

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

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GEOLOGICAL
SOCIETY OF
MALAYSIA

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About the Society

The Society was founded in 1967 with the aim of promoting the advancement of earth sciences particularly in Malaysia and the Southeast Asian region.

The Society has a membership of about 600 earth scientists interested in Malaysia and other Southeast Asian regions. The membership is worldwide in distribution.

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CATATAN GEOLOGI

Geological Notes

Cementation in Quaternary beach rock in the islands off the East Coast, Peninsular Malaysia: petrographic evidence

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Abstract: Several occurrences of carbonate beach rock have been found on several islands off the East Coast, Peninsular Malaysia. These well-indurated sediments occur in intertidal zones. The sediment composition is identical to the unlithified beach sediments found nearby. Petrographic studies show that the beach rocks were cemented mainly by peloidal micritic cements with minor amounts of aragonite needles.

INTRODUCTION

Beach rock from the tropical region has been widely documented. A number of theories have been invoked to explain their formation and origin of cement. Several occurrences of carbonate beach rock have been encountered in several islands off the east coast of Peninsular Malaysia. A detailed petrographic study was conducted to determine the origin of these deposits as well as to identify their diagenetic processes.

GENERAL SETTING

Pulau Redang, Pulau Perhentian, Pulau Kapas and other smaller islands of the East Coast have been well known by nature lovers and divers as sites for beautiful coral reefs (Fig. 1). The islands are surrounded by shallow water which supports a wide variety of carbonate producing organisms. Coastal landforms range from cliffs of granite and metamorphic rocks to sandy beaches between rocky headlands. Several of these beaches are sites of beach rock development. All beach rocks found are formed in the intertidal zones (Fig. 2). The beach rock is made up of pebbles that have been sourced from older rocks (which in this case consists of granite and metamorphic rocks) and fragmented skeletal materials that have been reworked

from the nearby coral reefs. These sediment grains are identical to those of unlithified beach sands.

PETROGRAPHY

Petrographic analysis of the beach rock shows that it is characterized by peloidal micrite cement, aragonite needle cement, micritized grains, and micritic envelopes.

First generation cement consists of aragonite needles, 15–100 μm long and 2–5 μm wide, growing mainly in intraparticle pore spaces (Figs. 3a–3e). The cement crystal is oriented with the long axes normal to pore walls. Such cement has been well studied and documented from San Salvador Island (Beier, 1985), Grand Cayman Island (Moore, 1973), South Florida (Ginsburg, 1953), Bermuda (Alexandersson, 1972) and from many other places.

Peloidal micrite cement is the most abundant cement type found in the beach rock. In some samples, peloidal micrite seems to be the sole cementing material. The cement occurs in pore spaces between grains or as an internal sediment in intraparticle voids. The cement consists of spheroidal micritic grains that can be clearly observed in thin sections as shown in Figures 4a and 4b.

