

SEASHORE MAN AND AFRICAN EVE

An Exploration of Evolution in Africa

Second Edition

Denis Montgomery



What's past is prologue.
William Shakespeare

By the same author :

The Reflected Face of Africa, 1988

Revised edition, 2006

Two Shores of the Ocean, 1992

Crest of the Wave, 2007

Mud, Sands & Seas, 2007

A beautiful Ivory Bangle, 2008

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'Seashore Men' at Tiwi Beach, Kenya south coast. August 1987

One morning towards the end of our stay at Tiwi Beach, I was sitting on the verandah as usual after breakfast nursing a mug of coffee. The tide was flowing and water was deepening over the reef. The thunder and roar of the waves breaking on the outer bastion was growing. A holidaying English family was coming home from an early morning exploration to their breakfast, picking their way carefully over the old coral, the children trailing behind the adults and chattering.

Following the holiday makers were two dark figures, stopping here and there, moving confidently onwards, then pausing again. They were two local men whom I had seen many times and I idly followed them with my eyes, until a thought burst into my mind that astonished me with its simple and absolute obviousness. Those men went out onto the reef every day and on their return, they passed by our cottages peddling fresh fish and shellfish. I knew them by sight and they always greeted me whether I bought or not. Why had I not seen it? They were aquatic men; there for any doubter to examine. It was not necessary to theorise at Tiwi Beach, intuitive observation provided me with proof.

I watched while they emerged from the sea and strolled up the lawn. Each young man was clad in a brief kikoyi cloth wrapped around his waist and they were burned obsidian black by the sun. Their curly Negro hair glistened with moisture. From a string around their waists was slung a handmade tool, a simple metal spike with a wooden handle that they used to pry shellfish from the rocks, and they carried a roughly barbed trident on the end of a long bamboo pole that they used to spear fish and octopus. A handmade sisal bag hung from their shoulders for shellfish and each had fish strung through their gills by a length of coconut frond. Remove the machine-woven cotton kikoyi and substitute bone, ivory or stone for iron and they were equipped as any aquatic man would have been for a million years, since that last great evolutionary jump.

Extract from *Two Shores of the Ocean* - Denis Montgomery (1992)

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The chief said ... Man originated on the seashore, and many of the most primitive habits of humans, as well as their bodily differences from the apes, came from their early life there. Man pushed back from the salt water slowly.

- Frederick O'Brien in *Mystic Isles of the South Seas* [1921]

Beach tucker has the added advantage of remaining available when the savannah dries up during an ice-age.

- Stephen Oppenheimer in *Out of Eden* [2003]

... the point is that whatever the pressures experienced by our ancestors to develop a larger brain, no response would have been possible without the necessary nutritional resources. Diet is, in this model, an enabling factor, not a selective framework.

- John Parkington in *Shorelines, Strandlopers and Shell Middens* [2006]

We suggest that human evolution, like that of previous epochs, was substrate-driven. By using the land-water interface, Homo aquaticus need have been neither wholly aquatic nor wholly land-based: he simply enjoyed the best of both.

- Michael Crawford & David March in *The Driving Force* [1989]

Man with all his noble qualities ... still bears in his bodily frame the indelible stamp of his lowly origins.

*

I believe it is because we are always slow in admitting any great change of which we do not see the intermediate steps. The mind cannot grasp the full meaning of the term of a million or hundred million years, and cannot consequently add up and perceive the full effects of small successive variations accumulated during almost infinitely many generations.

- Charles Darwin [1809 - 1882]

*The beasts that roam over the plain
My form with indifference see;
They are so unacquainted with man,
Their tameness is shocking to me.*

W.Cowper (1731-1800)

INTRODUCTION

My fascination with a Seashore Hypothesis for the evolution and development of humanity.

In science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.

- Sir Francis Darwin, son of Charles Darwin. [1848 - 1925]

For many years I had been baffled by the apparent indifference, often derision, with which scientists most concerned with human evolution had excluded discussion of the Aquatic Hypothesis. I wondered if they were apprehensive because it was mostly non-academics who were the protagonists?

The logic, which twenty five years ago still seemed somewhat tenuous, all pointed at the simple common-sense of the particular environment of the tropical African shore. As circumstantial evidence accumulated from diverse sources, it fascinated me to watch a scenario, in which I had faith, grow to be unassailable.

I became heartened by the evidence provided by scientific disciplines other than palaeontology. I believed that palaeontologists had become trapped by their own speculative scenarios whose inconsistencies some repeated as years passed. Alternative minor sketches within the general savannah hypothesis were devised and seemed to be tossed out without proper care for cohesiveness within the big picture. I wondered that people whose opinions I should regard with great respect seemed to have lost their way and were obdurate in disregarding a scenario which was so evident.

In seeking answers to simple questions about the behaviour of animals in African wilderness, I had long become satisfied that the simplest answers were always the best. The most obvious questions loomed ever hugely in my thoughts. Why are we so addicted to seashores, especially in warm climates? Why do modern people with excesses of disposable income devote so much of it to seaside holidays in crowded and expensive resorts in warm climates? Convalescence from illness at the seaside or on an ocean voyage was prescribed by doctors for those who could afford it. The usual explanations are unsatisfactory when you think about it with some depth and objectivity.

Why do we love to bathe in water and why are we such good swimmers and divers? Why are babies naturally immediately at home in water? Especially, why do we love to bathe in seawater? We can't drink it! Why do we want to paddle about in canoes, ride on surfboards, cruise about in sleek luxury yachts costing as much as a home, and 'mess about in boats' for hours and days of precious leisure time no matter how bad the weather. Fishermen and traders have used the oceans to make an often precarious and dangerous living, requiring physical endurance and hardship beyond any similar occupation on land, for many centuries. Surely these were ancient genetic imperatives since they apparently have no evolutionary or life-sustaining advantage?

In searching for our origins, we can recognize three distinct phases of development which fossils have been able to define. Much has been learned about these phases, but in the

orthodox scenario there is a missing ingredient or driving force which should link them together. The three phases are : the jump from an early ancestral forest ape like a primitive chimpanzee to a two-legged upright walking hominid (the *Australopithecus* family), the jump from an upright walking hominid to a creature with a brawny near-human anatomy but a relatively small brain (*Homo erectus*), and the jump from *Homo erectus* to modern humans with a large brain (*Homo sapiens*).

How did these jumps occur? What drove the physiological and cultural changes? The institutional body of science has ideas, but mostly does not know. Individual scientists speculate, but there is no conventional consensus yet and certainly no proof of any speculation. There is no proof because there are no fossils illustrating transitions between them.

The Seashore Hypothesis connects these phases of human ancestry. The link is the Indian Ocean littoral environment and fossil evidence would open the door to enlightenment. But, no fossil evidence has been found and it is because no palaeontologist is looking where the links may have occurred, which is along ancient seashores of eastern Africa. They do not know where those ancient seashores may have been. It is a snake with its tail in its mouth!

