NEW DISCOVERIES
of
EARLIEST PAKISTAN

by the
British Archaeological Mission to Pakistan
New Discoveries of Earliest Pakistan

Robin Dennell
Field Director,
British Archaeological Mission to Pakistan
Ancient India and Iran Trust,
Cambridge CB2 2BG

and

Mark Beech,
Dept. of Archaeology and Prehistory,
University of Sheffield,
Sheffield S10 2TN.
Areas where the British Archaeological Mission has worked
This booklet is about recent discoveries of the world our earliest ancestors inhabited more than a million years ago in Pakistan. Even if you know nothing about archaeology, we hope you will find it fascinating. All the material shown here has been collected and studied by members of the British Archaeological Mission to Pakistan. This is a research group that is based in the Universities of Cambridge and Sheffield, and which has spent an average of three months in Pakistan each year over the last ten years or so. All of our work takes place in conjunction with the Department of Archaeology and Museums of Pakistan, and with the Geological Survey of Pakistan: it is very much a joint project involving researchers from very different backgrounds, but with a similar interest in the remote past.

Where is Pakistan?

Pakistan is the largest Muslim country outside South East Asia, with a population now close on 100 million people. Its neighbours are Iran and Afghanistan to the west, China to the north, and India to the east. It is an enormous country, some five times larger than Britain. Pakistan is also a land of contrasts, with a range of peoples, landscapes and climates that is as diverse as Europe. Sind Province, in the southern part of the country is largely flat desert, in which it is too dry to grow crops except by irrigation from large rivers like the Indus. Baluchistan, in the west, and the North West Frontier Province, are more mountainous, and famous for their fierce Baluchi and Pathan warriors. The northern part of the country is dominated by the mighty Karakorum mountains, which become the Himalayas in India and Nepal. Pakistan can boast K2, the second highest mountain in the world, and 10 of the world's 14 mountains over 26,000' high. We work in the northern part of the province of the Punjab, which is the most fertile and densely populated part of Pakistan, containing some 60 million people, and famous for beautiful cities such as Lahore.

Pakistan contains an immense variety of human landscapes. Karachi, its biggest city, is
in Sind on the coast of the Indian Ocean. It is a vast, modern city with some eight to ten million people. In contrast, Islamabad, the capital of Pakistan is an ultra-modern city of some 200,000 people, built in only the last thirty years in the north part of the country near the city of Rawalpindi. Other cities such as Multan, Lahore, and Peshawar are much more ancient, and are crowded, noisy, and bustling, with many bazaars in narrow, twisting streets. It is in cities like these that one finds some of the loveliest 16th to 18th century marble and sandstone palaces and gardens from the Moghul period, and many of the finest mosques in the Islamic world. In contrast, life outside the big cities is largely village-based, and geared to the growing of crops such as wheat, cotton and fruit, and the rearing of sheep, goat and cattle. In many areas of Pakistan, many people still live as nomads, migrating to fresh pastures each year with their flocks, and carrying their tents and other possessions on camels and donkeys.

How was Pakistan formed?

Pakistan and India are the result of a continental collision with the rest of Asia. As the figure opposite this page shows, the land that eventually became India and Pakistan was a large island in the India Ocean around some 60 million years ago. This island mass gradually drifted northwards, and collided with Central Asia some 20 million years ago. At the edges of this collision, the earth's crust buckled upwards and produced the Karakorum and Himalayan mountains, and also Tibet, the highest country in the world. This collision is still going on - it is reckoned that Mt. Everest and other mountains are still rising, even if too slowly to be noticed in a human lifetime. The formation of these lofty mountain chains also created enormous rivers, like the Indus, which bring down enormous quantities of sands and silts each year, and deposit them over the Punjab, Sind, and the floor of the Indian Ocean.
Over the past 55 Million years The Indian Sub-Continent has been colliding with Asia.
Northern Pakistan has two of the ingredients that are vital to the preservation and study of fossil animal remains. First, the rivers that flowed through here over the past ten million years have laid down several thousands of feet of sands, silts and clays. Often, these deposits also contain the remains of animals that died near rivers, or were buried by them when a river changed course. Second, the movements in the earth’s crust over the last few million years have uplifted these deposits, so that they are now visible, instead of being buried several thousand feet below the surface.

So what’s a fossil?

Normally, when an animal dies in the wild, the meat on its body is eaten by scavengers such as vultures, hyaenas, wolves, or lions. Its bones and teeth will then gradually disintegrate, until after a few years, no trace remains. This is fortunate for us, because otherwise the world would be covered with animal skeletons! Sometimes, however, an animal’s carcass is buried soon after death. This can happen if it died near a river or a stream that overflowed in the rainy season, and buried it under a layer of sand or silt. Alternatively, an animal can become trapped in quicksand, or get swept away when trying to cross a river. Under the right chemical conditions, the bones and teeth do not decay. Instead, the organic parts are replaced by minerals, and the bone or tooth literally turns to stone.