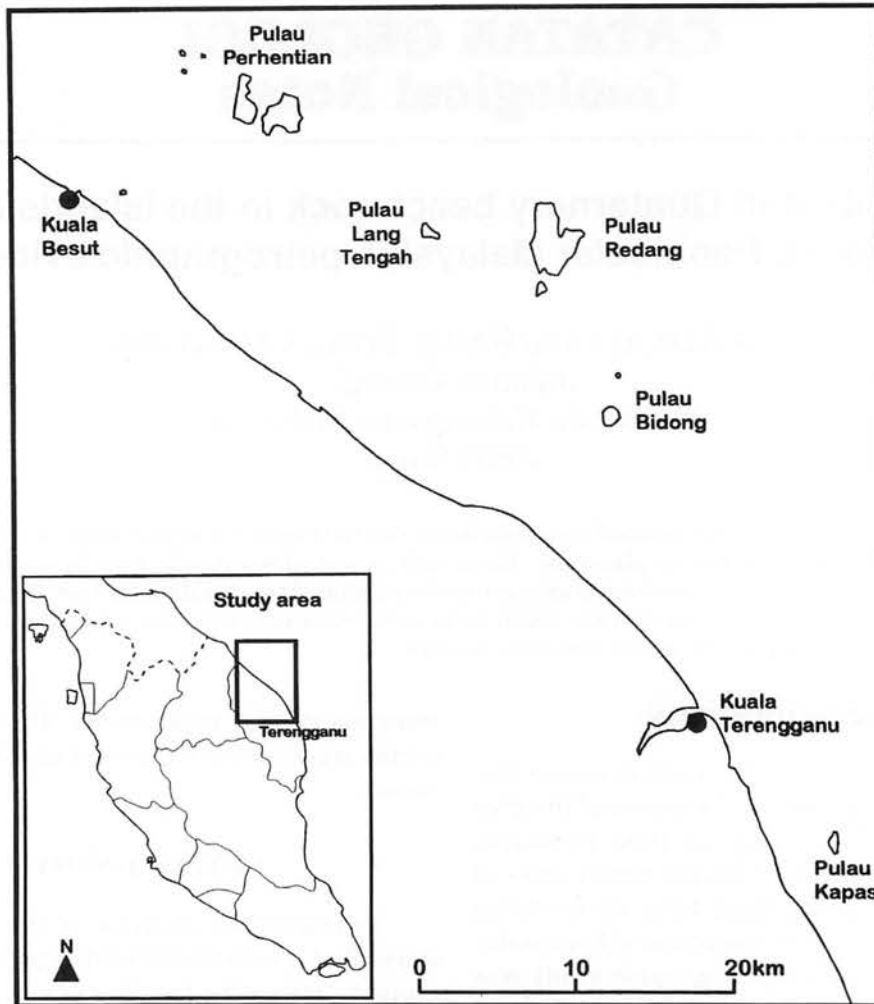


Figure 1. A map of the study area.

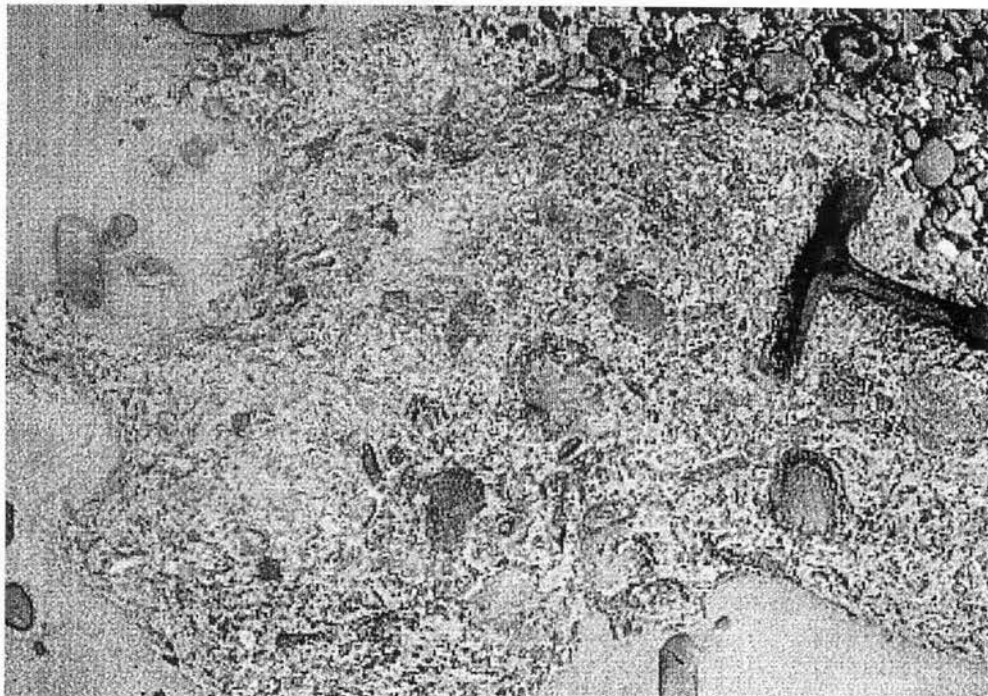
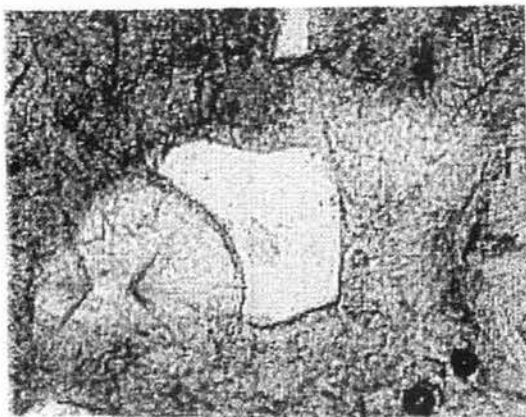
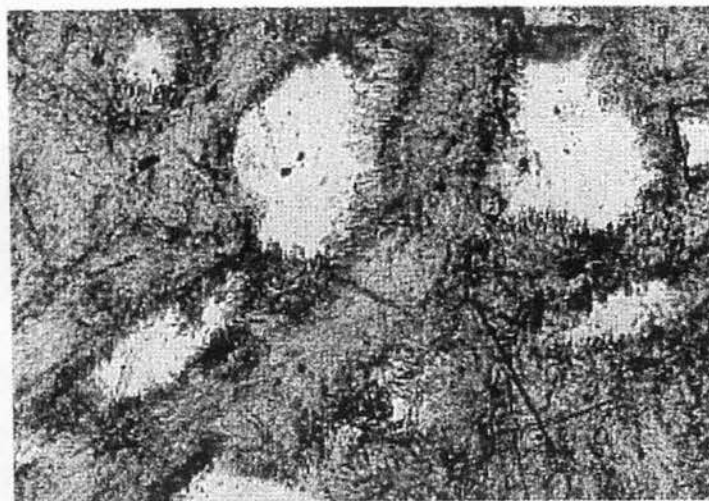