The Aquatic Ape Theory (AAT) was opened for debate in 1960 by Sir Alister Hardy, a distinguished marine biologist, as the solution to the enigma of the jump from ape to upright walking ape-man or hominid. I believe there is now over-sufficient evidence to promote wide scientific discourse on a presumption that an Indian Ocean littoral environment was the locale providing the driving force for all three jumps. It is where the core-population evolved, and from this core emigrant movements proceeded in favourable climatic periods during at least the last four million years. It is fossils of those emigres that have been found and the core-population is the missing link.

As the number and diverse locations of new fossil finds accumulates, the information leading to an understanding of human origins continually expands. What is fascinating, however, is that so far nothing negates the hypothesis that the jumps to our present state were stimulated by a seashore habitat for various long periods of time. And, so far, there is a continuing lack of acknowledgement in public statements or writing by many authorities on the power of a 'driving force' provided by centuries-long periods of uninterrupted concentrations of a seafood diet. It is through this research into seafood diet and its effect on mammal brains and neural systems that a body of scientists, not of the palaeontological or paleoanthropological disciplines, have had a positive leaning towards the seashore hypothesis for twenty years or more.

Research on seafood diet and the essential part that lipids play in the development of mammal brains and nervous systems continues to show the way. But at this time it is still the vital factor ignored in conventional hypotheses by most palaeontologists and anthropologists who, in public at least, reveal their adherence to an increasingly unsustainable savannah-origin.

New understanding of the effect of cosmic radiation provides another important theme which needs rigorous exploration. New particles, undetected until recently, and bursts of electro-magnetic waves coming from supernovae and black holes are puzzling and exciting astro-physicists. Variations in our sun's output are being measured with greater accuracy, and interpretations of all this are being examined with new insights. Mutation in larger animals, especially complex mammals such as hominids, may be caused by exceptional bursts of high-energy cosmic radiation. Apart from negative effects in living animals which cause premature deaths and lead to extinctions, this may alter DNA resulting in benign changes in soft tissues. These changes would be honed by natural selection working in coincidental combination with all the other environmental factors, especially seafood nutrition. One can imagine several feedback mechanisms acting in parallel and enhancing or influencing each other, and this is powerful activity. If changes in soft tissues and of behaviour then cause necessary skeletal

adjustments these may not be widely detected in fossils until a great many generations have passed.

Recent study of cosmic radiation in the period 100,000 - 10,000 years ago may provide an additional clue to the solution of the cultural 'jump' into the African Late Stone Age, help to understand stimulation for the 'out of Africa' migrations and the birth of agriculture followed by urban civilisation. It is probable that similar activity occurred to force, aid or stimulate both cultural and anatomical 'jumps' at around 4M, 2M and possibly 500K years ago. There is unconfirmed evidence from sea-floor sediments for bursts of radiation at those important transition marks.

In 2004, an article in the *New York Times* quoted scientists proposing that a mutation to the gene controlling jaw muscles contributed to the enlargement of skulls in the emerging *Homo erectus* range of hominids. The date for this mutation was suggested at 2.4M years ago. It was beginning to come together.

It is becoming apparent that some professional scientists, confronted with the stubborn problems of the conventional theories, are beginning to see solutions in a Seashore Hypothesis. In a BBC TV *Panorama* documentary in September 2005 it was stated that "some scientists" were recognising the possibility that the last great 'jump' from *Homo erectus* to *Homo sapiens* might have been precipitated by prolonged shoreside living and seafood diet. We were moving on, in a small way, at last. By 2008 an increasing number of archaeologists studying the cave sites and seashore shell middens of south-western Africa were persuaded that seafood, and its nutritional advantage in developing a large brain, has played a critical part in the evolution of modern mankind. Professor John Parkington of the University of Cape Town, in particular, has published his conclusions in this context.

There is, indeed, a gradual shifting of opinion towards the unarguable effects of seafood nutrition, but this shift is towards the development of *Homo sapiens*' particularly spectacular behavioural changes in the last 100,000 years. At the time of writing, there is a continuing hiatus in published material on the jump from *Australopithecines* to early *Homos* and their spread around the practical climatic limits of Africa and greater Eurasia. Academic discussion reaching the public is concerned with minutiae of particular fossils which often have little relevance in a broader context.

But there is still a great quantity of intellectual inertia regarding a general Seashore Hypothesis. Professor James Lovelock, the author of the Gaia Theory, wrote in his book *The Revenge of Gaia* in 2006:

Science is a cosy, friendly club of specialists who follow their numerous different stars; it is proud and wonderfully productive but never certain and always hampered by the persistence of incomplete world views. ...

Science tries to be global and more than a loose collection of separate disciplines, but even those who take a systems-science approach would be the first to admit that our understanding of the Earth system is not much better than a nineteenth century physician's understanding of a patient.

Lovelock was referring to the inertia surrounding acceptance of the dire perils of artificial degradation of our planet's environment, but his remarks apply to all world views.

African pre-history has often seemed to me to be particularly susceptible to the problem of specialists working in ivory towers far away from Africa, pursuing particular themes, without regard to the most obvious logic and supplementary evidence which either contradicts or should influence these themes, which are promoted with assurance. Dilerio Savino, Director of the Italian-Libyan Archaeological Mission, stated in the abstract to his address to the SAfA Conference in Calgary in June 2006:

Only a multidimensional, genuinely cross-disciplinary approach can produce a rounded and encompassing view of ancient cultural trajectories, and can serve to shape an adequately diverse cultural heritage policy. The experience of the Italian Archaeological Mission in the Libyan Sahara integrates archaeology, history, genetics and ethno-archaeology to decode the tremendously complex cultural landscape that was the ancient Holocene Sahara. This approach may be exported to other African contexts in order to construct a new vision of African archaeology.

This book, or series of articles, is my personal exploration of the problem of human evolution. There is no pretence at providing a continuous narrative of humankind's story. Particular themes have been chosen which I believe are critical to understanding, and which illustrate the more important phases of our descent from jungle to the dawn of urban civilisation.

Reflecting on the quotation at the beginning of this Introduction, I wonder who will have the credentials, charisma and the capacity for publicity which is needed for the Seashore Hypothesis to gain widespread attention and, ultimately, acceptance.

ONE - MAKAPANSPOORT, 1949

Where it all started for me.

When I was fifteen years old I was invited by a school friend to spend the July holidays of 1949 at Makapanspoort in the Limpopo Province of South Africa. It was one of the more memorable adventures of my teenage years. Makapanspoort is where the momentous Makapansgat Limeworks 'ape-man' palaeontological site was then being worked.

