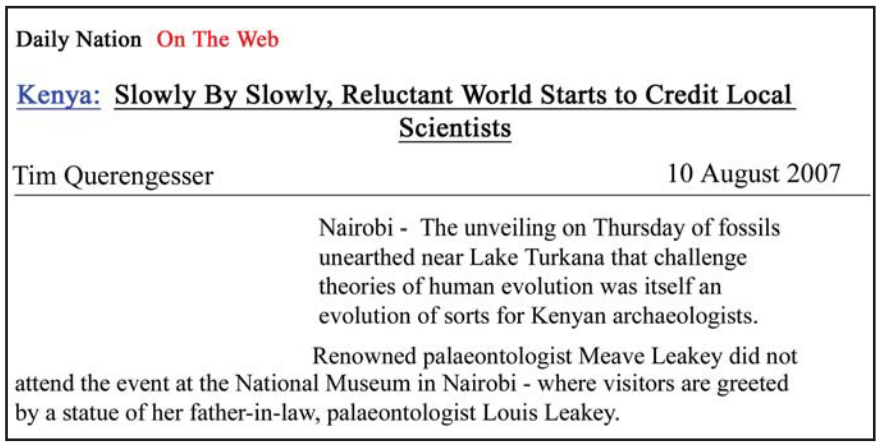
Since the discovery of the Taung (South Africa) juvenile hominid skull in 1924, the focus of research projects aimed at throwing light on human origins has been largely adjusted onto African countries. The stage lights have occasionally swung towards the Indian Subcontinent, notably when *Ramapithecus* was, for a brief interlude, erroneously considered to be an early human ancestor (Simons & Pilbeam, 1965) until the fossils attributed to it were shown to be the females of extinct apes. The lights have shone transiently on China and Thailand, only to swing inexorably back to Africa. From time to time the lights have played on European countries, notably Turkey, Hungary and Spain, but they seldom tarry there for long. The treasures in the Rift Valley keep attracting them back to Africa.

The major difference between the scientific announcements concerning fossil hominoid discoveries in Europe and Asia on the one hand, and African countries on the other (with the partial exception of South Africa and Ethiopia), is that in Eurasia, citizens from the countries participated fundamentally in the study of the fossils. In Africa, other than South Africa and Ethiopia, palaeocelebrities and their teams have consistently sidelined the citizens, any publicity accorded to them being of a token kind, aimed at giving the erroneous impression that citizens are deeply involved in the science and are not just pairs of sharp eyes employed to search for fossils.

In the East African Rift Valley (Tanzania, Kenya, Ethiopia), where the lion's share of fossils relevant to the study of human origins has been found, local citizens are notable by their invisibility (Fig. 22), not only in scientific publications, but also, to a great extent, in the popular press. Kenyans in particular have been very effectively marginalised from palaeontology and archaeology since independence in 1963, whereas Tanzanians and above all, Ethiopians, have made some headway in getting training, establishing scientific careers and getting their share of credit for their work. At independence, the latter two countries had no white palaeoanthropologists calling the shots there, and were thus largely exempted from the kind of hands-on control that Kenya has suffered.

Exclusion of Kenyan citizens from their own fossil resources has been managed extremely efficiently. The few Kenyans who were able to obtain training in palaeoanthropology have either been discouraged from continuing research in the country, or have been permitted to study only the younger fossils related to the latest stages of human history. Quite a few of those who have received training have opted to remain in the USA after graduation: they are simply not welcomed back home by the palaeoanthropology community that controls their country's resources.

One such local archaeologist, Dr John Onyango-Abuje, who, in the mid 1970s, successfully completed his PhD in Archaeology in a university located on the west



Daily Nation On The Web

Kenya: Slowly By Slowly, Reluctant World Starts to Credit Local Scientists

Tim Querengesser 10 August 2007

Nairobi - The unveiling on Thursday of fossils unearthed near Lake Turkana that challenge theories of human evolution was itself an evolution of sorts for Kenyan archaeologists.

Renowned palaeontologist Meave Leakey did not attend the event at the National Museum in Nairobi - where visitors are greeted by a statue of her father-in-law, palaeontologist Louis Leakey.