Figure 2. One of the beach rocks observed at Pulau Kapas.

a

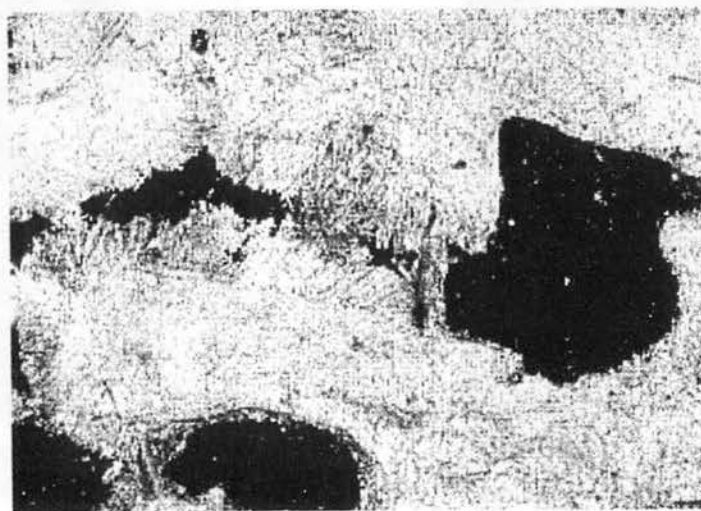
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Figure 3. Various types of aragonite needles.

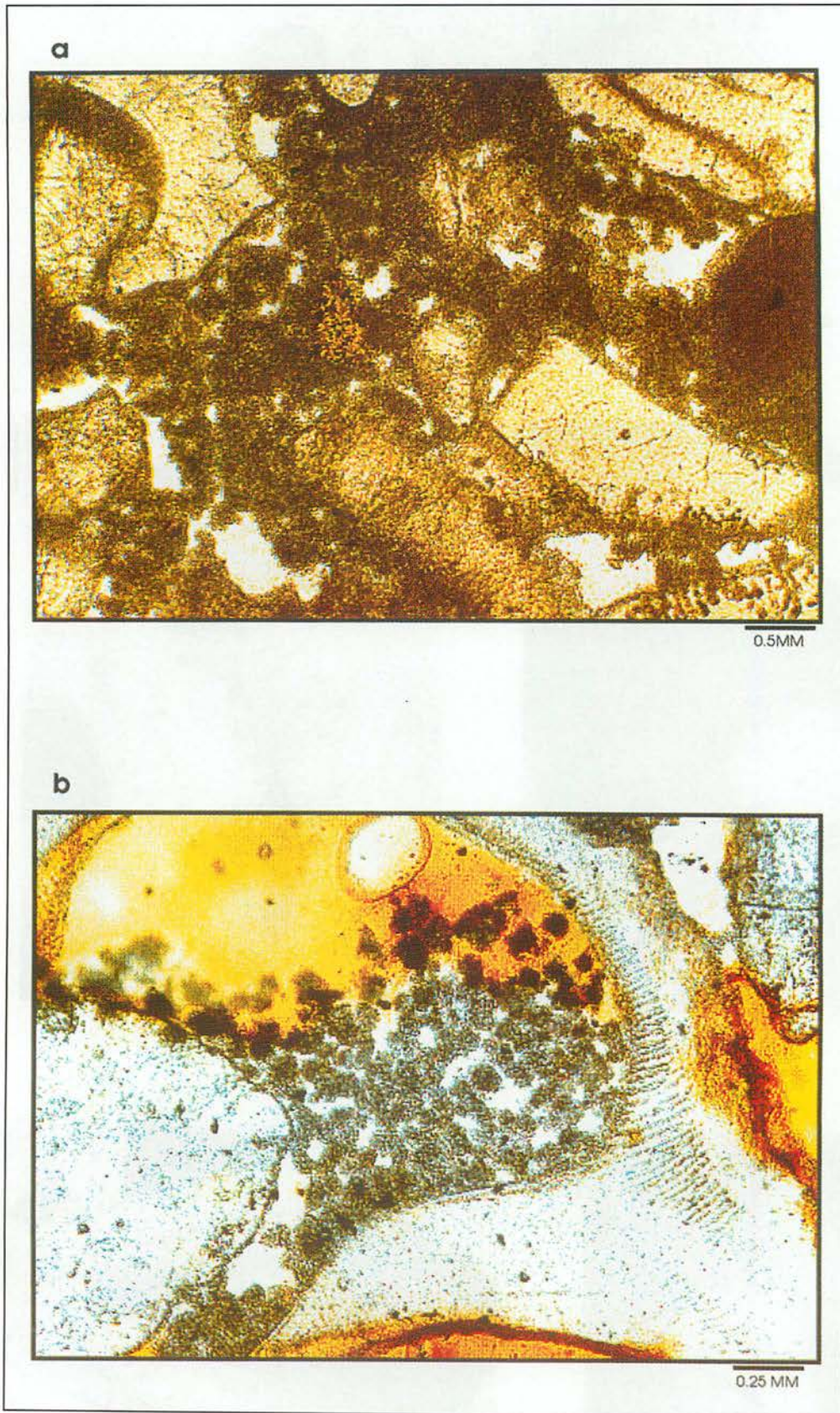


Figure 4. Peloidal micritic cements (a) between grains, (b) in an intraparticle void.