My friend John was the son of Professor C. 'Pieter' van Riet Lowe, a notable South African geographer and archaeologist, a colleague of the early giants of African palaeontology, Raymond Dart and Robert Broom, at the University of the Witwatersrand in Johannesburg. Professor van Riet Lowe was Director of the Archaeological Surveys in Uganda and South Africa during his distinguished career and attended the Nairobi conference in 1947 when Louis Leakey and Robert Broom dramatically revealed their post-war hominid discoveries in Africa. That conference acknowledged, for the first time, that mankind's origins were most probably in Africa. I remember Professor van Riet Lowe telling John and me something about the importance of that conference during an outing from school after he returned from Nairobi, and being particularly animated about it all. We were boys of thirteen or fourteen then, but my memory of the incident is sharp.

At Makapanspoort in 1949 we were to indulge ourselves to our hearts content, but there were three unbendable rules: we were not to shoot anything that moved, we were to obey without question the instructions of the adults with whom we were to stay and we were not to interfere with the diggings. From talking to John, I already knew that something important was happening there.

The excavations at Makapanspoort were being undertaken by the University of the Witwatersrand under the supervision of Raymond Dart and I was told something of what it was all about. Early Stone Age implements and ancient bones had already been found. I learned about the 'missing link', which is how a possible ape-man ancestor was popularly referred to in those days. John used to talk about Darwin and evolution, which fascinated him at the time, as much as 18th century British naval history was my passion.

From the web-site of Dr. Jeffrey McKee of Ohio State University in 2005:

During mining operations in the 1920's, a local mathematics teacher, Wilfred Eitzman, first drew Raymond Dart's attention to the abundance of fossil bones being blasted out of the cave breccia by limeworkers. Dart published a short note on Makapansgat as an early human occupation site but did not investigate the site thoroughly until 1947, at which time he discovered that a sample of the vertebrate fossils contained free carbon, leading him to speculate that the bones had been intentionally burned by early hominins inhabiting the cave.

In September 1947, one of Dart's researchers, James Kitching, discovered the occipital portion of an australopithecine skull on one of the limeworkers' dumps. Reasoning that this early hominin might have been responsible for some of the burned bones in the deposit, Dart named the new hominin *Australopithecus prometheus*.

By the mid-1960s however, most workers concluded that the majority of australopithecine fossils previously described as *A. prometheus* and *Plesianthropus* (named

for Broom's adult specimen discovered earlier at Sterkfontein) should be included in the single taxon, *Australopithecus africanus*.

Other important hominin discoveries were made at Makapansgat in 1948, including an adolescent mandible, an infant's right parietal bone, several craniofacial fragments and isolated teeth, and two fragments of an adolescent pelvis. The discovery of the pelvis was critical to paleoanthropological thinking at the time, since it proved conclusively that *A. africanus* was bipedal.

At present [2005], 35 hominin specimens (representing about a dozen individuals) have been recovered from the Limeworks site. These included the recent discovery of two mandibular fragments found by the Makapansgat Field School.

I remember one evening sitting around the hissing paraffin lamp in the rough old farm cottage in Makapanspoort and asking James Kitching, the agreeable site foreman who was kindly to us boys, to explain what they were doing at the cave. He explained how they were clearing out the old lime quarry and looking for more really ancient fossil bones. It was hoped that when they got down far enough, evidence of the 'missing link' would be found in its original sites within the rock. He described stratigraphy and how they could make rough estimates of the age of fossils from the depth at which they were found contiguous to particular geological events or known extinctions. He talked about orders of a million years which was a concept of time I found impossible to imagine.

(Dr. James Kitching subsequently had a distinguished career as an internationally respected palaeontologist and was a professor at the University of the Witwatersrand. He died in 2003.)

Makapanspoort, or Makapan's Valley as it is now usually known, is a deep *kloof*, or gorge, running into a tableland with steep sides rimmed by vertical cliffs. The floor of the *kloof* and the slopes leading to the rock faces were scattered with acacia thorn trees, euphorbias, aloes and willow scrub. There were jumbled rocks that had fallen over the ages and a stream ran perennially down its length. Although there were no elephants sheltering there then, there were troops of baboons, rock-hyraxes, dangerous snakes, small antelopes and a wealth of bird life.

Early theories of human origins were unveiled by Raymond Dart. Discoveries at Makapanspoort were electrifying then, and it is still a most remarkable palaeontological site to-day. Remains of *Australopithecus africanus* hominids were discovered in the limeworks cave, together with fossil bones of extinct large mammals. Other sites within the *kloof* have provided evidence of much later occupation in the Middle and Late Stone Ages. *Australopithecus* (southern hominoid ape or ape-man) is not the missing link, but it was a family of species at the dawn of mankind more advanced than other apes of its time with greater ratio of brain to body weight than its cousins. Their uniqueness was that they habitually stood upright. Although Makapansgat, as the limeworks cave site is now universally known, cannot be absolutely dated, the *Australopithecus* fossils found there were 2-3,200,000 years old.

I have often thought of that holiday. We were free to ramble and hike in the deep *kloof* and scale the cliffs. We splashed about naked in icy rock pools and practised marksmanship with our rifles, played out imagined stories of hunting with Selous or finding the treasures of 'lost cities'. We ate well of the simple food cooked by James Kitching's young wife on a wood stove and nobody told us to bath or change our clothes! The effect of passing our days of teenage adventuring in wild country was occasionally shadowed by awe at the incomprehensible time-gulf that separated us from the 'missing link' who may have lived there. It was an extraordinary introduction for impressionable fifteen year-old boys to the immensity of the fourth dimension of time in Africa. It was the beginning of my lifetime fascination with our origins.

I accepted that early mankind evolved in Africa and Africa had always been home to

our core-population. Whenever great natural disasters occurred in the northern hemisphere, notably the several Ice-ages of the two or more million years-long Pleistocene era leading to the present, a reservoir of people in tropical Africa was ready to expand again and fill the void after each long period of cold and glaciers.

Later, I became satisfied that the Indian Ocean seashore is the critical catalyst in the evolution of mankind. Without long time beside that ocean and adapting to a seashore life with a rich seafood diet we would never have become upright-walking creatures with big brains and extraordinary intellect.

During a period presently reckoned to be between six and eight million years ago, climate change resulted in a refining of the primate groups of mammals. Many species which had proliferated in an eon of widespread lush rainforest became extinct. The great arboreal apes of tropical Africa became distinct in three ancestral families from which have descended three modern types: the chimpanzees, the gorillas and humans. Each of the three types have differences resulting from long residence in specific habitats. There are at least two sub-species of chimpanzees and gorillas, and all three have a number of races. Humanity, having spread the furthest and become adapted to all the varieties of Earth's geography, has the greatest number of these.

Latest fossil discoveries of the earliest hominids show that they lived in many places in Africa during the formative period of maybe 3-8 million years ago. Not surprisingly, they have been found near where water would have been at that time, because the great apes need to drink regularly. But, it has also been pointed out by Elaine Morgan and others that wading in a water-flooded environment has always been considered to be the first, principal stimulus and demand for upright, bipedal walking. Uprightness may not have been forced on hominid ancestors breaking away from the rainforest by living at the seashore; they may well have begun this precise transition anywhere where there was the need to forage for food in water for most of the time.