FIGURE 22. Extract from the web site of the Daily Nation newspaper, Kenya, 10th August, 2007, the focus of which was on credit for discoveries made by local scientists. This article ended up with a plea for proper credit to be given to local scientists. It was written in reaction to announcements in Britain and America which credited the discovery to Meave Leakey, barely mentioning the role of the Kenyan scientists who made the find.

coast of America, made the unfortunate choice of being educated in the wrong institution. He wasn't to know that, at the time of his studies in America, a ferociously territorial lobby was being set up on the eastern coast, headed by a young, inexperienced and poorly educated Kenyan citizen, whose father happened at that time to be the director of the National Museum, who was politically well connected in Kenya, and who was soon, himself, scheduled to take over directorship of the museum from his ailing father. The American lobby that supported this poorly educated, but politically well connected Kenyan, was keen to assure unhindered access to Kenyan fossil sites for its members, so an unholy alliance was born between them.

When Dr Onyango-Abuje returned to Kenya, he joined the National Museum as a member of staff, and was soon asking why a Kenyan citizen with a PhD should be subservient to a director who didn't even have A-levels from a secondary school. He was in effect, manoeuvring for the director's post. The east coast lobby saw a danger to their plans, so a sharp lesson in real-politik was called for. Dr Abuje spent a couple of weeks in hospital, before his career was ruined by the director of the museum through the agency of Kenya's Attorney General's Chambers. The museum director also learned a lesson – do not encourage Kenyans to go to university to study prehistory and then return to Kenya to work at the National Museum. Make sure that any who do graduate and try to return don't last there long. None have.

For trying to promote the training of Kenyans, the author has been called "evil" by Meave Leakey, the wife of the ex-director of the National Museum of Kenya (Gibbons, 2006). But this is a compliment; Mahatma Ghandi and Nelson Mandela,

among many others, knew that people who fight for their rights are often called evil by those denying them their rights.

Bluntly put, the rich palaeoanthropological fossil record of Kenya has been used to benefit foreigners and a single family of Kenyans, and not to ameliorate the condition of local scientists or to promote Kenyan science. The power base and finances for this exclusion reside in America, but the players are orchestrated by a Kenyan family for the mutual benefit of both. Although the names of Kenyan citizens sometimes make it to the newspapers, access to the media is severely controlled by palaeocelebrities who work hand in glove with, and indeed, control some of the influential American palaeoanthropology lobbies.

Two generations after Kenya's independence, its fossil resources are still securely tied up by neo-colonial interests. Since 1963, over 300 PhD theses have been written on Kenyan fossils, fossil sites, archaeology and geology, of which fewer than 20 are by Kenyans. 85% are by Americans, with the remainder by citizens of other countries. One can only conclude that Kenyans have not benefited from their fossil record to the same degree that foreigners have, notably those from the "Land of the Free".

> ”*Race and National Bias in East African Palaeoanthropology*
> *Category: Africa • Race and Racism*
> *Posted on: February 24, 2010 2:52 PM, by Greg Laden*
>
> *A half century of struggle has resulted in more than a little change, which we hope is still ongoing.*
>
> *I was moderately disturbed to see, while watching a brand new documentary on human evolution, credit for the "discovery" of a particular fossil given to a man who had not in fact discovered the fossil. What was interesting about this mis-attribution is that a DIFFERENT guy who is also not the discoverer usually gets the credit. So, my first thought was "What were these two arguing about that led to this outcome, where the more powerful person got the credit?" and my second thought was "Unlikely scenario, that. More likely we are just getting farther and farther away from correct attribution because the original discoverer is dead. And was never an academic. And was a Black African".”

A somewhat cynical view of East African Palaeoanthropology by blogger Greg Laden dated 24th February, 2010, but with an element of truth in it

As far as many Africans are concerned, the American way in palaeoanthropology and other domains has alienated people from the Cape to Cairo, and from Kenya to Cameroon, whilst often rewarding incompetence at home in the good old USA.

THE TRINITY OF FAME, MONEY, AND POWER

For 60 years, palaeoanthropology has been diverted from its scientific aims by a small number of people who have sensed the "fame, money and power" which an important discovery concerning human origins can bring (Bowman-Kruhm, 2005). The three go together as conveniently as the holy trinity: different aspects of the same thing, each providing support for the other two in intimate feedback loops. If one collapses, so may the others; so each must be protected with vigour.

