

## Sterkfontein (South Africa)

No 915

### Identification

<i>Nomination</i>	The Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs
<i>Location</i>	Gauteng, North West Province
<i>State Party</i>	Republic of South Africa
<i>Date</i>	16 June 1998

### Justification by State Party

The Sterkfontein Valley landscape comprises a number of fossil-bearing cave deposits which are considered to be of outstanding universal value, because they encapsulate a superbly preserved record of the fauna, including an invaluable record of the stages in the emergence and evolution of humanity, over the past 3.5 million years. This makes it, without doubt, one of the world's most important sites for human evolutionary studies and researches.

For over sixty years the sites in the Sterkfontein area (of which there are twelve main and many subsidiary sites) have played a most important role in the establishment of Africa as the cradle of mankind. The juvenile status of the Taung child skull and some other factors militated against the acceptance by anthropologists that the species represented had any relevance to the origin and evolution of mankind. It was not until adult specimens started to emerge from Sterkfontein from 1936 onwards, and especially after World War II with the resumption of excavation at Sterkfontein by R Broom and J T Robinson, and the initiation of a new phase of excavation by P V Tobias with A R Hughes and R J Clarke, that the crucial clinching evidence was presented to the world of science. Above all, historically, it was the skulls and teeth and postcranial bones from Sterkfontein that established the truth of Dart's (1925) claim that these upright, small-brained creatures with small canine teeth were primates which were knocking upon the door of humanity.

It was the Sterkfontein adult specimens that finally converted the opponents of this view and permitted the conclusion to be drawn that *Australopithecus* could legitimately be regarded as a member of the Hominidae (the family of humans). Moreover, it was these southern African fossils (which were discovered earlier than the finds in East Africa) that helped to establish Africa rather than Asia as the cradle of

mankind, as Charles Darwin had predicted in his 1871 work, *The Descent of Man*.

Hence, from both an historical and an heuristic point of view, the Sterkfontein discoveries gave rise to major advances, factually and conceptually, in the understanding of the time, place, and mode of evolution of the human family. This seminal role continued to the present with the excavation and analysis of more specimens, representing not only the skull, endocranial casts, and teeth, but also the bones of the vertebral column, the shoulder girdle and upper limb, and the pelvic girdle and lower limb. The Sterkfontein assemblage of fossils has made it possible for palaeoanthropologists to study not merely individual and isolated specimens, but populations of early hominids, from the points of view of their demography, variability, growth and development, functioning and behaviour, ecology, taphonomy, and palaeopathology.

The cave sites of the Sterkfontein Valley represent the combined works of nature and of man, in that they contain an exceptional record of early stages of hominid evolution, of mammalian evolution, and of hominid cultural evolution. They include in the deposits from 2.0 million years onwards *in situ* archaeological remains which are of outstanding universal value from especially the anthropological point of view.

If the Sterkfontein Valley landscape is considered as a cultural property, under the definitions of the World Heritage Guidelines, it is submitted that these cave sites are of outstanding universal value from the point of view of science, archaeology, and anthropology. They contain exceptional testimony to significant stages in human prehistory and to the development of cultural traditions. Further, they fulfil the criteria and test of authenticity under Section 24(a) (iv) of the *Operational Guidelines* as "an outstanding example of a landscape which illustrates significant stages in human history."

As a cultural property, the distinctive character and components reside in:

- i the concentration of a number of different sites in a relatively small area, sites that differ in their geological ages, hominid contents, and palaeoecology;
- ii the duration of the evolutionary stages represented in this one small area and even within a single cave formation (Sterkfontein);
- iii the historical significance of the finds made before and after World War II (in the case of Sterkfontein) and since 1948 (in the case of Swartkrans), finds which provided the worlds of science with fossil evidence that convinced scientists that archaic hominids who lived in Africa marked the first emergence on the planet of the hominid family;
- iv the revelation that some of the early hominids (the robust australopithecines from Kromdraai and Swartkrans) had developed specialized features which seemingly removed them from being on the lineage of

later forms of man - a concept which, although commonplace for other mammals, had not up until the time of Robert Broom's discovery of the Kromdraai robust form in 1938 and of the Swartkrans robust form from 1948 onwards been applied validly to hominid evolution.