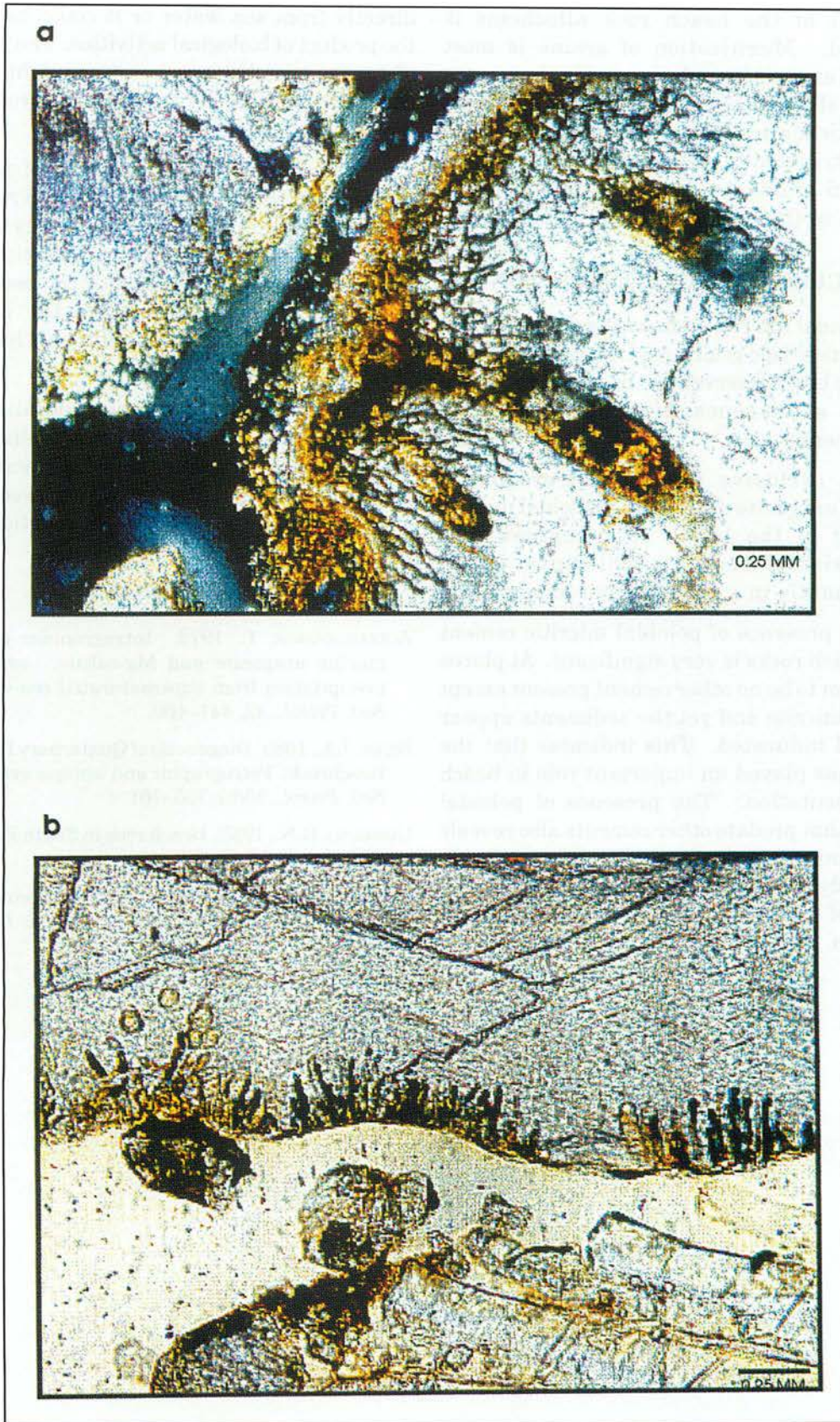


Figure 5. Microtunnels in skeletal grains.

Most of the beach rock allochems is micritized. Micritization of grains is most extensive at grain boundaries and in some cases at pore walls. This results in the development of a micritic rim around each grain. Micritization can be attributed to endolithic activity. Micro tunnels in grains are abundant and are very apparent in thin sections (Figs. 5a and 5b).

DISCUSSION AND CONCLUSION

Peloidal micrite cement, aragonite needle cement, micritized grains, and micritic envelopes that have been observed in the beach rocks are products of diagenesis in marine phreatic environments.

The exclusive presence of aragonitic cements (aragonite needles and peloidal micrite cements) in the beach rock suggest that diagenesis of beach sediments occur predominantly in a marine environment.