It is perhaps no coincidence that the most famous of the palaeoanthropology "families", the Leakeys of Africa, as they have been dubbed on more than one occasion, came from missionary stock who well understood the concept and power of the trinity, even if they didn't ascribe to it personally.

During the Victorian Era, missionaries were trained to convert natives around the world in order to make them more malleable, and thus easy to colonise. If the natives proved recalcitrant, then gunboat diplomacy was an effective way to convince people to change their minds, at least those near the world's coasts. It didn't always work. Trade would follow "pacification", followed by farmers and miners who needed land, and lots of it, to produce cash crops and minerals which would be exported to feed the empire's mouths and factories. Missionaries, who were given intensive training to perfect their natural talents and skills, were sent in advance of the colonisers. They were selected for their abilities to sway the minds of people, convince them to hand over their land, often in exchange for conversion, as happened to the Kikuyu tribe in Kenya, regardless of the consequences that might flow from such actions (the Mau Mau rebellion, which grew out of the land issue, followed two generations later). But missionaries needed something more than the "gift of the gab". How to convince people en masse to convert to a foreign way of thinking?

What better way than employing the concept of a superhuman being? What better way to ensure fame, riches and power, than the control of ideas concerning human origins by a celebrity who is so superior to ordinary mortals that he sits next to the stars? With this approach to the science of human origins in mind, the missionary zeal that typifies human evolution announcements comes as no surprise, nor does the use of gunboat diplomacy against those who threaten to enfeeble or hinder the dominant position of palaeocelebrities and their loyal apostles. When such a system has been put in place, as has been the case in American palaeoanthropology, it does not usually result in uplifting the people, rather the opposite. It has been done to dominate them, so that "fame, money and power" will continue to accrue to those who are already famous, wealthy and powerful. For these people all other pretenders to similar "fame, money and power" must be crushed before any damage is done.

Reputable science, in the meantime, takes a back seat.

CONCLUSIONS

One of the more pleasurable duties of a scientist is to disseminate knowledge to the general public. Most scientists do it willingly when called upon to do so, many do it free of charge, and most try to pass on an accurate assessment of the research findings. However, there are several palaeoanthropologists who, for the past half century, have exploited the outlets provided by the press for other purposes, notably to increase their influence and power, to create and foster lobbies that control science funding, recruitment and promotion, and deny citizens of African countries the right to study fossils found on their land. Notably, the announcements to the press by these people have tended to be propaganda rather than reputable science: they purvey yellow science.

Palaeoevangelists have frequently distorted their scientific discoveries (ranging from simple hype to outright propaganda) and they have generally insisted that the focus of the press be on them primarily and on the fossils and science only secondarily. The American press, urged on by lobbies, has been a willing partner in this enterprise, providing frequent sniffs of publicity, the oxygen that is essential to the well-being of celebrities, without which they would drop off the radar screen. By this means the yellow press has perpetuated the tenure of palaeoanthropology celebrities, which in turn has triggered the attendant growth of personality cults and augmented the influence of lobbies. The symbiosis is complete; celebrities in African countries ensure that selected personality cult members from America have long term access to a country's fossil resources, while the lobby members provide the power base, funds and on-going publicity to keep the celebrity in an influential position; so long as he or she ensures unrestricted access to prehistory resources in that country.

One unexpected outcome of this focus on the personality rather than the scientific idea has been an upsurge in the Creation Science and Intelligent Design movements, notably in North America, but also to some extent in Europe. But more dangerous to society than either of these movements, is the long term malaise that lobbies have engendered in the domain of palaeoanthropology. Lobbies like to control access to recruitment, promotion, funds and publication outlets by sitting on committees and refereeing panels, where they can favour like-minded lobby members and hinder rivals. A long term result of such activity is that some well funded American palaeoanthropologists and their "Big Science" teams (White *et al.*, 2009) are now 30 years behind the times when compared to some European teams. There are many excellent palaeoanthropologists in America, but the power has resided for too long in the hands of a few palaeocelebrities (some of whom are not even citizens) whose influence far outweighs their commitment to good science. The outcome has been inevitable: good scientists with independent minds have often been marginalised, whilst weak willed yes-men have frequently been

recruited and promoted. The outcome for Science has been less than desirable: yellow science has prevailed over real science.