For these reasons, the Sterkfontein Valley Sites meet the criteria for a cultural property.

[**Note** The State Party does not make any proposals as regards to the criteria under which it considers the property should be inscribed on the World Heritage List. However, criteria **iii** and **vi** are implied in the justification.]

### Category of property

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a *site*.

### History and Description

#### History

The fossils of the Sterkfontein Valley caves depict South Africa's landscape and fauna 3.5 million years ago. Some of the most important specimens of australopithecines (*Australopithecus (Paranthropus) robustus* and *Australopithecus (Plesianthropus) africanus*), collateral ancestors of modern man, have been discovered in this area. Sterkfontein geologically revealed the earliest record of hominid in southern Africa (close to 3.5 million years ago). It is also historically the earliest discovery of an adult australopithecine in 1936, by Robert Broom, the richest source of fossils of this species and the oldest stone tools recovered (2 to 1.5 million years BP). Specimens of *Homo habilis* have also been found in the breccias of Sterkfontein caves. They are key elements in determining the origin and the evolution of mankind. Their belonging to the lineage that gave birth to *Homo sapiens sapiens* (modern man) was demonstrated by proving that their cranial capacity, their diet, and their upright posture were all indicative of a kinship to modern man. Stone and bone tools, dating to around 2 to 1.5 million years BP, have been brought to light at Sterkfontein, Kromdraai, and Swartkrans which support this hypothesis.

Evidence for the controlled use of fire has been observed in the Swartkrans cave (1.8 to 1 million years BP), another specific trait of human behaviour. The antiquity of these fossils and their relative position as primates with indisputable hominid traits proclaimed Africa as the cradle of humanity.

#### Description

The site proposed is located 45km west of Johannesburg and 5km north of the closest urban centre. A band of dolomites and their associated breccias run through the entire area, creating a hilly terrain. The area is covered mainly by grass, with more dense vegetation along the rivers.

The total area proposed for inscription is c 25,000ha (with a buffer zone of c 28,000ha). The area selected for nomination was determined by the topography, both so as to include potential additional fossil-bearing sites and also to ensure that the visual quality of the landscape as a whole is preserved against incompatible or undesirable intrusions.

The palaeontological and palaeoanthropological sites are a series of caves found in the dolomite band and its associated breccias. Some of them were discovered as a result of lime-mining activities, new discontinued.

Sterkfontein is located on a hill to the south of the Rietspruit river valley, midway in a straight line between Swartkrans (1.2km to the WSW) and Kromdraai (1.6 km to the ENE). These three main cave sites are surrounded by a string of fossil-bearing caves from which, of the nine included in the proposed area, only three (Drimolen, Coopers B, and Gondolin) have so far revealed hominid remains. Wonder Cave, Gladysvale, Bolt's Farm, Minnaar's Caves, Plover's Lake, and Haasgat have only produced faunal remains but they possess a strong potential for revealing hominid remains.

Sterkfontein has produced some 500 catalogued specimens, most being representative of the *Australopithecus africanus* species (found in Member 4) and some, from more recent deposits, belonging to the species *Australopithecus robustus* and *Homo habilis*. Thousands of stone tools, of the Oldowan (2 million years BP) and Acheulean (1.5 million years BP) industries have been recovered. There are thousands of faunal remains and hundreds of fragments of fossilized wood testifying to the past environment. Very recently the first ever complete *Australopithecus* skeleton has been discovered; this is of great scientific interest, since preliminary tests suggest that it may be of a species other than *A. africanus* or *A. robustus*.