What do fossils tell us?

Fossil remains can tell us a lot about what an animal was like, and the environment in which it lived. Given a good fossil, an expert will be able to say which part of the skeleton it comes from, and which animal it belongs to. If the animal is extinct, the experts then have to decide what to call it. This is often the most controversial part, as the naming of an extinct animal also implies what it was related to, and the evidence is usually too fragmentary and ambiguous to show whether or not a fossil species is the same as another similar one. The teeth of animals can show a lot about what an animal
ate - whether it was a carnivore, like a dog or cat, that eats meat, or a herbivore, like cattle and sheep, that eat grass and leaves, or an omnivore, like us or bears, that eat meat as well as plants. The legs and feet also show a lot about the life-style of an animal. For example, was it able to run quickly, like a cheetah, or walk slowly, like an elephant? Or was it nimble, like a mountain goat, and adapted to live in rocky areas? Or again, did it have hands, like us and monkeys, that could be used to hold food and carry things? Fossils also provide important evidence about the environment in which these animals lived. If they include creatures like crocodiles, turtles and fish, there must have been some year-round stream or lake; if one finds the remains of animals like elephants, rhinoceroses or gazelle, there must have been large areas of grassland, whereas other types of animal prefer forest environments.

**Fossil hunting in Pakistan**

Members of the British Archaeological Mission to Pakistan have been looking for fossil remains in northern Pakistan for the last five years. Our main interest is in the last two million years, because that covers the earliest history of our remote ancestors. We have been collecting fossils to understand the type of world our early ancestors lived in, and hopefully to find their actual fossil remains. The area where we have done most of our work is one small part of Pakistan called the Pabbi Hills.

**The Pabbi Hills**

The Pabbi Hills are a series of low hills about 600' high, and some 30 miles long and 5 miles wide. They lie halfway between Islamabad and Lahore, and within sight of the snow-capped peaks of the Karakorum. As with many other parts of the northern Punjab, the Pabbi Hills are the result of the two geological processes we mentioned earlier: rivers and movements in the earth's crust. The rivers that flowed through this area between two and a half million and half a million years ago laid down over 3000' of sands, silts and clays. These would be buried
had it not been for the fact they they have been uplifted in the last half million years and brought to the surface. Since then, they have been eroded by rain, and the softer deposits have been washed away so that today, the Pabbi Hills appear as a deeply dissected wilderness, used only for the grazing of livestock and the cutting of fire-wood. There are no streams or springs in the Pabbi Hills, and for the most part, no roads, so all the work has to take place on foot. Working there is difficult because many gullies are very deep, and the surfaces of the hillsides are often loose and treacherous. There are also lots of thorn bushes, with thorns up to 3" long that are quite capable of puncturing tyres and penetrating the soles of one's boots. Additional hazards are snakes, spiders and scorpions. However, the Pabbi Hills are extraordinarily rich in fossils - so far we have found over 40,000 of them, many of which are world-class in quality. In addition, we have also excavated two especially rich fossil sites, and are currently excavating a third one.

Fossil hunting

There is no easy way of finding fossil animal remains, and most fossil hunting is far from being the glamorous activity that is often presented in films. For the most part, it is very hard and often boring work! What we have done in the last four years in the Pabbi Hills is to send out two teams of two or three people each day into areas which look promising. If fossil remains are found, the team members have to collect each piece. Each group of fossils is given its own record number, and the details have to be written down on a survey card. Often, a sketch map is drawn so that the area can be revisited if necessary, and plotted on a map. At times, it can be very frustrating and tiring work, especially if a whole day is spent finding only a few scrappy pieces. On good days, however, several thousand well-preserved bones and teeth may be found spilling down a slope and covering a small area. Sometimes, there can also be surprises - like finding, for example, the almost complete remains of an entire elephant leg almost two
The geological layer in which two-million-year old stone tools were found near Riwat.
Typical "badland" scenery in the Pabbi Hills. A million years ago, these yellow hills would have been part of a river bed.
million years old, and lying near a foot-path; or coming across a complete skull of an animal that died and was rapidly buried over a million years ago, and only just being re-exposed. Once collected, all the fossil remains have to be washed and cleaned, and then labelled so that each can be recorded individually. Because the fossil collection is now so large, all the records are stored on computer files. The fossils themselves remain in Pakistan, and form part of Pakistan's national collection of fossils in Islamabad where they can be studied by local and foreign scholars. We make replicas of the most important specimens so that they can be compared with similar ones in collections in European museums.

