

## Archaeological Treasures Give New Evidence

by Jamal Arsalam

BAKULADESH has some accomplished archaeologists, according to Md Moshem Ali, Joint Secretary, Ministry of Cultural Affairs, Government of Bangladesh. What has to be done is to prepare the next generation. There is a project involving the Japanese government amounting to 50 million yen; and the question is: will it remain unutilised like the 65 per cent in 1992? Collaboration projects with the French government will enable the acquisition of many modern techniques, not merely technological sophistication but theoretical deductions. In fact, there is a joint venture scheduled currently in Bangladesh itself. However, our main concern here is Falalak, an island off Kuwait. Here excavations have revealed traces of a Greek garrison colony probably dating from the time of Alexander's great invasion of the then civilised world.

In 1930 the British navy were the first to find some indication remains: statues dedicated to Poseidon and Artemis. The early 60s saw a Danish expedition. A US team dug up the middle of the island in 1976. First sea soundings in 1983 showed the ancient sea shore had receded several meters further south. The French work began before the Gulf War. The excavations found six distinct levels of settlement that could be dated. Dr Jean Francois Salles, Archaeologist of the French National Centre for Scientific Research presented some of the findings at a seminar sponsored by CESTI, Centre for Technological Information at Alliance Francaise. Dr Salles stressed the fact that the remains of the Greek garrison were found not on the mainland but the island. He believes Alexander was interested in this region for two reasons: colonisation was not feasible but control over the area could be exercised from the island base and a port established there would aid the

international trade. Texts contemporary to Alexander's expedition disclose heavy traffic in goods: peacock, pearls, spices, pepper from the orient, particularly the sub-continent to the Eastern Mediterranean. The gulf region dominated at that time. The Red Sea route was closed, says Dr Salles for "reasons we do not know." The south Arabian kingdoms were in ascendance. Derra was a thriving centre of a trans-caravan route.

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**Though ancient texts refer to plenty of trees on Falalak, now there are none. The island teems with subterranean water. Irrigation with well was an easy task. During rainy seasons, water remained appreciably long enough on the surface. The '30s archaeological expedition found the highlands had been extensively cultivated during olden times.**

to plenty of trees on Falalak, now there are none. The island teems with subterranean water. Irrigation with well was an easy task. During rainy seasons, water remained appreciably long enough on the surface. The '30s archaeological expedition found the highlands had been extensively cultivated during olden times. Cereals were a major crop even up to the Second World War. Incidentally, the Gulf War left the island completely undamaged as Dr Salles found on his recent visit. Fish traps were found scattered throughout the site. The fishermen went out with the tide setting traps. Again for reasons not known the fishes were larger than now. Pearls cannot be preserved because of chemical interaction. So their presence has to be deduced from the nature of the oyster remains. There were plentiful where pearl divers were looking for them. Ancient texts have beautiful pictures of pearl diving. The records of that time are given in Aramaic and Arabic.

The Semitic tribes did not have any definite script of their own. The dialect was different from that spoken in South Yemen or Jordan. Comparison of writings found at other sites aid in dating events and times. Such writings are found in the sub-continent as well as other civilisations like that in Anatolia.

Pottery is also a fairly accurate means of dating a period. Pottery that is glazed or of gold points to a particular moment of history. Harappan pottery

than 30 silver coins in places — but weapons are strangely absent!

The French archaeologist, Dr. Salles speculates that most likely the fortress was suddenly abandoned, which would account for the removal of all things that could be of use to the deportees. In support of this theory is the fact that useful tools are not to be found either! Only a number of useless bronze and iron axes and nails. No Greek remains have yet been unearthed after 150 BC. Another lure of the island was the bitumen industry. Furnaces reveal this along with hundreds of bitumen jars. The processing was not local to the island. But the evidence is very fragile.

The local vegetation is tamarisk bushes. Consequently, wood for roofs had to be shipped from outside. No roof beams survive. But the very thick layers of burnt pine testify to their presence. Dr Salles led the study of the main outline history of the island, Falalak.

The laboratory work of the archaeological part of the excavation was done elsewhere, including the analysis of seeds. Dr Salles was requested by the participants of the workshop that the French authorities should provide facilities and training of our own archaeologists in this respect. The discussion led to the further request from the Bangladesh navy and the French experts to locate the mate of the huge cannon now at Osmania Park dating from Mir Jumla's time which lies buried somewhere in the waters of the Buriganga. After all, such an archaeological relic cannot be washed away by the currents! With the precise and highly sensitive equipment available at the end of this century, such a cultural trophy can be rescued and set up at the National Museum or a suitable site. Specially since this was the bigger of the two cannons.