Swartkrans is the greatest source of *Paranthropus crassidens* (robust apeman), and a second species has been found in the same members as *Paranthropus*, thus assumed to be contemporary, which is regarded as *Homo erectus*. It contains the largest collection of *A. robustus* remains. The site also holds an important number of stone and bone tools (nearly 900 dating to 1.8 to 1 million years BP) and the evidence for the controlled use of fire (assumed from the discovery of charred bones). Thousands of faunal remains have been collected.

Kromdraai is the site of the first recognized *A. (Paranthropus) robustus* specimen in 1938. Kromdraai A brought to light essentially tools and fossil fauna, whilst Kromdraai B revealed more specimens of *A. robustus*.

Close by Kromdraai, the excavations in 1938 and 1939 in the breccias of Cooper's Caves revealed the presence of australopithecine remains and of non-hominid remains.

Just south of Swartkrans, the Bolt's Farm site has so far only yielded faunal remains. Of the four sites

forming the second cluster (Minaars, Plover's Lake, Wonder Cave, and Drimolen) north of the main cluster (Bolt's Farm, Swartkrans, Sterkfontein, Coopers, and Kromdraai), only one (Drimolen) has yielded hominid remains. The latter is the most recently excavated site (1992) with Gondolin. It brought to light the remains of the two youngest *A. robustus*, aged respectively 8 and 12 months, and dating to 2 million years BP.

Three sites are isolated from the main groups of sites (in order from south to north): Gladysvale, Haasgat, and Gondolin. Gladysvale, known to be a rich fossil-bearing site since 1936, revealed hominid remains for the first time in 1992 in the form of teeth and finger bones. Haasgat and Gondolin, two sites found in the North West Province, yielded both faunal remains. In 1997, the site of Gondolin revealed robust australopithecine remains.

## **Management and Protection**

### *Legal status*

The legal status is not uniform throughout the site. A number of legislative mechanisms control land use, land development, and environment impacts on the area. The present legislation aims at protecting the site and not managing or developing it. However, the present National Monuments Act (No 28, 1969) is shortly to be replaced by a new National Heritage Act, the objective of which is "to present an integrated holistic heritage structure which will coordinate the expressions of the living heritage of all who belong to South Africa"; this statute will take account of management and presentation as well as protection. The site also comes within the provisions of the National Environmental Management Act (No 107, 1999), which requires the formulation of management plans and their approval by the governmental Committee of Environmental Coordination.

Swartkrans, Sterkfontein, and Kromdraai and the palaeoanthropological material associated with them are protected by the National Monuments Act. Any interventions to be undertaken in the area, particularly mining activities, are subject to the Minerals Act (No 50, 1991) and the Environment Conservation Act (No 73, 1989), which stipulate that environmental impact assessments must be carried out before any major construction work is started.

The local provincial authorities are strengthening their control on local planning and development strategies, through Land Development Objectives, as provided for in the Development Facilitation Act (No 67, 1995) which would supplement the already existing national acts on development. These objectives encourage agricultural, recreational, and tourism-related activities. They also preserve and protect the site from any urban spread and harmful land use. The Draft Gauteng Development Planning Bill incorporates Land Development Objectives in the form of "local development plans" (see below).

In addition to these legislative controls, many landowners in the area implement their own management and conservation plans. The commitment of local landowners to conservation is also demonstrated by the many Natural Heritage Sites registered in the area. In this situation, private landowners apply to the Department of Environment and Tourism for their land to be registered. This status is conditional upon the owner agreeing that no destruction or degrading will be done by him and that he will report any infractions to the relevant authorities.

The Gauteng Draft Development Bill, in the process of being drawn up, aims at providing the Province with a single system of development planning. The nominated area would be specifically dealt with as a World Heritage Site, giving it a defined management strategy, a unique overall protection, and an administrative body responsible for its promotion, protection, and management.

### *Management*

Some 98% of the land is in private ownership. Of the remaining 2%, the State owns 8ha and the rest, essentially the Nature Reserve on which the Sterkfontein Caves are located and the farm where Swartkrans is situated, are owned by the University of the Witwatersrand.