But it must have been for most of the time during many centuries to cause major skeletal changes to hips and backbone.

Professor Philip Tobias, doyen of African physical-palaeanthropology, in his autobiography, *Into the Past* (2005), described his student days under the tutelage of Raymond Dart. Dart dinned into his students the enormous 'jump' that apes had made to achieve upright walking. Tobias reminds us that the problem of skeletal changes is equalled by the enormous evolutionary effort required by the brain and nervous system. Especially this is applicable to the problem of easily maintaining balance in all the variety of activity that humans excel. Tobias wrote:

Palaeontologists ... concentrate perforce on changes in the skeleton. Certainly these are impressive and must have been pivotal in the achieving of uprightness and bipedalism. ... We dare not, however, neglect the role of the nervous system, that is the brain, spinal cord and nerves. While a gorilla needs powerful muscle contraction to stand upright even for a short time, a modern man or woman requires only delicate muscular contractions to maintain upright stance even for long periods. It was this realisation that directed my attention to the subtlety of the information that the sensory nerves bring to the central nervous system, during such an apparently simple act as bipedal standing or walking in a relaxed fashion. ...

... We need much more evidence before these problems can be resolved. At this stage we have no ready answers to the question of whether and to what extent our success as bipeds, with gaze directed to the horizon, is to be laid at the door of the anatomical adjustments to the skeleton, and how much to a more exquisitely developed proprioceptive system [messages which reach the spinal cord and brain from 'anti-gravity' muscles, ligaments and joints].

Maybe uprightness began at any forest-fringe environment where flooding was usual; at the edge of lakes in the Great Rift Valley and the flat lands where ancient lakes spread about the modern position of Lake Chad in Central Africa and the Makgadikgadi system of the Kalahari in the south. But an ape which frequents freshwater to forage and over millennia of skeletal adaptation has somehow gained a permanent upright facility for wading has no need to evolve into a creature with all the other attributes of its *Homo* descendants, leading to ourselves.

If a water-oriented early ape, becoming familiar with wading and foraging in lakes and swamps had to dramatically evolve further, then other harsh demands or powerful stimuli were experienced. Following Tobias' remarks quoted above, there had to be the conditions for a general overhaul and advance in the brain and nervous system, breaking new grounds.

We must always keep in the forefront of our thinking that mankind's habitual and irrevocable bipedalism is unique in the mammal kingdom. It's uniqueness is possibly more strange and noteworthy than our extraordinary intelligence. Our intelligence is a matter of degree, bipedalism is absolute.

The importance of the Indian Ocean and its effect on the climate of eastern Africa, and thence on evolution of higher mammals can be highlighted by recent research into monsoon systems. Studies of micro-organisms in sedimentary layers obtained from core-drilling in the ocean floor off East Africa show that the monsoons began about nine million years ago. At that time movements of tectonic plates northwards were creating the great Himalayan range and the high plateau of Tibet. Hot air rising over central Asia during the summer, exacerbated in the warm periods and lessened during ice-ages, sucks in air from the western Indian Ocean, which is the monsoon. The monsoons create the phenomenon of two rainy seasons in the highlands of East Africa along the Great Rift Valleys.

Not only did the rising of the Himalayas and the Tibetan plateau affect eastern African climate by the introduction of its two rainy seasons, but also the sucking away of air from interior Africa towards the northeast during the northern summer caused extreme dry conditions during that time. Instead of a pleasantly uniform climate with general year-round rain in a tropical environment, resulting in the great forests where primates flourished, the eastern side of Africa dried out. Tectonic shifting caused the African Great Rift Valley to emerge with vulcanism and rising along its length. The volcanoes and highlands along the Rift caught moisture during the changing of the monsoons and resulted in the two rainy seasons. These coincidental manoeuvrings of the great tectonic plates caused first the drying of the land and then saved it from complete desertification by promoting the two rainy seasons.

It is noteworthy and of critical importance that this major change in tropical climate within the influence of the Indian Ocean occurred at about the time that the split between hominids and the African forest apes was taking place. This revolution in climate, with increased differentiation of general annual rainfall patterns, may have been one of several coincidental triggers for dramatic changes of evolutionary paths. For the last 9M years, the western Indian Ocean monsoon system, waxing and waning with global climate, has dominated the eastern African environment.

Richard Leakey, in the 1980s, proposed that this unique climate was a major contribution to the emergence of diverse mammal species including the hominids. Mark Maslin and his colleagues, Martin Trauth and Beth Christensen, in an article in *Geotimes* in September 2005, based on detailed scientific work, support this view and describe the climate changes resulting from tectonic effects with particular changes at about 2 - 2.5M years ago and about 1M years ago. At about 2.5 M years ago the closing of the Panama gap between North and South America, which strengthened the Gulf Stream, caused massive ice-sheets in the Arctic and a cyclical cold-warm climatic regime. Dramatically lowered sea levels and effects on high air circulation systems intensified the Indian Ocean monsoons. About 1M years ago,

the frequency and duration of Ice-ages and warm interglacials began to be more clearly defined.

These two periods of general global adjustment coincide remarkably with the jumps from the *Australopithecines* to the *Homos*, and then from the earlier *Homos* who remained in Africa to *Homo erectus* who migrated around the northern Indian Ocean rim to the eastern end of Asia and around the Mediterranean to the west of Europe.

The dramatic changes which affected the geography and climate of tropical Africa were pivotal for the emergence and later evolution of mankind. Upright walking seems to be an undoubted result of increasingly habitual wading and foraging in lakes and rivers. But I believe that a seashore habitat must have been the critical factor resulting in the final break between the great apes of the tropical African rainforest and the successful core-line of continually evolving species leading to ourselves.

The most natural locations for this critical occurrence are where the chain of lakes and rivers in the African Great Rift Valley meet the sea. These places are at the 'Afar Triangle' in Eritrea-Ethiopia, long proposed by Elaine Morgan, and the deltas of the Zambezi and Pungwe Rivers in Mozambique, suggested many years ago by Lyall Watson. Secondary locations are also obvious: the deltas of the other major eastern African rivers that flow from the Rift Valley highlands to the Indian Ocean: the Tana, the Galana, the Rufiji and the Rovuma.

During particular ancient wet periods, the Great Rift Valley lakes were greatly enlarged and river systems linked the Lake Chad region to the central Great Rift, and the Makgadikgadi - Kalahari inland sea to its southern end. A vast chain of lakes and rivers, connected to the ocean shores and straddling the tropics, periodically covered the known locations of all hominid fossils previous to the emigration of *Homo erectus*. Martin H. Trauth and colleagues in their paper, *Late Cenozoic Moisture History of East Africa* (2005) further describe three humid periods at 2.7 to 2.5M years ago, 1.9 to 1.7M years ago and 1.1 to 0.9M years ago.