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## Antarctica Finds Set More Dinosaur Riddles

Frank Nowikowski from Buenos Aires

REMAINS of a 1.65-foot long dinosaur have been discovered in Antarctica. They were on Vega Island near James Ross Island and scientists say they are from a hypsilophodont, a herbivorous dinosaur. The specimens are being studied by scientists at the Natural History Museum in London.

This relatively small area of Antarctica has yielded a considerable collection of vertebrates which include sharks, plesiosaurs, marine lizards, turtles, penguins, and various mammals.

Although the news has excited scientists, it is not the first discovery of dinosaurs in the icy continent. In 1986, Argentine geologist Dr Eduardo Olivero, working on an island off Antarctica, unearthed fragments of bone belonging to a dinosaur which died around 77 million years ago.

The find was momentous. No dinosaur had ever been

**Remains of another dinosaur have been found in Antarctica, setting off renewed speculation as to how the creatures reached the region. Argentine geologist Eduardo Olivero, working on an island off Antarctica, first unearthed fragments of bone of a 77-million-year-old dinosaur in 1986. How did dinosaurs survive in the ice-clad continent? Gemini News Service reports on speculation that the dinosaurs migrated to Antarctica from north America.**

nosaur" because of its body-protecting, bony plates, is related to, but different from, 100-million-year-old ankylosaurs found in Australia.

Though Australia and Antarctica were linked in the past, the differences in the two kinds of ankylosaurs rules out the possibility that Antarctic dinosaurs came from Australia.

During the southern summer of 1987-88, Dr Olivero and his team, funded by the

Paleontologists headed by Dr Zulma Gasparini at the La Plata Museum, estimated that the specimen was a young dinosaur of between five and six feet in length.

Only a small part of Antarctica is free of ice during the summer. The Palmer or Antarctic peninsula and its surrounding islands are in a part of the continent claimed by Argentina, Chile and Britain. It is the only part of the frozen continent in which shots have

on James Ross Island. How the dinosaurs got to Antarctica is an open question. Tectonic movements of the earth's crust have meant that continents were not always in their present position. In the past animals could migrate from what is now one continent to another.

A suspected migration route is through Africa, which up till the late Jurassic period acted as a bridge between North America and Antarctica. Also open to discussion is the position of Antarctica in the past. Geologists believe that the Antarctic peninsula roughly held its present latitude and only relatively recently became part of Antarctica.

Fossil evidence indicates that climatic conditions must have been considerably different, during the Cretaceous period. Some dinosaur fossils in northern Alaska, southern Australia and now Antarctica indicate a different climate in the past. Seventy million years ago the seas around Ross Island off the Antarctic peninsula, were probably quite warm.

Many fossils have been found of sharks and large marine reptiles such as plesiosaurs and mosasaurs. The dinosaurs from the Antarctic peninsula suggest a warmer climate at the end of the Mesozoic era.

The herbivorous dinosaurs which lived long ago at high latitudes, required abundant plant food. A question being asked is: how did dinosaurs survive low-light winters? Did they migrate to warmer areas?

Dr Gasparini said that paleontologists believe that where there are herbivorous dinosaurs, there were probably also carnivorous ones which preyed on them. Fossil evidence of these has still to be found. The search for more Antarctic dinosaurs has intensified since the latest discoveries.

