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The Cradle of Humankind

Home of Mrs Ples

By Francis Thackeray

It is part of the human condition to want to know where we come from. Our knowledge of our roots is still patchy, but much of what we do know of how and where our species, homo sapiens, developed, came from the fossils found at the Cradle of Humankind near Pretoria and Johannesburg.

It is an intriguing story of characters with names like Nutcracker, Little Foot, Handy Man, Taung Child and Mrs Ples (what an odd name for a young man!). It is a story that would have made Charles Darwin reach for the champagne.

The Cradle is the richest single source of fossils that represent distant relatives of humanity, extending back many millions of years to the time periods that geologists call the Pleistocene and Pliocene.

The Cradle initially included Sterkfontein, Swartkrans, Kromdraai and about ten other caves with important fossils in the adjacent area, situated 75 kilometers south-west of Pretoria. More recently, in July 2005, the Cradle has embraced two additional areas, notably the Taung Skull Fossil Site in North West Province, and the Makapans Valley in Limpopo Province.

All of the caves in the Cradle of Humankind have been formed from a gray rock called dolomite, rich in limestone. Remarkably, the rock itself is more than two thousand million years old, dating to a time when the interior of

southern Africa was under a shallow salty sea. Within the last 5 million years this dolomitic rock has been subject to erosion. Solution cavities were formed when limestone was dissolved by water seeping through the rocks. The caves were occupied by hominids, distant relatives of humankind. Their bones were covered by sands that were cemented by limestone. In this way the fossilized bones have been protected for very long periods, until they were discovered by miners who excavated the caves for limestone, often using dynamite.

In 1924 a dramatic discovery was made by miners at Taung, situated north of Kimberley. A skull of a juvenile primate was blasted out of the limestone cave deposits, together with skulls of other fossils that included many baboons. The fossils were brought to Raymond Dart, a professor of anatomy at the University of the Witwatersrand. He recognized that the juvenile primate skull was certainly not a baboon. It was a new species which he called *Australopithecus africanus*, a human-like ape from South Africa. The Taung Child had died about 2.5 million years ago, and was only about three years old at the time of death. It was probably killed by an eagle whose sharp talons had penetrated the eye sockets.

The Taung Child is significant in that it was the first fossil of its kind to be discovered. Professor Dart had claimed that it must have walked upright on two legs (a human-like feature), although it would have had a small brain (like that of modern apes). In a sense this was an “ape-man”, representing a distant relative of *Homo sapiens*, the single species to which we all belong.

It was Charles Darwin who had suggested in 1871, in a book called “The Descent of Man”, that human “progenitors” must have originated in Africa. Darwin was a very observant scientist. He noted that of all the living primates that we see today, it is the chimpanzee and the gorilla that have skeletons most similar to those of humans. Further, it is only in Africa where we find chimps and gorillas. Darwin argued that the common ancestor for chimpanzees and humans must have lived on the African continent. The Taung Child, described by Dart in a prestigious scientific journal in 1925,

provided confirmation of Darwin's views. Africa truly is the Cradle of Humankind, and South Africa has yielded good evidence for this.

Neither Darwin nor Dart was saying that humans were descended from chimpanzees. Instead, they accepted the view that chimpanzees and humans must have had a common ancestor (the so-called "missing link") that would have lived in Africa many millions of years ago. Genetic evidence has suggested that this so-called "missing link" must have lived in Africa some time between 5 and 10 million years ago.

If the Taung Child is 2,5 million years old, as many scientists believe, then *Australopithecus africanus* can be considered to have been a creature (a hominid) that was on the way to becoming human, having descended from an ape-like ancestor which was itself also the ancestor of chimpanzees.

In 1925 there were many skeptics who refused to accept Dart's interpretation of the Taung Child as an ape-like human relative. What was required was an adult of the same species. Dr Robert Broom was interested in the possibility of finding such specimens. In 1936 he went to Sterkfontein soon after he had been appointed as a palaeontologist at the Transvaal Museum in Pretoria. He was intrigued when he saw fossil baboons similar to those that had been found from Taung. He asked the lime-mine manager to look out for fossils that might represent *Australopithecus*. Within a week the first hominid was discovered at Sterkfontein. It included fragments of an adult skull, and the impression of a brain. Broom was thrilled. He called it *Plesianthropus*, meaning "almost human". Today it is recognized that this fossil, like the Taung Child, belongs to *Australopithecus africanus*.

The Second World War interrupted scientific work on hominid fossils, but in 1947 Broom was encouraged by Prime Minister Jan Smuts to continue fieldwork at Sterkfontein. Broom was almost 80 years old and despite his age was intensely enthusiastic. However, geologists were critical that he was not paying attention to the stratigraphic context of fossils. Authorities associated with the Historic Monuments Commission refused to issue Broom an

excavation permit. In defiance of the law, Broom went to Sterkfontein and asked the miners to blast at a particular spot. Triumphantly, on April 18, 1947, he discovered an almost complete skull of a fossil which he called Mrs Ples, assuming that it represented an old woman of the kind that had been called *Plesianthropus*.