**What type of fossils have we found?**

Most fossil collections, including ours from the Pabbi Hills, are limited to animals that are medium to large in size, because their remains are more robust and survive well. Most of the fossils that we have found belong to animals that could be recognised today, even if many no longer live in Pakistan. We have found several types of deer and cattle, each with their own distinctive types of antler and horns, and also various types of horses. Other grazing animals are extinct types of elephants and rhinos, and a peculiar type of giraffe. Pigs and hippos are fairly rare, possibly because the environment at the time would not have been suitable for them. Carnivores would have been a common sight in northern Pakistan a million years ago: the commonest would have been different types of hyaena. One type must have been particularly unpleasant to meet, as it was twice the size of present-day ones, and almost as large as a pony. Other meat-eaters represented in our collections are lion, jackal and crocodile.

**What sort of environment would they have lived in?**

Most of the animals that lived in the Pabbi Hills between one and two million years ago would have preferred open grasslands. There is hardly any indication of the type of animals that live in
thick forests. Perhaps the best modern-day example of the type of environment that we have been studying are the grasslands of East Africa, which include some of the best wild-life reserves of animals like elephants, rhinos, giraffes, eland, zebra, and of course the big predators such as lion and hyaena. However, northern Pakistan a million years ago would probably have been a much richer environment because of the rivers that flowed through it, providing a continual source of drinking water. There would also have been much more rain because of the annual monsoon, and this would have been very beneficial for the vegetation which many of the animals would have eaten.

Fossil excavations

Why bother to excavate a fossil site if it is so easy to pick up fossil remains on the surface? The reasons are quite simple. Once fossil bones are exposed on the surface, they are very likely to break up when trampled on by livestock, or if they roll down a hill side. They also become dispersed, so it is usually not possible to see what parts of a skeleton were originally together, or which other animals they were associated with. Sometimes, it is necessary to conduct a rescue excavation, simply because otherwise the fossil remains will be washed away in the next rainy season.

Excavating a million year old fossil site is very different from the sort of excavation that archaeologists often do with wheel-barrows and shovels, and large numbers of excavators. Fossil excavations are usually very slow and time-consuming. Different bones are often jumbled up together, so that it is difficult to remove one without breaking or disturbing several others. Often, bones start to distininteGrate because they are so brittle, and so they have to be conserved with chemicals which bind them together. Often, their surfaces are covered with a hard crust that has to be carefully flaked off without damaging the specimen. Sometimes, groups of bones have to be lifted together as a block, held together by the earth in which they are embedded; these
blocks are sometimes wrapped in a plaster of
Paris jacket, rather like a broken leg, so that
they can be carried safely to the base. The main
tools that are used are pointing trowels to
scrape away the sediment around a bone; a
cold chisel if the sediment is very hard; and
small dental picks and paint brushes for
exposing a bone before it is lifted. The
photograph shows one group of bones that
was uncovered this spring - several can be
seen, each of which has to be given its own
number, plotted on a plan, and then cleaned
properly back in the field base and laboratory.

The excavation this year produced over 700
fossil specimens, many of which were
complete. Several complete skulls of different
types of deer, cattle and horse were found, and
these will be very useful in helping us to identify
the more fragmented remains that we have
found on survey in previous field seasons.
Easily the best specimen that we found was the
complete skull of a young rhinoceros. Many of
the bones shows signs of gnawing, and it is
likely that many of these were animals that were
captured or scavenged by hyaenas.

Stone tools and early humans

As archaeologists, we have been trying to find
evidence of the proto-humans that may have
lived in Pakistan before a million years ago.
There are various types of evidence that
archaeologists elsewhere, notably in East
Africa, have used to piece together our earliest
history. The most dramatic (and rarest) type of
evidence is the fossil remains of our ancestors,
as these give us the most direct clues about
what they looked like. Another type of evidence
is the remains of animals that they may have killed or scavenged. Sometimes, archaeologists have found animal bones bearing marks that were caused by meat being sliced off them with stone tools. In most cases, in fact, the commonest source of evidence that we have for our remote ancestors is the stone tools that they used.

The earliest tools made by our remote ancestors may well have been of wood or bone, but these have not survived. The only tools that have survived are made of stone, and these are the main source of evidence that we have for the Old Stone Age, which covers all but the last ten thousand years of the last two million years. The earliest stone tools - known largely from East Africa - were very simple, and date from around two and a half million years ago. In most cases, a quartzite or basalt stone was struck with another stone so that a flake was detached. If struck at the correct angle, the edge of the flake would have been sharp enough to use for cutting meat and tendons, or for scraping wood or skin. The stone from which flakes were removed could also have been used for heavier tasks, such as smashing bone to extract the marrow. These earliest stone tools were largely used for processing food, rather than obtaining it - there is no evidence for any type of spear or bow and arrow until comparatively very recently in our long history.