Until the administrative body provided by the new Gauteng Draft Development Planning Bill is established, the Gauteng Province Departments of Agriculture, Conservation and Environment, of Sports, Recreation, Arts and Culture, of Finance and Economic Affairs are responsible for the management mechanisms and day-to-day management of the site. Following approval of the Planning Bill, the Gauteng Province will then continue to coordinate the activities of the Board.

An interim management plan is being drawn up and will be effective by December 1998, concurrent with the draft legislation. The plan will focus on protecting known and future sites, on ensuring that the present uses of the land will continue without threatening the site in its landscape or its intrinsic nature, and on increasing public access. A programme for the continuous monitoring of the state of conservation of the site will be an essential component of the overall management plan. This will involve the staff unit that is to be appointed, and institutions such as the University of the Witwatersrand and Transvaal Museum will provide scientific inputs.

There are currently no staff responsible solely for the maintenance and management of the site. A Staff Unit is planned to be set up in the Planning Bill. The university and museum will continue managing all scientific aspects.

Tourism is an essential aspect of the development of the site. Already some 75,000 visitors annually visit Sterkfontein on horseback or on nature trails, for its gold mines, the oldest in the region, its game reserve, and its unique scenery. Public access is a subject of considerable debate at the present time.

The site is not easily accessible. There are few major highways, and mainly dirt roads lead to the area. Road improvements are thus considered a priority for the development of tourism and for the proper management of the site.

Agriculture and reserve-related activities are predominant on the site, accompanied by some light industrial and commercial activities. These are small in scale and are not considered to threaten the integrity of the park.

The main threat to the site comes from urban development, with Krugersdorp expanding northwards and approaching to less than 5km and Randburg expanding to the north-west to 15km from the boundaries of the site. This threat is considered to be very serious by the authorities and plans to regulate urban development and zoning are in preparation.

## Conservation and Authenticity

### *Conservation history*

It is inappropriate to examine this group of fossil hominid sites in conventional conservation terms, since their significance results essentially from investigations leading to the removal of scientific specimens. Instead, the history of excavation at each will be summarized briefly.

At *Sterkfontein* the fossil-bearing breccias were first discovered during quarrying for lime in the 1890s. It was not until the late 1930s that the search began in earnest for faunal and hominid fossils. Work ceased during World War II and was resumed in 1947-49. Following a short phase of work in 1956-58, P V Tobias began his present long-term investigation in 1966.

It seems likely that the potential of the *Swartkrans* site was first recognized in 1936, but no work was carried out there until 1948. This continued until 1953, and there was a further phase of investigations between 1965 and 1992, headed by C K Brain.

Specimens were collected from the breccias at *Kromdaai* and sent to London for examination, but the bones were not extracted from them for over sixty years, when they were "rediscovered" by L S B Leakey. However, work was carried out there intermittently from 1938 until the 1990s.

The first significant fossil was discovered at *Coopers B* in lime-working dumps in the late 1930s. However, despite several campaigns of excavation, the second hominid fossil was not identified until 1989. Plans are in hand for a further excavation campaign.

The important *Drimolen* site, which is especially rich in hominid fossils, was not discovered until 1992, by A W Keyser, who has been excavating it since that time.

The first discoveries were made at *Gladysvale* in the late 1940s. Systematic studies have been in progress since 1993, by a joint South African-Swiss university team.

Sporadic investigations at *Bolt's Farm* since World War II have produced considerable mammalian fossils but so far no hominid remains. There has so far been no systematic excavation there. Similarly, *Haasgat* and *Plover's Lake*, which were intensively excavated in the late 1980s and early 1990s, have so far failed to yield any hominid fossils.