The presence of peloidal micritic cement in the beach rocks is very significant. At places there seem to be no other cement present except peloidal micrite and yet the sediments appear very well indurated. This indicates that the micrite has played an important role in beach rock cementation. The presence of peloidal micrites that predate other cements also reveals that the micrite precipitation occurs very early and rapidly before precipitation of other cements. Origin of peloidal micritic cement is still uncertain. It could have been precipitated

directly from sea water or it could have been the product of biological activities. The presence of intense microborings, however, might indicate that the micrites have been the products of biological activities.

There is no direct evidence of meteoric influence in the cementation of beach rock even though the sediments are frequently exposed to subaerial conditions during low tide. This suggests that marine diagenetic processes occur more quickly as compared to the meteoric processes even though the sediments have been subjected to both conditions.

In conclusion, it can be generalized that cementation in beach rock occurs mainly under marine conditions and peloidal micrite is a predominant cement type which precipitates very early in the beach rock's diagenetic history.

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PERTEMUAN PERSATUAN Meetings of the Society

Ceramah Teknik (Technical Talk)

Seminar by staff of Geology Department, University of Malaya

This seminar by staff members of the Geology Department, University of Malaya, a collaboration with the Society, was held over 4 Monday afternoons. The papers presented include:

24 February 1997

1. Stability of the slope cuts in the Rawang-Tanjung Malim area
I.J. Sta Maria
2. Kajian kestabilan cerun kawasan Genting Highlands
Qalam Azad Rosle

3 March 1997

3. Types of carbonate karsts in the tropics, their origin, detection and geotechnical significance
E.B. Yeap
4. Treatment of mining slurries by flocculation of suspended solids and heavy metals
B.K. Tan

10 March 1997

5. Dam-induced seismicity of Kenyir
Che Noorliza Lat
6. Cavemen of Langkawi
C.P. Lee

17 March 1997

7. Posers over the evolution of northwest Borneo: Waltz, Jazz or Mumbo Jumbo?
Azhar Hj. Hussin
8. Paleogeographic and tectonic controls on Tertiary sedimentation in northwest Sarawak
Abdul Hadi A. Rahman

Seminar by staff of Geology Department, University of Malaya — Abstracts of Papers

Stability of slope cuts in the Rawang-Tanjung Malim area

I.J. STA. MARIA

The study area is underlain by metasedimentary rock formations and igneous rocks. To the south of Tanjung Malim, the metasedimentary rocks consists of the older quartz-mica schist, graphitic schist and graphitic phyllite of the Terolak Formation (M. Ord.-Sil.?) along with younger metasandstone, metaquartzite, chert, shale and phyllite of the Belata Formation (Carb.?-Perm.). Both the Terolak and Belata Formations show general strike trends of NW-SE, moderately to steeply dipping towards west. The Belata Formation is postulated to be stratigraphically equivalent to the Kenny Hill Formation (Gan, 1992).

In the Rawang area, the metasedimentary rocks are composed of the Older Sequence and the Younger Sequence (Wong, 1970). The Older Sequence consists of fine grained quartz-chlorite-mica schist (Choh schist) and graphite-quartz-mica schist (Rawang schist). The Younger Sequence consists mainly of phyllite. In Taman Sentosa (Bukit Beruntung), localised dolerite dyke intrusion into the surrounding graphitic schist and phyllite were detected. The Older sequence is postulated to be stratigraphically equivalent to the Dinding Schist (Gobbett, 1964; Wong, 1970) while The Younger Sequence is postulated to be stratigraphically equivalent to the Kenny Hill Formation (Wong, 1970).

Slope cuts involving metasedimentary rocks along the Rawang-Tanjung Malim PLUS highway interchanges were mapped and classified into five different groups. The number of slope cuts, benches and failures were also recorded. Generally, all the slope cuts along the highway possesses the slope angle within the range of 38° to 48°.

Consolidated undrained shear tests were conducted involving slightly to highly weathered phyllite and graphitic schist samples. The former shows peak and residual angle of internal friction between 26.5° to 32° and 25° to 32° respectively. The graphitic schist shows the peak and residual angle of internal friction between 30.5° to 31.5° and 24.7° to 26.3° respectively. The natural moisture content for slightly weathered to highly weathered phyllites and graphitic schist samples taken from stable slope cuts ranges from 7% to 20% and 12% to 24% respectively.

Slope failures present in the study area could be generally divided into circular failure, slip and slide (due to day-lighting) and failures due to discontinuity planes. Majority of slope cuts between Tanjung Malim highway interchange heading to Rawang highway interchange were subjected to slip and slide failures. These are due to the general dipping trend of metasediments from the Terolak Formation, Belata Formation, Choh Schist and Rawang schist which are dipping westwards, in the same direction as the existing slope cuts which resulted in day-lighting. Slope failures between Rawang highway interchange heading to Tanjung Malim highway interchange are less abundant and mostly circular. The main reason is that the metasediments are dipping into the slope and are not day-lighting. Most of the slopes that failed show signs of seepage implying high moisture content and pore water pressure. The moisture content collected from failed slopes ranges from 26% to 38% and is generally higher than those samples obtained from stable slopes. The factors controlling slope instabilities are mainly the general dip and strike trends of the metasediments, groundwater table, pressure release, discontinuity planes, high slope angle, low vegetation on slope surface and erosion.

