Written by Elaine Morgan "a couple of years before she died"
See post by her son Gareth Morgan at https://groups.io/g/AAT/message/74206

AARON FILLER

"The Origin of Species" has stood the test of time, and by now the basic concept of natural selection is taken as read by scientists discussing any aspect of life on earth. But unanswered questions remain. While Darwin's central idea may not be rejected, there is a legitimate assumption that it may need to be supplemented before those questions can be answered.

One of the most adventurous attempts to do this was Aaron Filler's book "The Upright Ape", published in 2007. The dust cover calls it a groundbreaking theory of evolution, and comes close to claiming that it is a new Origin of Species. That could imply that the author was setting out to replace Darwin's version with a better one.
However, closer scrutiny of the subtitle reveals a word printed in small italics: this is not going to be a new Origin of Species, but a new Origin of *the* Species – i.e. *Homo*. Whereas Darwin was talking about all living things – plants and animals, fish and fungi, earthworms and barnacles and slime moulds – Filler's book focuses almost exclusively on vertebrate animals, with special reference to one particular vertebrate, namely Homo, and one particular feature- the spine.

He does not dispute that Darwin provided a powerful insight into how new species arise and how they become different from their ancestors, but he repeatedly reproaches him for failing to explain why they nevertheless continue to resemble one another in so many ways.

"Any thoughtful observer", he observes, "will immediately appreciate that there are similarities among the creatures of the earth. A giraffe and a mouse and a human all have one head, two eyes, one mouth, one tongue, teeth, lips, four limbs and so on. When confronted with an extraordinary recurring pattern, such as this, the human mind is impelled to ask how, why, and what." Darwin, he observes, "does a poor job of explaining why they remain so similar." He never explains why he thinks it is a poor job. At one point he does he does spell out what Darwin believed, but it appears buried in a list of other obsolete hypotheses.

"Modern science teaches Darwin's view that similarity among organisms arises simply because they have descended from common ancestors. Orthodox theology says simply that God chose to make creatures this way. The ancient Greeks…" and so on. Natural selection is treated as on a par with Jehovah and Zeus, as if they were all equally and self-evidently outmoded.

His other criticism is that Darwin envisaged change in living organisms as a gradual process, an accumulation of small changes between one generation and the next. Filler believes it sometimes proceeds by giant leaps. He makes reference to Stephen Jay Gould's theory of punctuated equilibrium, which states that the anatomy of a species tends to remain unchanged for long periods of time, and then suddenly changes. That is certainly true, but why should anyone consider it surprising? Filler's assertion that "under pure Darwinian analysis, we might expect species to always undergo a steady accumulation of changes across time" is without foundation. Darwin said nothing of the kind. Examples of unchanging species include the coelacanth and the hermit crab. They have remained unchanged for millions of years

simply because nothing in their environment has changed for millions of years – exactly as Darwin would have predicted.

Besides, Gould's conception of a sudden change was very different from Filler's. The changes he cited were "sudden" only in a relative sense and were not a product of gene mutation but of speeded-up natural selection. Filler himself admits that he finds it "difficult to see how this differs from the gradual change of Darwin's typical model." He himself is proposing something far more dramatic: a major transformation of the body plan, taking place in a single generation. Faster than that, in fact. He points out that if you think in terms of the gene itself rather the organism, it takes place "all at once in a true instant – literally less than a second."

To understand Filler's preference for a "mutationist" rather than "adaptationist" approach, we need to know the sequence of events that led up to it. In 1968 Nature published a paper by Alan Walker and Michael Rose describing some fossilised bones that had been found near the Uganda- Kenya border in 1961 by geologist William Bishop, and left behind for later study if the need arose. One of these was an almost complete mid-lumbar vertebra assigned to the species *Proconsul Major* - now called *Morotopithecus* - which did not fit neatly into the narrative of human evolution as it was then understood.

Bishop brought this fossil to Cambridge and showed it to David Pilbeam who went out to Africa in 1966 to get a better idea of the nature of the site. Fifteen years later in Harvard, he handed a cast of the vertebra to Aaron Filler and invited him to try to make sense of it. Filler is convinced that this bone, belonging to a creature believed to be a common ancestor of apes and humans, already possessed the anatomical modification that underlies our own upright stance and bipedal locomotion. It had a "human-like lumbar transverse process." An animal with such vertebrae, he declared, could never have walked comfortably on all fours.

The inference is that a common ancestor of apes and humans had already been walking upright. If chimpanzees no longer do so, it must be because they are ex-bipedal animals that later reverted to using four limbs for locomotion. This possibility is not universally accepted, but it has gained many supporters. If true, it would not eliminate a mystery but deepen it. We would need to ask two questions instead of one. Firstly, "Why did the common ancestor become bipedal?" and secondly "Why did the chimpanzee and the gorilla cease to be bipedal?" Filler's book never addresses the second question, but he offers a mind-blowing answer to the first one.

Slow and gradual "adaptationist" changes in a plant or animal can be transmitted from one generation to the next by means of a single mutated gene. But we now know that there are genes known as *Hox* genes, which determine not individual minor features such as the colour of the eyes or the hair, but a whole suite of changes in fundamental aspects of the entire structure and orientation of the body. In the case of a primate, Filler lists changes such as becoming upright, tailless, broad-chested, with a caved in lumbar spine and a solidly fused sternum, as some of the package of modifications that might be caused by such a single mutation in a .