Recent research on Mrs Ples indicates that it was an adolescent individual with wisdom teeth still developing at the time of death, about 2.1 million years ago. There are also indications that it was probably a young male rather than an old woman. Be that as it may, Mrs Ples remains the most complete skull of *Australopithecus africanus* yet discovered. The skull strongly supports the view that this species was a bipedal hominid with a relatively small brain, distantly related to *Homo sapiens*.

After his discovery, Robert Broom was issued a permit that allowed him to continue work at Sterkfontein until his death in 1951. Palaeontologists at the Transvaal Museum, including John Robinson and Bob Brain, worked at Sterkfontein for several years and discovered stone tools in deposits that are about 1,8 million years old. In 1966 Professor Phillip Tobias, distinguished anatomist from the University of the Witwatersrand, took on excavations at the site. Together with Alun Hughes he discovered a skull initially identified as *Homo habilis*, believed to be the manufacturer of the stone artifacts.

Skulls of *Homo habilis* ("handy man") had also been found at Olduvai Gorge in Tanzania where Louis and Mary Leakey undertook excavations. In the same deposits at Olduvai was the cranium of a creature that represented a different species, *Australopithecus boisei*, with very large teeth. This skull was nicknamed the Nutcracker Man by Professor Phillip Tobias who described the specimen in detail, as well as several specimens of *Homo habilis* from Olduvai.

The "Nutcracker Man" from East Africa is very similar to fossils that have been discovered at Kromdraai in the Cradle of Humankind in South Africa. Kromdraai is within two kilometers east of Sterkfontein. In 1938 a schoolboy,

Gert Terblanche, noticed a few teeth in the calcified sands of this cave. He knocked out one of the teeth with the expectation that he might be paid for the discovery (in terms of current law, South African fossils may not be bought or sold). Terblanche took the tooth to Sterkfontein where he gave it to the mine manager, who in turn passed it on to Broom. The schoolboy later gave Broom more pieces of the same specimen which was recognized as a new species, *Paranthropus robustus*. Phillip Tobias prefers to classify it as *Australopithecus robustus*, closely related to the East African “Nutcracker”.

One kilometer to the west of Sterkfontein is the extraordinary site of Swartkrans. Here more specimens of the “robust” ape-man were discovered, together with a few specimens attributed to *Homo ergaster*. In addition, Bob Brain discovered about 250 bones of antelope that had been burnt in fires with relatively high temperatures, higher than the temperature normally associated with a natural grass fire. It has been claimed that the burnt bones represent the earliest evidence for the controlled use of fire, about 1 million years ago. The fire would have provided warmth in winter, as well as protection from predators such as leopards. Such carnivores certainly preyed upon *Australopithecus robustus*, as indicated by the presence of two punctured holes in the top of one skull. Perhaps it was *Homo ergaster* that had the technological advantage of controlling fire. This species may thus have had a competitive advantage over the “robust” ape-man which became extinct about a million years ago.

Other sites in the Cradle of Humankind include Drimolen which, like Swartkrans, has yielded remains of both *Australopithecus robustus* and *Homo ergaster*. The adjacent Wonder Cave has not as yet provided evidence of hominids, but it does have spectacular stalagmites and stalactites which formed many millions of years ago. The cave can only be entered through a narrow opening, through which baboons have fallen without being able to climb out. Their calcified bones have been found at the bottom of this cave, analogous to bones of animals that have been discovered in the Silberberg Grotto at Sterkfontein, also a “death trap”.

Amazingly, the Silberberg Grotto has yielded an almost complete skeleton of *Australopithecus*, dubbed Little Foot, about 3 million years old. It was discovered by Ron Clarke, Stephen Motsumi and Nkwane Molefe, associated with the University of the Witwatersrand. The creature had evidently fallen into the cave, and may have died of starvation. The mummified skeleton was well preserved after being covered by sands that were later cemented by calcium carbonate. The bones of this hominid were not disarticulated by predators.

The skeleton of Little Foot is slowly and carefully being excavated by Dr Clarke and his team. A replica of the fossil will be made, and will eventually be placed on public view on the spot where the bones had been fossilized. The original will be prepared for scientific description at the University of the Witwatersrand.

Original hominid fossils curated by the university and the Transvaal Museum are part of world heritage of which all South Africans can justifiably be proud. Fossils such as Mrs Ples and the Taung Child are occasionally placed on public display, but are regularly studied by scientists who continue to learn more about human origins, using a diversity of techniques that continue to be developed.

Palaeontology, the study of fossils, is a field which is currently attracting a great deal of interest, locally and abroad. The development of new school curricula in South Africa, together with the establishment of information centres and new museums, such as those at Maropeng and Sterkfontein, will hopefully stimulate young South Africans to turn to palaeontology as a career, to follow in the footsteps of people such as Raymond Dart, Robert Broom and Phillip Tobias.