There had to be a surviving and evolving core-population of increasingly water-dependant hominids. From this core, a number of species and sub-species or races branched out and eventually became extinct. I believe that the trunk of this evolutionary tree must have had its roots in the Indian Ocean shore where growth continued unabated. From that core-population, fully-upright *Australopithecine*-type species periodically migrated back to riverine and lacustrine locations in Africa over a period of maybe two million years or more. Climate changes beyond their adaptability, vulnerability to predators and failure to obtain sufficient or appropriate nutrition extinguished them. Beside the ocean, the surviving core-population prospered and evolved further, continually adapting to the seashore habitat and being fuelled by abundant seafoods.

At about 2.25M years ago, the new family of the *Homos* of which *Homo erectus* is the best known began to emerge. Their fossils have been found beside the Great Rift Valley lakes and in a wide swath across the tropical and temperate zones of Africa and Eurasia as far as China and Indonesia. *Homo erectus* had a large and powerful physique and millennia of cultural evolution which enabled it to survive successfully in the interior of Africa and to migrate pulsatingly according to climate in increasing numbers along seashores. As their forebears had done in Africa, different races of *Homo erectus* followed rivers and found comfortable waterside habitats in further Eurasia.

As we know, the story did not end there. Repeating Ice-ages battered all mammals through the Pleistocene, and with each one there were extinctions of failed species or sub-species and races. Refined offshoots and mutated descendants filled the gaps during each next warm period. Hominids were subject to these fluctuations and no doubt there were failed subspecies which we have yet to identify. One recent example which we do know about was the Neanderthal group. Notwithstanding these trials of the ice-ages, one thread held strong and continued to evolve with exponential increments in physical, intellectual and cultural

diversity.

It is the theme of this book that all of this was dependant, absolutely, on the effect of the particular eastern African seashore environment which constantly supported jumps in evolution during rigorous challenges of succeeding Ice-ages, minor cyclical events and random-chance crises. The survival of our ancestral line was dependent always on waterside living and the powerful nutritional support of the Indian Ocean seashores where the core-people had their home-base for long periods of time.

Our most universal trait today, no matter how successfully we have colonised every environment on Earth, is our abiding love for the oceans and our particular ability to be at home beside them, and travel upon them. This trait was born with a supposed *Australopithecus aquaticus*, but it would long ago have been superseded and lost had our more immediate ancestors not been nurtured and refreshed by the benign Indian Ocean.

TWO - A BROAD BACKCLOTH

The general conventional theory of our origins and the questions that were unanswered.

All people ponder their origins and there is no society that does not have its creation legend. We do not know when people first began devising stories to account for their existence and place in the Universe. It probably occurred during the emergence of language capable of communicating abstract thought. There is controversy about when this happened, but it probably began more than 500,000 years ago. According to the present fossil record, Early Stone Age people then inhabited most of Africa from the Cape to the Mediterranean Sea, southern Europe, the Middle East, India, China and Indonesia.

In one way or another, whether in oral mythology of tribal societies or dogmatic religion and philosophical systems in civilisations, early evolution theories were based on some form of divine creation. The Universe was beyond the understanding of anybody, thus a concept of God was born. In later civilised societies, philosophical argument about evolution was mainly between those who proposed that the world was created in all its finest details by a Master Designer and those who saw that God ordered the principles and laws of the Universe. Subsequently, through development by other mystical spiritual forces, often personified in a pantheon of lesser gods, God's will resulted in the world as they knew it. In the monotheistic Jewish, Christian and Islamic religions, the Book of Genesis was the foundation of the creation story.

In Europe, during the 18th and 19th centuries, when scientists were exploring increasingly complicated and detailed strands of physics, discovering the nature of electricity and magnetism, developing Newtonian concepts of gravity and cosmology and, in the case of Darwin, tackling the giant problems of evolution, these stories faltered on the hazy dividing line between the secular and the spiritual.

At the beginning of the 20th century, growing awareness of the unique role of chemistry in the existence of life provoked continued argument. Without the seemingly miraculous properties of hydrogen, oxygen, carbon and nitrogen, and the simple compound water, the variety and marvels of life could not exist. Carbon formed in the decay of stars and expelled in their red-giant phases is the ultimate key to life as we know it and carbon-based organic compounds provide the basis for a universal biochemistry with almost limitless flexibility. From these facts an axiom emerged which became known as the Anthropic Principle: that mankind or some similar warm-blooded reasoning animal was inevitable and part of a Universal Design.

Professor John Gray in his book *Straw Dogs* (2002) reviews the reasoning of the several philosophers and writers of the Enlightenment and in the 20th century, from Schopenhauer through Kant, Nietzsche and the others to Wittgenstein and Shaw. Very broadly, he asserts that following the effect scientific discovery had on the religious belief of divine origins, philosophers wrestling with the problem proposed personal forms of religion to account for

the role of humans on Earth. Humanity was 'different', if not superior, to the rest of animal life because of our abstract reasoning and creative abilities. We are rational and have free will or the ability to control our destinies; the rest have not. In his Foreword, Gray writes:

Straw Dogs is an attack on the unthinking beliefs of thinking people. Today liberal humanism has the pervasive power that was once possessed by revealed religion. Humanists like to think they have a rational view of the world; but their core belief in progress is superstition, further from the truth about the human animal than any of the world's religions.

Having observed many animals in the wild behaving rationally, I have long rejected the concept that humans have some mental or psychic ability denied to other species. As Gray points out in different contexts, our particular ability lies in our extended use of complex language both in communication over time with writing and within our own psyches in thinking. I have no doubt at all that other species 'think', our special ability lies in the anatomical evolution of larynx and breath control which enabled the development of greatly extended articulated language. Complex language enhances logical and exploratory thinking, and the use of imagined models. This is a theme I explored in relation to the Seashore Hypothesis.

The conflict between some form of divine or supernatural intervention and Darwinian evolution does not go away. This is certainly a problem besetting the study of all evolutionary transitions and specifically to mankind's evolution from ape to *Homo sapiens*. But whereas creationists following whatever dogma cannot see another course than to believe in a supernatural force, I am sure that the lack of fossils either shows that transition occurred through very rapid extinction and mutation at the time of a catastrophic cosmic event or because the transition occurred in locations either unsuitable for the formation of fossils, were unavailable to palaeontologists or where they have not got around to looking. Fossils are found where they are relatively easy to find and where it is sensible to look for them. This is a theme which is central to the Seashore Hypothesis. Is it possible to look for fossils along really ancient seashores of the Indian Ocean? Where are these seashores? Nobody knows.