In the Pabbi Hills, we have often found stone tools whilst collecting fossil animal remains. Often, these stone tools are found on the same geological surface as the fossils, and it is very tempting to assume that they are of the same age. Generally, the tools found amongst the oldest fossils are cruder than those found on younger geological layers, and this may imply that, as in Africa, the making of stone tools improved very gradually between one and two million years ago. However, we need to be certain that these stone tools are coming from the same geological layers as the fossils themselves, and that means finding them either in an excavation, or in the original place where they were buried.
One place where we have been able to do this is near a small town called Riwat, which is in turn near the cities of Rawalpindi and Islamabad. In 1983, we found a flaked stone embedded in a very hard and stony geological deposit. Indeed, it was so firmly embedded that we had to use a hammer and chisel to remove it. Other flaked pieces were found in the same layer in 1983 and 1988. We are convinced that these are struck deliberately, as they do not show the type of flaking found under natural conditions as when, for example, two stones collide when being rolled around in a stream bed.

One of the photographs shows one of the team standing immediately above where the first piece was found. Above the layer in which these were found, there are some 200’ of sands and silts laid down by a river over several thousands of years. As a result of much geological work by members of the British Archaeological Mission, we have been able to date the layer in which these stone tools were found to around two million years old. This date surprised us and many others, as it means they are almost as old as some of the oldest from East Africa, where our ancestors are supposed to have evolved before their descendants moved out into Europe and Asia, sometime in the last million years. What our discovery at Riwat may indicate is that our earliest ancestors were living over a much larger area than previously supposed, perhaps from the grasslands of southern and eastern Africa right across to the same type of landscapes in northern Pakistan.

Summary

Although we have been working in Pakistan for over ten years, our investigations have only just begun to scratch the surface. Compared with East Africa, from where most of our evidence for early human evolution comes, hardly any work has been done in northern Pakistan. What we hope we have shown is that there is an enormous amount to learn, and an incredibly exciting and fascinating story to unravel. The
rivers, plains and mountains of northern Pakistan contain one of the most continuous and detailed geological histories in the world covering the last ten million years. Many of the fossils are not only outstanding as individual discoveries, but collectively they offer a way of studying an environment that we are only just beginning to understand. The stone tools that we have found also show us that Pakistan has been inhabited by our ancestors far longer than was suspected, and perhaps almost as long as East Africa. Who knows what mysteries are still waiting to be discovered?
The British Archaeological Mission to Pakistan

The British Archaeological Mission to Pakistan is directed by Drs. Bridget and Raymond Allchin of the Ancient India and Iran Trust, Cambridge. Our work could not take place without the active help and encouragement of Dr. Ahmad Nabi Khan, Director-General of the Dept. of Archaeology and Museums, and Dr. Mahmoud Raza, of the Geological Survey of Pakistan. Many colleagues have been referred to indirectly in this booklet. Our geologist is Dr. Helen Rendell of Sussex University, and she often collaborates with Dr. Ernie Hailwood of Southampton University. The fossils are studied by Dr. Rogan Jenkinson of the Creswell Heritage Trust, and many were discovered by his colleague at Creswell, Dr. Sheila Sutherland, who directed much of our survey work. Mark Beech at the Dept. of Archaeology and Prehistory in Sheffield is in charge of the excavations of the fossil localities. Peter Whybrow and Gillian Comerford of the Natural History Museum, London have done some excellent conservation work on many of the key fossils. The stone tools we have found are studied by Dr. Linda Hurcombe, now at Exeter University. The Department of Archaeology and Prehistory at Sheffield University has provided an outstanding team of post-graduate team members over the years, as well as their Field Director. None of their work could have taken place without the assistance of organisations such as the Ancient India and Iran Trust, the British Council, Unilever (Pakistan) Ltd., the Leverhulme Trust and the British Academy. Ocean Air International and P. and O. Shipping are also gratefully acknowledged.
Pakistan is brought to the forefront of research into the origins and evolution of Man. The British Archaeological Mission to Pakistan (BAMP) has been working in the north of the country for several years, finding evidence for human occupation of the Indian sub-continent stretching back to almost 2 million years ago. Fossil remains of a wide variety of animals help construct a picture of conditions at that early date. Working together, BAMP and Creswell Heritage Trust now bring you some of the results of this exciting research.