Kajian kestabilan cerun di kawasan Genting Highlands

QALAM AZAD ROSLE

Kawasan Genting Highlands dan kawasan sekitarnya merupakan kawasan dengan topografi yang berbukit bukau dengan cerun yang berkecuraman tinggi dan amat terdedah kepada berlakunya kegagalan. Secara amnya geologi kawasan didasari oleh batuan metasedimen di sebelah timur dan batuan igneus di sebelah barat. Beberapa ujian kejuruteraan, terutamanya yang membabitkan cerun-cerun yang terdiri daripada bahan-bahan terluluhawa (tanah/tanah) telah dilakukan. Kajian keatas profil luluhawa dilakukan pada beberapa singkapan terpilih di sepanjang jalan menuju ke pusat peranginan Genting Highlands dan kawasan berhampiran berdasarkan kepada cerun-cerun semulajadi dan potongan. Secara amnya bahan-bahan tanah/tanah yang melapisi permukaan cerun di kawasan kajian terdiri daripada bahan terluluhawa yang bergred V-VI, yang terletak di atas batuan bergred II-IV. Terdapat juga cerun-cerun yang terdiri daripada gabungan di antara kedua-dua bahan batuan dan juga tanah. Lapisan bergred V-VI ini mempamerkan ketebalan yang pelbagai dari senipis 0.5 m hingga lebih daripada 10 m di beberapa kawasan. Sejarah menunjukkan kegagalan cerun berlaku pada kedua-dua jenis cerun ini, iaitu potongan dan semulajadi. Kegagalan cerun-cerun potongan di kawasan kajian kebanyakannya berlaku pada bahan bergred V-VI yang berketebalan rendah di atas bahan (batuan) yang secara relatifnya lebih segar. Fenomena yang sama juga ditunjukkan oleh cerun-cerun semulajadi namun dengan tambahan faktor ciri-ciri (morfologi) cerun berkaitan. Suatu aspek lain kajian yang juga telah dilakukan adalah geomorfologi kawasan kajian, di mana kawasan Genting Highland ini menunjukkan ciri-ciri jenis rupabumi yang rumit dengan faktor had kestabilan masing-masing yang tertentu.

Types of carbonate karsts in the tropics, their origin, detection and geotechnical significance

E.B. YEAP

Karst (named after a region of the same name in the former Republic of Yugoslavia) refers to a characteristic topographic feature or landscape which can be developed by rocks undergoing dissolution by downward percolating meteoric water. Many features of karst are also developed by flowing water which had flowed laterally on reaching the water-table. Several rock types under such natural "weathering/solution" environment can develop karstic topography. They include limestone, dolomite, gypsum, salt deposits and silica rocks. However, the most common and the best known are those developed by carbonates calcite (CaCO_3) and dolomite [$(\text{Mg}, \text{Ca})\text{CO}_3$]. Under tropical humid conditions, calcitic and dolomitic limestones or their metamorphosed equivalents develop tropical karstic features which show spectacular tall steep-sided hills (tower karst or mogote) and solution features such as karren, dolines, uvalas, and cockpits (locally referred to as wangs). Where the percolating water had reached the water-table, the lateral flow of the water can carve out cave systems which given enough time will develop secondary karstic features such as stalagmites, stalactites, scalloped surfaces, reverse pinnacles, bell holes etc. Other karstic features such as overhanging caves, rock windows and sphaeriums could have developed subsequently.

In the Southeast Asian Region, limestone or marble constitute one of the major rock types and they have formed large areas with above surface spectacular karstic features. There are ample evidences to indicate that in the past [probably from Pliocene (6 to 2 million years ago) to around Early to Middle Pleistocene (2 to 0.5 million years ago)] the sea levels, in several episodes, had receded way beyond the continental shelf area for significant lengths of time in response largely to the ice accumulations in the polar regions during the Quaternary Glaciation. A large continent (the Sunda Continent) had existed then and it encompassed the whole of Southeast Asia and the surrounding seas including Straits of Malacca, South China Sea, Sunda Sea. During these periods of regressions (or sea level lows), the climatic conditions in this region had been quite different from the humid tropical type prevailing presently. A cooler and dryer climate is believed to had been active. This had allowed development of a few

karstic types in the Southeast Asian region which had not been recognized elsewhere in the world.

Four (4) distinct karstic types are recognized. They include (a) tower or mogote karst, (b) subsurface karst, (c) submarine karst, dan (d) stratigraphic karst.