Professor Eric Axelson, an authority in his day on European exploration of southern Africa, was investigating the mouth of the Quelimane river in central Mozambique, at the southern end of the Great Rift Valley, searching for a medieval Portuguese monument. He found evidence of recent dramatic changes in the shoreline. He wrote in an academic pamphlet published in 1957:

At the lighthouse I met a Portuguese naval officer, who was doing a new survey of the coast. He said that the sea was indeed swallowing up the land, over half a mile had disappeared since 1910, and it was quite possible that da Gama's cross was five miles out to sea.

In 1505 a stone fortress was built on firm land at Sofala, again not far from the southern end of the Great Rift Valley. It was still standing and in use as a government building in 1900 but was destroyed in a cyclone shortly thereafter. I visited Sofala looking for the ruins in 1971 and the fort was a sad pile of stone in the middle of a wide sandbank covered by the tide. The town of Sofala beside the fort had disappeared together with a substantial tree-covered offshore island which was shown in old maritime charts.

I have studied the Bay of Inhambane on the Mozambique coast at the Tropic of Capricorn and the coast northward towards Sofala in some detail in relation to maritime history of the past millennium. In that short time, the seashore has been altered quite substantially because of climate change and tropical cyclones.

On the Kenya coast remains of ancient coral reefs can be seen inland from the present seashore and there are lines of those under water away from the present live reef. Coral dated up to 200,000 years old has been quarried for a cement factory near Mombasa for many years.

I have no doubt at all that the ancient sandy shorelines of eastern Africa, during the past four million years, have waxed and waned with tectonic movement, changes in seashore levels from cyclic Ice-ages, great floods from rivers and the onslaught of thousands of cyclones.

* *

There has been a general understanding that behaviour is influenced more by learning and experience than by genetic inheritance. Of course, all animals learn the detailed particularities of their environments, but the structures of their minds and bodies, and therefore the manner of their learning and application of knowledge, are decided by their genes. If the environment is sufficiently alien or different to that for which they are adapted by inheritance, no amount of learning will enable survival. Frequently, attempts to adapt to an environment which conflicts with genetic inheritance leads to failure. We may seem to be masters of the Earth, but there are warning signals in the increase in metabolic and mental disease experienced by people living in modern technical civilisation at the beginning of the 21st century.

Recent research into epigenetics shows that nutrition in all its forms, and stresses experienced by recent ancestors, modify the transference of genes to offspring by the switching off of certain genes without changing the genes themselves. The research is primarily focussed on the transference of vulnerability to genetic disorders and disease such as cancer, for which funding is available. The effects of stresses and consumption of harmful substances such as drugs in parents and ancestors further back can cause defects in later generations resulting in disease. However, if epigenetic effects can transfer malign possibilities rapidly to descendants, it follows that benign effects and useful adaptations to abrupt changes to environment and nutrition are also transferred. This has important relevance to the whole problem of evolution.

Personal communications from Prof. Michael Crawford in August 2006 emphasised the importance of epigenetic processes in enabling rapid changes in immediate descendants without altering the underlying DNA. Recent research in several institutions in Europe confirm earlier indications and this mechanism must now be seen as an essential tool or function in evolution.

* *

Within our galaxy, our solar system moves relative to others and to intergalactic gas clouds which we sweep up. Within our solar system, the sun is converting matter in an atomic furnace to release the energy that drives us. That process has variations. The form of the planets depends on their size, composition and location. Each planet is different and none has ceased evolving. Our Earth has a fluid centre and the continental plates ponderously move about the surface, causing volcanic activity and earthquakes along the fault zones.

The planet Earth's relative stability, achieved after more than three billion years, is jolted from time to time by random and cyclical events both external to our solar system and within it. Swirling forces within the rotating disc of our galaxy buffet our solar system, causing subtle shifts in the planetary orbits. Those orbits are all eccentric to a degree; none are perfectly circular, and the planets moving on their differing orbits interact with each other. Powerful galactic sources bombard us with cosmic rays. The close approach of comets and asteroids to Earth causes minute wobbles and there are occasional collisions, some of which are so catastrophic that major extinction of life occur.

There are recurring cycles which seem to govern the catastrophic events which cause

these mass extinctions. Scientists perceive these cycles at more than one level, like storm swells on an ocean, with giant cycles recurring at enormous intervals of 295 million years and subsidiary waves reaching their peaks at 24 million years and 2 million years. When the solar system moves through the plane of our parent galaxy we are not only subject to a peak of gravitational effects but we encounter moving molecular dust and particle clouds. This cyclical event is reckoned to occur every 35 - 40 million years and is accompanied by an increase in the number of comets and meteor showers. In the short term there are minor wobbles and the sun has strange cyclical surges of energy.

A devastating mass extinction occurred about 259 million years ago. Another, about which more people are familiar, resulted in the end of the dinosaurs, numerous smaller animals, sea creatures and many plant species, about 65 million years ago. Small burrowing mammals and proto-mammals made up the majority of larger land animals that survived and it is from them that the domination of Earth proceeded. Whenever mass extinctions of great magnitude occurred there were always survivors from which evolutionary diversions and mutations grew rapidly to fill vacuums.

Between thirty and maybe ten million years ago, during the period known as the Miocene epoch, all mammals proliferated and apes evolved separately from monkeys. Asiatic apes, ancestors of the orang-utans and gibbons, split away as tectonic drift separated tropical Asia from tropical Africa. In Africa, several species from that epoch have now been identified. A particular genus of ancient apes, *Ramapithecus*, who lived 12-10 million years ago in Africa and western Asia, was considered one of several possible candidates for our direct ancestors.

At the end of the Miocene epoch (approximately ten million years ago, also coincident to the beginning of the Indian Ocean monsoon system) general cooling of the Earth reduced rainfall and the tropical forests began to shrink. Much of eastern and southern African vegetation changed to scattered woodland (the so-called mosaic savannah), grassy savannah and dry grassland. At about eight million years ago (as the monsoon system consolidated) this process became acute and many forest species, including apes, disappeared in a minor mass-extinction. Surviving forest animals, forced to adapt to plains and woodland, diversified and were refined; primates, elephants, antelopes and buffaloes spread genetically and geographically, and their predators followed. The baboon and savannah monkey families became the principal primates in the drier zones.

Within these great cycles, shorter waves of change occurred, and they have become clearly definable in the last two million years (the Pleistocene) with alternating cool and warm periods. Some of these cooler periods have been punctuated by sharp drops in global temperatures. These severe intervals have been named Ice-ages because during them much of Europe and North America were covered by glaciers and ice sheets.

Professor James Lovelock, in *The Revenge of Gaia* (2006) reminds me that the increasingly frequent fluctuations of climate in the Pleistocene probably reflects the efforts of Earth's 'Gaia' self-regulating system while the Sun's radiation very gradually increases. Perhaps, at about the beginning of the Pleistocene, and the appearance of ice-age and interglacial climate spikes a threshold was passed where increasing efforts of the environmental regulator become obvious. A clearly defined one hundred thousand year cycle has emerged which has intensified in the last 500,000 years.