He supplies one well-documented example of such an event. As long ago as 1822, Etienne Geoffroy Saint-Hilaire had conceived a theory about the origin of vertebrates that was greeted

with almost universal scepticism. He formed the opinion that the segmentation of the vertebrae in animals has a great deal in common with the segmentation in insects, except that the segments are differently orientated. If a primeval insect had flipped over on its back and continued to evolve in that unlikely position, it would predictably have ended up as something closely resembling a vertebrate. He found no takers: the scientists of his day regarded the suggestion as too vague, too far-fetched, absurd. How, they enquired, could a cockroach turn over on its back and turn into a mouse?

But they're not laughing now. Geneticists confirm that the sequence of genes governing the segmentation of insects is identical to the sequence governing the segmentation of vertebrates but with the orientation reversed. . Saint-Hilaire had been right after all! Filler was deeply impressed by this. His book contains several chapters of praise for nineteenth century figures such as Goethe and St Hilaire, for whom the spinal column was the "archetype" – the basic design feature which determined the nature of everything else about the animals which possessed it. Nobody has studied the vertebral column more intensively than Filler. .

Filler hypothesised that a similar flip in a *Hox* gene transformed a common ancestor of apes and men into an upright bipedal ancestor of humans, and he gives other examples of far-reaching changes that may have been just as sudden as that. There was the Cambrian explosion, around 522 million years ago when, after half a billion years in which only one-celled organisms had existed, multicellular ones appeared, and it is suggested that within a short period the predecessors of all of the dozens of major animal phyla existing today suddenly came into existence. The second such revolution, Filler records, was the abrupt emergence of the "inverted insects" we know as the vertebrates. Then he mentions a change in the body plan of some reptilian vertebrates which might have initiated the age of the dinosaurs, and subsequently some reorganisation in the body axis of mammalian vertebrates that enabled them to out compete the dinosaurs.

With these as models the flip from ape into man becomes easier to contemplate. He regards that single lumbar vertebra that was put into his hand as proof that Morotopithecus was one of the earliest specimens of an instant overnight transformation. It caused the ancestors of humans to strike out along a totally different evolutionary path from the other apes: it left them no option. Environmental pressures had nothing to do with it. .

It's an exciting story and I hate to throw cold water on it. I am certainly not competent to assess his expert analysis of the lumbar transfer process of Moroto. If it is proved that the last common ancestor did indeed walk upright, that would invalidate the simple story of a chimp/ hominid split in which I had fondly believed, and would raise a lot of new questions. But it would be credible.

The flip-over from insects to vertebrates, too, seems to be well attested. It would always have been easier to accept if it had been more accurately portrayed as a flip-over between aquatic ancestors of the insects and aquatic ancestors of the vertebrates. We must conclude that it happened in water, and not only because the first vertebrates – and for millions of years the only vertebrates – were fish. There is also the fact that once an animal moves out onto the land, it is far more constrained by the greatly increased influence of the force of gravity, and the nature of the substrate and its relation to it. On land the difference between being the right

way up and being upside down is a very big deal: in water such a flip-over would have been virtually cost-free.

But I can't accept that Morotopothecus appeared overnight. I am one of those gradualists Filler describes as Darwin's "acolytes", and I would like to voice some of my doubts. He bases his case on that lumbar process in a single specimen of Moroto. He had no way of judging whether that was a new phenomenon, or whether that specimen was descended from a long line of predecessors also possessing the lumbar process, either with or without other modifications in the sternum or the chest or the tail.

But for the sake of argument let us suppose that the owner of the bone Filler held in his hand was indeed very different from all his forebears. In that case, when he was born his mother and father were apes and when they were on the ground walked on four limbs. Young Moro was unable to do that without severe discomfort. He would be unable to keep up with others of his own age. Even after millennia spent in adapting to it, bipedalism is still a skill that takes years rather than weeks to acquire, so in his early life he would be functionally disabled, moving with pain, a young lame ape. If he did try to stand up and walk it would be very difficult unless his feet had also been transformed. The other specimens found on the site have feet like apes, with an opposable toe for grasping a branch, and the *Hox* gene has nothing to say about feet. In his intense concentration on the vertebra, Filler has nothing to say about them either. How likely is it that this young misfit would have out competed all his contemporaries, and monopolised enough females to spread his magic new genes throughout his entire species?

I find it much easier to believe in Darwin's picture of gradual adaptation by the whole population to gradually changing conditions of life. But Filler, without totally rejecting Darwin's theory, never speculates about the kind of life Moroto might have led. In the whole book, only about two dozen words are expended on the possible influence of surrounding conditions. At one point he refers to "this change, and the permissive ecological situation in which it occurred…" (What situation? In what sense was it permissive? We are not told.). At another point he indicates that the environment has no relevance "aside from the fact that the offspring survived and were able to breed." For the mutant gene to spread, its possessor would have to do better than that: it would have to outbreed all the others who lacked the *Hox*. And that is a pretty big aside.

In a passage on the discovery of the Moroto vertebra, he does make one passing comment on the environment. He says that the bones had been found in sedimentary rocks that had been formed "in the forest at water's edge during the Miocene era."