In the long past geologic history, where limestone had been formed and had been exposed to the atmospheric conditions, apparently similar types of solution and karstic formation probably had occurred. When such surfaces were submerged and other rock units were deposited on top of them this gave rise to the fourth type of karst which is called the stratigraphic karst.

The lowering of the sea levels in the past geologic history of this region had superimposed solution features on the subsurface and stratigraphic karsts which were formed and preserved. This has added to the potential geotechnical problems and hazards of these two types of karsts when high-rise and other infra-structures were constructed over areas underlain by them. Site investigation of difficult karstic areas requires input by the geologist who understands karst and karst formation.

Treatment of mining slurries by flocculation of suspended solids and heavy metals

B.K. TAN

Most forms of mining use large quantity of water and the wastewater contains a high degree of suspended solids. Slurry or slime are terms commonly used to describe the highly turbid and muddy suspension of very fine clay particles, silt and soluble mineral components which may contain an appreciable amount of toxic heavy metals. Conventional mining practice requires the wastewater to be stored and treated at the mine site. The slurries are often left to settle in large ponds where the fine suspension settles leaving a water layer at the top. This clear water is reused, thus minimising the use of water in the mining operation. However clay particles in suspension settle very slowly on its own and the process of dewatering can take months or years. Since mining is continuously discharging slurries, the holding ponds for the slurries would require large areas to be set aside for this purpose. Malaysia's long history of alluvial tin mining, has left a legacy of numerous ex-mining ponds and ex-mining land with buried slime. Houses and other structures built over such land have often encountered serious settlement problems.

Over the past thirty years, various means have been adopted to speed up the process of settlement of the very fine clay in the slurries, with varying degrees of success. A number of chemical reagents has been found to be effective in hastening the dewatering process, usually by a process of flocculation of the clay particles. However the effectiveness of the reagents depend on a large number of factors such as the composition of the suspended solids, the pH, the chemistry of the wastewater, the percentage of the solids in the slurry and the method of introducing the reagents. Different types of mining generate different types of slurries and the effective dewatering process is often different for each mine. A considerable amount of research is required before a workable dewatering process is found. Environmental requirements in many mining areas compel the mining companies to find solution to the problems posed by the slurries and most mines have been successful in finding solutions to the problems caused by the suspended solids. Research carried out on mining slurries in Peninsular Malaysia has identified the reagents which are very effective in dewatering the slurries. Of these reagents, natural rubber latex has been found to be most effective as a flocculation agent. The flocculant works by binding the clay particles and metallic ions into large flocs which settle instantaneously. The resulting flocs are very stable, an important factor in tropical environment where high rainfall and the resulting runoff may transport the flocculated material into the natural drainage system.

Cavemen of Langkawi

LEE CHAI PENG

Amongst the twenty four caves located, described and illustrated in the tourist book *Mysterious Caves of Langkawi* jointly published by the Department of Irrigation and Drainage (DID), Ministry of Agriculture, Malaysia and Design Dimension Sdn. Bhd. (1994) is Gua Siam located at the Sungai Batu Gajah in the heart of a wide expanse of mangroves in Setul Limestone country south of Tanjong Rhu, northwest Langkawi. Although it is not a very large or spectacular cave compared to the others it was included because skeletal remains of humans and animals and primitive stone tools have been discovered in it. Some broken bones including a monkey skull were illustrated in the photographs in the book.

Two brief visits were made in June and September last year to conduct some preliminary investigations of the cave. Accessibility to the cave is difficult as one has to bash through some thick mangrove swamp after arriving by boat before reaching the limestone hill. The cave entrance is not easily seen as it is located about 15 metres above the ground. It is accessible only by climbing up a near vertical cliff using the roots and vines clinging to the rock face.

The cave is located on the west side of the limestone hill with its entrance oriented roughly north-south and it narrows towards the east. The chamber of the cave is not very big being only about 7 metres in diameter at the entrance where it is widest and 12 metres deep with a series of narrow tunnels on the southeast wall. There is sufficient natural lighting to illuminate the chamber during the day.

As is common to most prehistoric cave sites in this country the guano digger has preceded the archaeologist (Peacock, 1965), the cave shows obvious signs of having been dug up and until quite recently too as evidenced by a piece of nylon fish-netting left in the rubble. Pieces of broken bones (to access the bone marrow for food), tooth of a large herbivore and lots of shells of freshwater, brackish and marine molluscs including the common freshwater food-snail, *Brotia costula*, with chopped off apices were found amidst the rubble and brown earth on the cave floor. The skeletal relics illustrated in the book were gathered together in a small recess on the north side of the entrance. Apparently no one else has visited the cave after DID team's visit. As time was running out, I just collected some samples from the relics including a large crude hand axe and departed.