*Gondolin* produced a substantial mammalian fauna during excavations in 1979, but it was not until the present excavations, begun in 1997, that australopithecine fossils came to light

### *Authenticity*

Authenticity is similarly a concept that is not applicable to fossil sites of this kind. It might be more appropriate to evaluate them in terms of their integrity, as in the case of properties considered under the natural criteria. The breccias from which this wealth of fossils derive are intact and undisturbed. They are no longer being exploited for their minerals and the livestock farming and game ranching that are still being carried out there have no impact on the fossil-bearing deposits. The integrity of the nominated sites may therefore be deemed to be total. The entire landscape also has a high level of authenticity and/or integrity, for the same reasons: indeed, the landscape supports a domestic fauna in the same way that wild beasts grazed it in prehistoric times.

## Evaluation

### *Action by ICOMOS*

An ICOMOS expert mission visited the sites in January 1999.

### *Qualities*

This group of sites is one of the most important in the world for an understanding of the evolution of modern man (*Homo sapiens sapiens*) from his ancestors. They have produced a wealth of hominid fossils, the oldest dated to some 3.5 million years ago, along with their tools and with fossils of the contemporary fauna. Investigations over the past sixty years have played a crucial role in establishing Africa as the cradle of mankind. The potential for further significant discoveries is enormous.

### *Comparative analysis*

The comparative study of *Potential fossil hominid sites for inscription on the World Heritage List* prepared by two leading human palaeontologists for ICOMOS in 1997 establishes six criteria for evaluating such sites: good chronologies; number of fossils; antiquity of finds; potential for further finds; groups of closely related sites; and discovery and demonstration of human evolution. It divides human evolution into four periods, the earliest of which is from 5 million to 1 million years BP.

The authors of the study consider that the Sterkfontein Valley scores very highly under all of these criteria and that it is worthy of inscription on the World Heritage List.

### *ICOMOS recommendations for future action*

The size of the nominated area and its associated buffer zone is a challenge to manage. The situation is made more complex because of the multiple and diverse number of stakeholders involved – landowners, local, provincial, and national administrations, scientific institutions, etc.

The State Party has addressed the major problems the site will face in the near and distant future in the eventuality of its nomination on the World Heritage List. The urban expansion of the neighbouring settlements constitute the major threat to the integrity of the site. Since most of the lots that make up the nominated area and buffer zone are privately owned, it is essential for the State Party to ensure that there is strict control on land-use, on zoning, and on visitor control and management. The fragility of the fossil hominid sites requires there to be special controls over access to them, so as to avoid destruction to important scientific data as a result of over-visiting.

Associated with this aspect of the site is the current appearance of several of the fossil sites. Bolt's Farm, Drimolen, and Gladysvale are in a sorry state. ICOMOS does not advocate backfilling, but suggests that the condition of the sites should be improved, so as to prevent further erosion of the breccias.

The nomination refers specifically to the fossil hominid sites. However, ICOMOS feels that the nominated property has another important quality. Archaeological investigations have shown that the area was continuously occupied by *Homo sapiens sapiens* until around 20,000 BP, that is, from the Lower Palaeolithic to the Neolithic. Much of the contemporary landscape has remained unchanged since that time, and ICOMOS feels that this should be given prominence in the public presentation of the site.

The ICOMOS mission was concerned about the proposed buffer zone. Whilst it is suitably large, attention needs to be given to the extension of its boundaries at several vulnerable points, so as to prevent encroachments, such as that of the so far unauthorized Letarno housing project and that for a casino.

All these comments relate to one specific recommendation. It is imperative that a definitive management and conservation plan for the entire site should be produced with the minimum of delay.

### **Brief description**

The many caves in the Sterkfontein Valley have produced abundant scientific information on the evolution of modern man over the past 3.5 million years, on his way of life, and on the animals with and upon which he lived. The contemporary landscape also preserves many features of that of prehistoric man.

### **Recommendation**

That this property be inscribed on the World Heritage List on the basis of *criteria iii and vi*:

The Sterkfontein area contains an exceptionally large and scientifically significant group of sites which throw light on the earliest ancestors of humankind. They constitute a vast reserve of scientific information, the potential of which is enormous.

ICOMOS, September 1999