Dissemination of science via the mass media should continue; it is a duty of scientists to reward the general public with information about their findings, which, at the end of the day, have usually been funded from the public coffers. The internet has led to a vast burgeoning of science diffusion, but it has also facilitated unscientific and anti-scientific activities. But the latter are not as dangerous to society, or to the advancement of science, as the propaganda disseminated by scientists themselves, or by the lobbies that have coagulated around certain palaeocelebrities. These lobbies and palaeoevangelists are far more pestilential to science than the most articulate and productive of creationists or intelligent designers.

It is ironic that American support for certain personalities in African countries, aimed at facilitating their palaeoanthropological and other activities in those countries, has in some cases led to a degradation in the quality of American palaeoanthropology output. Many a competent American team has suffered exclusion from these resources, simply because they don't adhere to, or ascribe to, the lobby concept. Those who have adhered to the star system have themselves become victims of their own propaganda. It has been a disaster for African science.

I have a dream which would be a nightmare for palaeocelebrities and their lobbies. A Kenyan scientist encouraged to study and carry out research, receives seed funds which allow him to conduct field research in his home country. He finds a hominoid fossil, which he then studies and publishes in a local Kenyan Science Journal. The find is important, and the world press latches onto it, not because it was published by *Nature* or because news of the discovery was released to journalists under embargo, but simply because it was an important discovery accompanied by competent description and interpretation. The focus of the press announcements is primarily on the fossil, but does not neglect the scientist. It congratulates him, and the positive publicity plus the competence of the analysis, ensures that he obtains enough funding to continue his researches. This is not an impossible dream – after all 99% of the fossil hominoids found in Kenya were discovered by local people. In sharp, cutting contrast, 99.9% were studied and published by foreigners – that, to me, is the nightmare.

ACKNOWLEDGEMENTS

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This article is dedicated to people who found important hominid fossils without which the science of palaeoanthropology would not advance : Bernard Ngeneo whose sharp eyes spotted KNM ER 1470, Tom Gray who faded into obscurity after locating the first bits of Lucy, Justus Erus who found *Kenyanthropus*, and the Franco-Chadian team, Djimdoumalbaye Ahounta, Alain Beauvilain and the late Gongdibé Fanoné, who collected *Sahelanthropus*, not forgetting Aude Bergerat, who had the misfortune to recognise the femur of Toumaï for what it is, and suffered for it. May they, and all the other finders of important fossil hominoids, eventually be rightfully credited with their discoveries, and get some benefit from them.

I remember the many scientists who have been manipulated, marginalised, penalised and harassed by palaeocelebrities and their loyal lieutenants. I remember the scientists who have had their fossil discoveries poached by rival teams. I admire them for not joining power-hungry lobbies in order to prevent repetitions of the same behaviour. I remember the civil servants of African countries who were tempted by lobbies to compromise their professional ethics. Some succumbed to the temptation, only to lose out in the short to medium term, but many didn't. That gives me tremendous hope; more than all the fame, money and power in the world can do. I thank the civil servants, teachers and scientists in Africa and Asia who helped provide access to science resources in their countries without putting hurdles in the way. I remember those who refused to compromise their science for political or expedient reasons, of whom there are many in America. They give me great strength. I remember colleagues who risked getting mired down by the American system – some kept their heads above water, others didn't. I remember with great pleasure the multitude of field workers in Kenya, Uganda, Tanzania, Botswana, South Africa, Angola, Namibia, Egypt, Tunisia, Pakistan, India, Oman, France, Spain and Portugal, with whom I shared unforgettable moments of scientific enquiry. I try to forget those who have put hurdles in the way of science, but I can't. They gave me the incentive to continue fighting for science.

Referring to the quotation from Mary Bowman-Kruhm's book which opens this contribution, I remember the public which, for the past half century, has been at the receiving end of volumes of excruciating and contradictory propaganda about human origins. How can people be expected to assess the merit of fossil discoveries on the basis of the warped science and sheer propaganda frequently disseminated to them? Eleanor Margery Holman, upon reading one such announcement in 1960 concerning *Zinjanthropus* remarked "*If you can't be honest, you'll never be a scientist*", a sentiment that I have grown to appreciate more and more as time passes by.

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