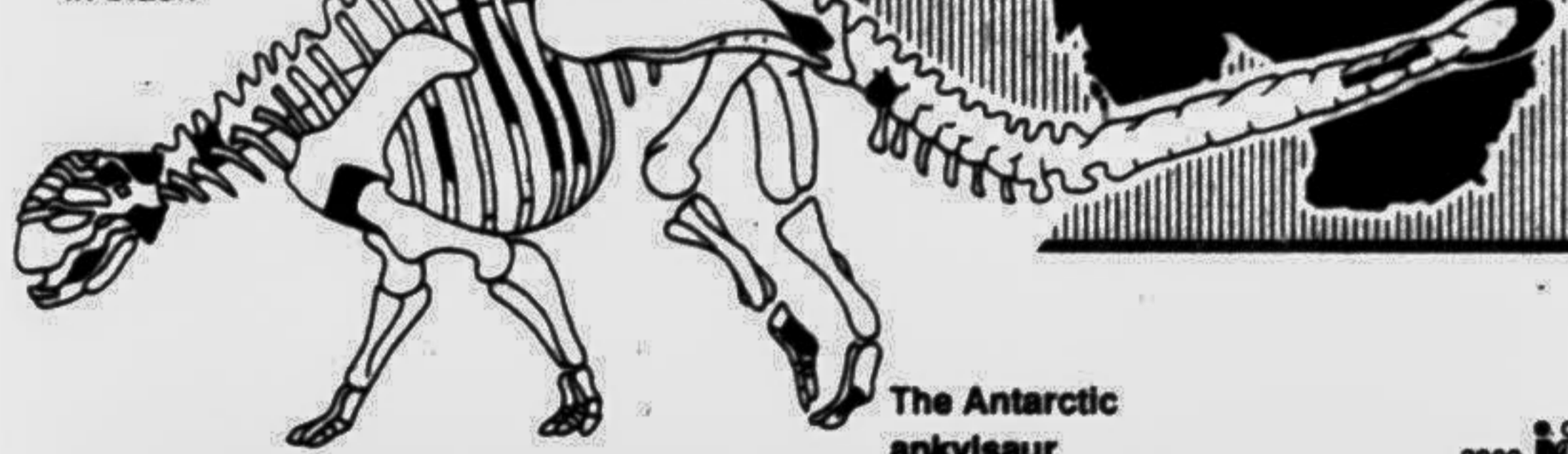
The harsh conditions in Antarctica today makes scientific work extremely difficult. The continent gives up its secrets reluctantly.

— Gemini News

About the Author: FRANK NOWIKOWSKI is a British freelance journalist based in Buenos Aires.

## Monster of the ice

Reconstruction of the first dinosaur found in Antarctica. The fragments found are marked in black



found in Antarctica before this. However, the find on the now frozen continent raised more questions than it answered.

Paleontologists said the dinosaur resembled ankylosaurs fossils found in the northern hemisphere, but which have never turned up in South Africa. The question scientists now asked was: How did the ankylosaur get to Antarctica?

The Antarctic ankylosaur, also known as a "tank di-

Argentine Antarctic Institute, worked to collect as much of the dinosaur as possible. The bones had been fragmented by the freezing and thawing action of ice over thousands of years.

Nevertheless, they found parts of the skull, jaw, ribs, legs, shoulder bones and body armour plates. These were handed over to specialists at the Natural History Museum at La Plata, near Buenos Aires.

been fired in anger over territorial disputes.

Under the Antarctic Treaty all rival claims on the continent have been suspended and today there is much logistical co-operation between scientists from many countries. All fossils from the Cretaceous and early-Tertiary periods found in Antarctica have been discovered on three islands to the northeast of the peninsula. Olivero found his ankylosaurs

## Mystery of Pacific Humpbacks

WHALE watching has not only become a boom industry, it has uncovered the mysterious behaviour of humpbacks in the North Pacific as well.

Whale watching has now become a recognised and popular pastime and is booming in Ogasawara and Okinawa. In 1991 in Ogasawara alone, it is estimated that the industry earned 400 million yen (US\$3 million). In Okinawa, more than 1,000 people attended Whale watches last year.

The industry is a spin-off of a World Wide Fund for nature (WWF) project to survey the status of humpback whales—which was largely unknown—in the western North Pacific. It was in response to multiple sightings in the 1980s of the humpbacks by local residents of Ogasawara and Okinawa.

In April 1989, WWF sent Canadian scientist Dr Jim Darling and Japanese student Kyoichi Mori to Ogasawara to apply new survey techniques for the humpbacks. The first season's work led to some startling developments.

Besides taking 20 identification photos of humpbacks and recording their songs, the first ever Japanese whale watching tour was organised. This inspired local authorities to prepare for whale watching on a longer term basis in order to stimulate the local economy.

**About 80 per cent of Japanese say whaling is no longer needed, but many express concern for people who lost their jobs**

Dr. Darling then helped the local government prepare a guidebook, promotional materials and basic guidelines for whale watching. By 1989, Japan's first whale watching association was founded. "Since then, it has pretty much exploded," says Dr Darling of the whale watching industry in Japan.

The WWF-sponsored survey also continued to grow, attracting local volunteers and cooperation, such as from Ogasawara Marine Centre. In 1989, the survey was further extended to Okinawa waters with the help of Yukifumi

Miyamura. The research team conducted a preliminary survey in Saipan and Taiwan, once part of the wintering areas of the Western Pacific population. With tremendous efforts, the number of whale photos increased—from 76 in 1989 to

301 by 1991. Over 350 photos were taken during the 1992 season.

In response to WWF—Japan's appeal to support the survey, more photos and videotape recordings are coming in from local donors and tourists who have participated in whale watching expedition.