'Gaia' is the name Lovelock gave to the feedback mechanism within the whole of living matter on Earth which helps maintain an equable climate suitable for life; a self-regulating system which functions well within certain parameters. When global conditions begin to exceed limits which suit the system, a subtly varied mechanism comes into operation, like changing gear in a vehicle. The Pleistocene system with its stimulating climatic variations, some quite severe, has been of the greatest importance for the evolution of humanity.

There were extinctions and retreats during Ice-ages and re-dispersions when the climate

was amenable. Ancestors of hominids and other mammals adapted and were forced along evolutionary paths by the rigours of dramatically changing climate. Tracing the ape line in Africa, there was a major divergence some time between 6-8 million years ago. During that immense span of time, the lines of some African forest apes split into two distinct mainstreams of evolution; ancestors of gorillas and chimpanzees in one stream, and ancestors of upright-walking hominids in the other.

Fossils from the past six million years illustrate evolutionary progress and there is now quite a respectable record. The remains of dozens of ancient creatures have been dug up and assembled from the famous South African complex of Sterkfontein, Swartkrans, Kromdraai and Makapansgat, all along the East African Rift Valley from Lake Malawi to Olduvai in Tanzania to Lake Turkana in Kenya and onwards into Ethiopia and Eritrea. Discoveries in Chad show that eastern and southern Africa do not have a monopoly.

The general classification for the early fully-upright, bipedal hominids, *Australopithecus*, was coined by Raymond Dart in South Africa in 1925 to define the first true hominid skull identified, the Taung child. By 1997, *Australopithecine* fossils had been classified into seven separate species and as scientists delve ever more deeply into the detail of differences between relics in various places more species are defined

As each new species or subspecies of early hominid from the period 4-8 million years ago is discovered, new taxonomic names are created. The layperson inevitably becomes confused by this, but it illustrates the proliferation of these creatures seeking survival in a changing world and expiring after failing to adapt. The *Australopithecines* now have forebears, some of whom may also have lived in parallel for a while, with genus names such as *Ardipithecus*, *Orrorin* and *Sahelanthropus*. There will be more of these ancient, lost species when their fossils are found. But it is the *Australopithecus* group which is important to us, for they survived in a series of subspecies and races over most of Africa for up to three million years. They existed relatively briefly in parallel with the first divergences of the *Homo* line.

Recently, genetic scientists studying the human and chimpanzee genomes have concluded that this very early period of diversion between the ape and hominid lines was not clear-cut. There was not some sudden abrupt cleavage and the speciation hovered in the balance for maybe as long as one or two million years. Miscegenation, or hybridization, occurred for a long time before a sufficiently large population of hominids had been geographically separated from the forest apes for clear speciation to have occurred. This conforms precisely with my intuitive thinking following the discovery of the large variety of hominid or proto-hominid fossils with dates varying from seven to four million years ago.

I am satisfied that a genetic path was set with the move to habitual upright stature, no doubt precipitated by adaptation to finding food in lakes and rivers. But this was a perilous evolutionary path with frequent losses of isolated races and emerging species. Small numbers survived until the adaptation was sure and a firm genetic platform emerged. Although this is not any kind of proof, it is yet another factor favouring a seashore hypothesis; speciation occurred when hominids were isolated from forest or forest-fringe apes by sojourn on the Indian Ocean coast.

* * *

At this point, some further clarification of names and species identification is necessary. Until recently, all the early hominids whose fossils had been discovered were classified within the *Australopithecus* genus. New species names were introduced, usually by the discoverers of the fossils, as described above.

Two species, *robustus* and *boisei* identified by Robert Broom in South Africa and Louis Leakey in East Africa, were always considered to be different from the 'gracile' species known

usually as *Australopithecus africanus*. They had jaws and teeth most suited to a diet of tough roots and nuts with a stronger skull to support powerful chewing muscles, and a generally more thickset skeleton. When a fair quantity of fossils of the whole range of hominids had been discovered and dated, it seemed that the 'gracile' *A. africanus* became extinct at the beginning of the Pleistocene, about 2M years ago, while the two 'robust' species survived for several hundred thousand years longer in South Africa and the Great Rift Valley. It also became clear that the 'gracile' species had been omnivorous, like baboons, while the 'robust' pair had been vegetarian, with a diet more like gorillas. It could be assumed that the 'graciles' lived on the savannahs and the 'robusts' survived longer within the protection of forests in the margin between high rainforests and open savannah.

When Dr Robert Broom identified the first fossil of the *robustus* species from Kromdraai in 1938 he named it *Paranthropus robustus*, believing it was sufficiently different to Raymond Dart's *Australopithecus africanus* to have its own genus. In the last couple of years, with the proliferation of *Australopithecines* and the application of new family names to fossils from earlier times, Broom's name has been revitalised. The 'robust' *Australopithecines* are now generally known by the genus *Paranthropus* and I have endeavoured to use this nomenclature throughout without creating too much confusion. Those who are not academics or professionals engaged in the regular study of hominid fossils will find all this difficult. In keeping my writing both clear and up-to-date I also have difficulty and have tried to limit the use of species names in my narrative.

Way back in 1972, Richard Leakey wrote :

In answering this [the question of different types of early hominid] we run smack into one of the most thorny problems that has bedevilled human prehistory ever since the science got underway. During past years fossil finders frequently attached labels to their discoveries on the flimsiest of anatomical nuances. New species and genera were created with little regard to the inevitable variations between individuals. ...

The problem of identifying each fossil find without an even greater cluttering of the range of genus and species names has not eased since 1972. There is presently controversy about the proliferation of *Homo* species which have been named because of the variation in skull shapes during the past two million years.

There are fundamental questions. How and why did a small, omnivorous ancestral forest ape pass through an evolutionary jump to *Australopithecus*, a vertically-walking hominid? If changing climate caused the rainforests to decline, leaving the ancestral ape to survive in fringe woodland and savannah, why didn't it evolve simply into an ape in parallel with the African baboon? Within the rainforest, evolution resulted in gorillas and chimpanzees, and their ancestors had evolved alongside a large number of monkey species.

In the 1960s and 70s, it was proposed that a *Ramapithecus*-type ape, or possibly a more specific relative, a *Kenyapithecus*-type, lived in the trees of the declining rain-forests and was forced to evolve by natural selection into a savannah ape. Unable to survive on the savannah by eating fruit, the ape changed to exploit the possibilities of scavenging and hunting. According to the hypotheses of that time, the upright stance was the result of the need to stand higher to seek prey and avoid the big cats, bipedal locomotion enabled them to chase antelopes while carrying weapons, improved hands enabled them to become tool and weapons makers, bigger brains were necessary for using weapons and coordinating hunting teams. Team-work in toolmaking and hunting required language and bigger brains still. The division of labour between hunting males and child-rearing females stimulated pair-bonding with sophisticated socialising and greatly increased sexual activity which led to monogamy.