As the number of whale photos increased, the mysterious behaviour of the humpbacks in the region has been uncovered. For example, one individual identified in Ogasawara in 1989 was rediscovered in Okinawa in 1990, and one in Okinawa in 1989 was found in Ogasawara in 1990. In 1991, the team compiled the data and photographs into a catalog for both scientists and tourists to use when identifying individual whales.

Later that year, the team also discovered that one humpback previously discovered in Ogasawara in 1990 was identified in Hawaii by researchers from Moss Landing Research Institute in California.

"It was a first," said Dr Darling. "What it means is there is at least a mixing of humpbacks throughout the North Pacific population." Indeed, at an early stage of the survey, analysis of whale songs suggested some mixing between the Japanese population and populations in the central and eastern Pacific.

"Anything that affects whales in one area could affect whales in another area of the North Pacific. There is no use in protecting animals in Hawaii if we do not protect the animals in Japan, or know their feeding grounds," Dr Darling said.

"The feeding grounds are critical. The Japanese are now taking the step to see where their whales feed," added Dr Darling. He headed a study team in mid-1992 to the coast of the former Soviet Union and Aleutian Islands to examine the whales that frequent the coast there.

During the first half of the 20th century, humpback whale populations throughout the North Pacific were so significantly reduced and endangered by commercial whaling

that in 1966 whaling of humpbacks was banned.

In early 1970 researchers, lacking information on the remaining populations, developed a non-lethal survey method based on photographic identification of individual animal's markings. Scientists have found that the black and white markings of the underside of the tail flukes are as distinctively unique as human fingerprints, allowing them to track individual whales over time.

Each year, North Pacific humpback whales (Megaptera novaeangliae) migrate across thousands of kilometres of ocean, making it difficult to study individuals and changing populations.

They travel from their summer feeding grounds along the Pacific rim and in the Bering and Okhotsk seas, to their winter calving and mating areas in the eastern North Pacific along the coast of Mexico, the central North Pacific around the main Hawaiian Islands, and the western North Pacific around the Ogasawara and Okinawa Islands.

The WWF project applies the new survey techniques in order to obtain estimates of humpback abundance in the North Pacific. The survey will also investigate the relationship between humpbacks and other whale populations and will provide training for Japanese students in the application of benign cetacean research techniques.

The survey has had pleasant spin-offs as well. Partly because of the popularity of whale watching, other local governments declared protection for humpbacks.

In other places, such as in Shikoku, some ex-whalers are now employed as guides or run their own boats. This allows them to use their hunting experience to locate whales and compensate some of their financial losses. In Hokkaido, the town of Muroran once flourished because of the steel industry, but is now trying to revamp its recession-hit economy with whale watching.

While the government continues to argue the necessity of whaling, great attitude changes towards whales have been underway. A survey shows that about 80 per cent of Japanese say whaling is no longer needed, although many express concern for people who have lost their jobs.

Given the outcome thus far, WWF-Japan will continue to develop its survey of humpback whales. It plans to publish an updated catalogue by the end of 1991.

(WWF-Depthnews Asta)

## Technique Identifies Waste-Degrading Bacteria

A technique to quickly identify bacteria that will be most effective at metabolising particular wastes in soil and water has been developed by scientists at the Oak Ridge National Laboratory, reports the journal *Chemical and Engineering News*.

Test have shown that the laboratory's rapid screening process is up to 10 times more efficient than current methods used to identify bacteria that degrade volatile contaminants such as trichloroethylene, the journal said quoting ORNL.

The new technique employs a rectangular plastic plate about the size of a standard in-

## Science Brief

dex card. The plate is lined with rows of half-inch-deep cavities or "wells," into which samples of bacteria are inoculated.

The plate is then placed in a sealed chamber along with a contamination source, such as a container of chloroform. The contaminant is allowed to vaporise and enter the wells. The wells contain a special dye: if the bacteria are capable of metabolising the contaminant, the dye is activated and

becomes visible in graduated shades of purple. The plate is then put in a device that scans the wells and produces a numerical indication of the level of colour change.

"The darker, the better," the journal quoted ORNL microbial ecologist Tony Palumbo as saying. "Once the automatic plate reader indicates which bacterial samples are most effective for that particular contaminant, we can study them

in more detail, and we can eliminate the bacteria that are not effective."