One of the main distinguishing features of mankind, the loss of hair or fur, was a

feature of Desmond Morris' book, *The Naked Ape* (1967). Hominids, it was suggested, lost their fur because of the need to cool themselves by perspiring in the heat of the hunt. This nakedness was more advanced in females because it played a dual role by increasing sexual attraction for pair-bonding, which also led to the evolution of prominent breasts and buttocks. In 2004, Morris in *The Naked Woman* continued to follow this time-worn path, ignoring the crucial fact that massive sweating without frequent drinking in the dry savannah leads to a quick death. I find this incomprehensible.

Robert Ardrey devoted massive research and writing to the hunting hypothesis and he made a plausible case. He expanded his theories to explain aggression and warfare through a genetic territorial imperative developed during this early savannah period. But there were a number of gross errors which became obvious as the result of studies of San-Bushman hunter-gathering nomads in southern Africa and various species of predators.

Hunting is not carried on by running about in a specialised vertical stance with much verbal discussion, but by crawling and dodging about silently in cover. Four-legged running is much faster and easier than two-legged. Evidence from observation of surviving African nomadic hunter-gatherers on the vast, open savannahs is that they were not aggressive socially and did not fight for territory. Those modern hunter-gatherers whose natural aggressive nature had been extensively observed and reported are those who were constrained by their environment in tight territorial pockets. It is the natives of the dense rainforest in Papua-New Guinea mountains and parts of the Amazon basin which are usually quoted as being violently territorial with head-hunting rituals; whereas the Bushmen of the Kalahari were especially noted for their peaceful society.

Robert Ardrey's hunting hypothesis and its violently aggressive offshoot, the territorial imperative, were discredited and a gentler scenario was generally accepted as the convention. Richard Leakey wrote in *Origins* (1977):

Meat eating was important in propelling our ancestors along the road to humanity, but only as part of a package of socially-oriented changes involving the gathering of plant foods and sharing the spoils.

It was proposed that tool-making developed hands and brains, vertical stance was needed for surveillance and especially to carry weapons, tools and possessions while food-gathering or hunting. As gathering and hunting became more successful and complex, social organisation developed, and communal food sharing and preparation took place, enhancing the need for language and more brain power. Positive feed-back promoted greater variety and sophistication of all these facets of behaviour, particularly the complexity of social manners as children matured more slowly with the advent of larger brains.

Chris Stringer and Robin McKie in their masterly summary, *African Exodus* (1996), presented what I found to be one of the more interesting scenarios for a savannah origin.

For many millions of years, in an era we call the Miocene, the primate group to which we belong - the apes - had been thriving across the warmer parts of Africa, Europe and Asia. These large-bodied tail-less, relatively large-brained animals were a highly successful, widespread and diverse group. Then they began to die out, losing a battle for resources with monkeys, who tend to be smaller-brained and smaller-bodied, but who nevertheless began to take over the forest of the Old World ... about ten million years ago. The reasons for this shift in the primate power axis are not clear, though anthropologists believe that climate change probably played a key role, since the Earth began to get cooler and drier then. In addition some scientists point to the ability of monkeys to digest relatively unripe fruit, a power that would have allowed them to pick off less mature produce ahead of their ape competitors...

... some scientists believe the rise and spread of the monkey ... played critical roles in our own evolution. Faced with creatures that displayed greater flexibility in diet and environmental tolerance, some apes began to adapt to life on the level. Our ape ancestors were forced down from the trees, and once on the ground, evolved upright gait and later the large brains and tool technology that are the distinctive hallmarks of hominid intellect.

This speculative suggestion is that those apes forced from the trees to the east of the African Great Rift Valley, on the emerging savannahs, became hominids and those to the west, within surviving rainforests, became the chimpanzees and gorillas. This was the so-called 'eastside hypothesis'.

Thus, there were several more benign hypotheses than Ardrey's picture of the emergence of vicious gangs of snarling cat-men. But there were a number of awkward, unanswered questions and I detected circular arguments. In any case, the discovery of early hominid fossils in west-central and South Africa tends to negate the simple eastside concept. If hominids developed on the savannahs to escape competition from forest monkeys, how could they survive amongst the more agile, omnivorous savannah baboons and prolific vervet monkeys and the big cats, hyenas and packs of African hunting-dogs? Within the rainforest, how did the ancestors of chimps and gorillas survive this same competition from forest monkeys?

Did our ancestors really have to walk around vertically? *Australopithecus* walked vertically four million years ago and how did it benefit them? They were not tool-makers and did not carry kits around with them, so what had tools or carry-bags to do with promoting vertical stance? Leakey's explanation was flawed.

If *Australopithecus* evolved from tree-dwelling forest apes, they did not need to stand to pluck fruits, as some anthropologists have suggested. They were only about four feet tall, anyway, much the same height as a vertically-stretched male modern baboon which runs fast with four limbs on the ground and climbs around in trees with great facility. Human boys in our own 21st century will climb trees if their parents will let them and children's playgrounds have jungle-gyms.

Why are we naked? Furlessness in the tropics is a great disadvantage for it leaves the skin vulnerable to insect bites, parasites and the weather. At higher altitudes in South and East Africa people today need clothing and fire to combat cold. Yet it is claimed that a colder dry climate, resulting in declining tropical rainforests, was the essential spur to the evolution to hominids. Why do we have a layer of fat under our skin? No other primate or tropical savannah mammal is encumbered with this. If we had to develop a fatty layer coincidentally to compensate for losing our fur, there had to be some greater imperative at work.

Why do we sweat such a lot, if we evolved in response to a drying environment in which heavy sweating without frequent drinking kills very quickly? There seems to be no reason for natural selection to have led to nakedness and sweating on the dry savannah plains of Africa; indeed it would have been counter-productive and rapidly have led to extinction.

Why did we complicate our drinking and breathing mechanisms? Other mammals can drink and breathe at the same time when exposed to predators at vulnerable watering places, but we cannot.

Was it necessary to develop language and massive brains? Baboons and vervet monkeys are excellent mosaic woodland and savannah gatherers with disciplined clan societies. Gorillas and chimpanzees are efficient forest gatherers and have complex family groups. Chimpanzees are occasional cooperative hunters and meat eaters. Wild dogs, lions and hyenas are superb cooperative hunters. None of them needed to develop big brains and complicated spoken language. Big brains create problems in giving birth and rearing children with many years of immaturity.

How did we develop our massive brains together with increased bodily stature when it has been shown that a largely vegetarian diet, or one short of specific nutrients only found abundantly in fish and shellfish, results in dramatically diminished brain to body ratio as size increases? Our ancestral line increased its ratio over four million years. *Australopithecus* had a brain to body quotient of about 1-3 while *Homo sapiens*' is about 3 - 4, using the same criteria. The other great apes are away down the scale.

Why did we need to make a range of tools and habitually use them? Presumably not to survive, since none of our primate cousins need them.

Nor did *Australopithecus* !