According to Palumbo, the technique has made it possible to screen about 4000 isolates in one week. Current methods allow screening of only about 40 to 50 isolates per week. Another aspect of the screening process, according to Palumbo, is isolate enrichment in which bacteria are grown in a solution containing soil, for example. This process allows the good bacteria to better reveal themselves. "We can introduce a specific contaminant in to the soil sample and then see which bacteria prove to be the best at metabolising it," the journal said quoting the scientist.

## Shanghai's Bridges to the Future

by Ian Gill from Shanghai

KNOWN as the 'Paris of the East' before the communist take-over in 1947, Shanghai languished in neglect for decades, punished for its swinging past as a showcase of western decadence.

But with China's recent move toward economic reforms, this eastern coastal city of 13 million is regaining some of its vibrant past.

Shanghai's old city centre on the west bank of Huang Po river — where the expatriate community used to frolic in imposing mansions and swanky shops and nightclubs — is being refurbished to bring back some of its former glamour.

But the heart of Shanghai's rebirth lies across the river in Pudong, where a major residential and industrial development project is rising from what used to be marshes.

Linking the past with the future is the Nanpu Bridge, which was inaugurated last year. These days, it is China's best-known bridge, its grey steel cables and two white H-shaped towers earning the admiration of both the locals and foreign visitors.

For those involved in its design and construction, Nanpu represents an astonishing example of technological transfer. China has built several cable bridges before but as German bridge engineer Holger Svensson put it, Nanpu was "by far the longest and a

big leap forward in terms of technology."

By linking the city's overcrowded west bank with the fast-developing Pudong New Area on the east bank, Nanpu is playing a significant role in China's transition from a centrally-planned economy to a market-oriented model.

Since 1990, Pudong has been a key area in which economic liberalisation measures

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are being implemented to attract foreign investment.

But before Nanpu was built, inadequate transportation links were a major hindrance in developing Pudong. Commuters could cross the river only by two tunnels or by ferry.

Commuter traffic between Shanghai's halves has intensified since. In January this year, 12,000 vehicles used Nanpu daily. By June, that number had risen to 17,000. To meet the surge, the Shanghai Transit Company now runs 54 buses to Pudong. The buses handle some 70,000 people crossings daily, says Shanghai Transit director Du Zhu Wei.

Much of Pudong is still under construction, with huge open pits, bulldozers and

cranes amid the jumble of steel and bamboo.

As more companies settle in, commuter traffic is expected to increase some more. For that, Shanghai officials are building another cable bridge, the Yangpu, due to open by the end of 1993.

The Chinese enlisted technical help from Japanese and US consulting firms in constructing Nanpu, but they are

ject involved moving some 4,200 households and 130 businesses.

Yangpu meanwhile entails relocating 3,595 households and 87 businesses. The costs of acquiring land, paying compensation and providing new housing for Yangpu alone is estimated to reach 67 million dollars.

Surveys under both projects showed had over 95 percent of the people were willing to relocate. For most, it has meant moving from small, old dwellings without indoor toilets to modern flats with better facilities.

Factory employee Zhou Ping and her family moved to a new apartment in January. She says she doesn't miss their old apartment where they "had to empty a pail every morning".

But, she adds, some elderly folk "miss the friends next door they used to sit and talk with."

But if the bridges have separated old friends, they have brought younger people together.

A local daily recently reported more than 60 percent of Nanpu's visitors are courting couples.

They happily pay three yuan each just to catch a breeze on stifling summer nights on the bridge, or watch the busy river traffic beneath them.

## Single Cow Mothers 11 Calves in a Year

A single elite cow became the mother of 11 identical calves in one year in a landmark achievement by dairy scientists using the embryo transfer (ET) technology under a scheme sponsored by the Department of Biotechnology (DBT).

Scientists of the DBT's ET centre at Sabarmati Ashram Gausaha in Kheda district in Gujarat, who performed this

many as 15 embryos. The embryos were flushed out and implanted into the womb of foster mothers.

Out of the 15 cows, 11 delivered healthy identical calves, all carrying the genes of the elite parents.

Former DBT secretary Dr S Ramachandran told PTI the ET technology which has now been standardised for cows

and buffaloes has the potential of causing a revolution in milk production in five years.

Mr Ramachandran said the ET programme had been handed over to the dairy technology mission under the National Dairy Development Board with DBT concentrating on "upstream" technologies like embryo sexing and embryo splitting. (J)

— PTI Science Service

least, say that 11 calves from a single cow is a world record.

The Holstein cross-bred cow with a daily yield of 20 litres of milk belonged to a farmer in Bhajwanagla village in Nainital district.

Scientists artificially inseminated the cow with semen from an elite bull and using hormonal injections superovulated the cow to produce as