The second visit took place in September 1996. While searching for the entrance to Gua Siam, a couple of smaller shallow caves were found slightly to the north of Gua Siam. There were also indications that they had been inhabited in the past as evidenced by "eaten" shells. While sifting through the rubble I found a polished stone adze which is a much more refined artifact than the crude hand axe from Gua Siam. Another two such stone adzes were recovered by others from Gua Siam itself. Cord-impressed pottery shreds were also recorded from the rubble in Gua Siam indicating that the remains in the caves were most likely to be post-"Hoabinhian" that is early Neolithic age as comparable polished centre-edge ground adzes and cord-impressed pottery shreds had been recovered from other prehistoric sites in Malaya, for example at Dengkil by Batchelor (1978). This discovery would make Gua Siam the latest addition to the numerous known Malayan Neolithic sites in caves around the region including Pula Tuba and several others in Kedah and Perlis (Peacock, 1965). A more precise dating of the age could be obtained by radiocarbon dating the shells used as food by the prehistoric inhabitants of Gua Siam. There is a strong possibility that other hard to access caves in Langkawi could also hold prehistoric relics of archeological interest.

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Dam-induced seismicity of Kenyir, Terengganu

CHE NOORLIZA LAT

Among the more documented cases of man-made or induced earthquakes are those associated with fluid. Dam- or reservoir-induced earthquakes are quite common. Seismicity data can be used to site a dam or to monitor a dam for safety reasons, using data before and after construction, throughout the life of the reservoir. Shocks are expected from large dams constructed in a seismically active areas. However, dams that exceed 100 meters high are also good candidates even though their sites were previously aseismic. The Kenyir Dam was no exception; tremors were reported (and recorded) near the Kenyir area since 1984, and recorded by seismic stations in Ipoh, Kluang and Kuala Lumpur. These stations are a part of a nationwide network managed by the Seismological Division of the Malaysian Meteorological Department since 1979.

A total of 27 shocks were recorded, with the magnitude ranging from 2.5 to 4.6 on the Richter scale. The earthquakes from Kenyir have their own *signatures* on the seismograms. In addition to providing data for dam monitoring, this data set can also be used to study the regional geology and the crust structure between the source and the recording stations. The records, however, have to be reevaluated to increase precision and minimise error.

Poser over the evolution of northwest Borneo: Waltz, Jazz or Mumbo-Jumbo?

AZHAR HAJI HUSSIN

Northwest Borneo has long been recognized as having blocks of different geologic entities, which has progressively fused to its present configuration since the late Paleozoic. The southern block of **Wesara** in west Sarawak with a span of history from pre-Late Carboniferous was thought to have finally fused with the **Norsara** block of north Sarawak by middle Eocene. Subsequent merging of the basement of the **Luconia Province** in the present offshore of north Sarawak with the fused **Wesara** and **Norsara** must have occurred by mid-Miocene.

However, the origin of these blocks has yet to be satisfactorily resolved. For Wesara, paleontological evidence from the Permian, Triassic, Jurassic and Cretaceous have been cited for an affinity with eastern margin Mainland Asia. Sedimentological evidence further support for a present southern link with sedimentary provenance of granitic, metamorphic and volcanic terrain in the late Triassic. Due to the lack of exposure the pre-Tertiary origin of Norsara and the basement of Luconia Province remain speculative.

Paleomagnetic data suggest that Wesara has already reached its present position by late Cretaceous. However, the fused Wesara and Norsara attained its present orientation in the Miocene.

Basin development and inversion since early Jurassic recorded at least two unconformity-bounded sequences in Wesara and three unconformity-bounded sequences in Norsara. The sedimentation style of these sequences attest to filling of tectonically driven accommodation spaces, with sedimentary and dynamics of sea level changes imposing a lesser control.

Sediment-gravity flows in the clastic sequences suggest large-scale instability of the basin margins in Jurassic-Cretaceous and the Eocene. In the more quiet area of the Jurassic-Cretaceous of west Sarawak, subsidence allows the deposition of carbonate bodies, which were intermittently exposed. In Norsara, the basement was vertically mobile. The great thickness (> 4,000 metres) of the shallow marine Melinau Limestone suggests subsidence from late Eocene into early Miocene. Laterally to the south, the time duration is represented by only 80 metres of limestone with a major disconformity within it. To the north, this sequence is represented deep-water calciturbidite and calcilutite.

Petroleum prospects in Tanzania

M.Z. FARSHORI

Laporan (Report)

Ceramah bertajuk *Petroleum prospects in Tanzania* telah diadakan di Bilik Mesyuarat Jabatan Geologi Universiti Kebangsaan Malaysia pada hari Khamis 3 April 1997 jam 14.30. Ceramah telah disampaikan oleh Penyelidik Pelawat di Jabatan Geologi UKM, Dr. M.Z. Farshori yang berkhidmat dengan sebuah syarikat pencariigali petroleum di Canada, CANOP. Seramai 30 peserta telah menghadiri ceramah tersebut.

Most of the material presented by Dr. Farshori were taken from a report that he and his colleagues provided for their company for the purpose of future exploration work, and the potential of future petroleum discovery in this East African third world country. The study was concentrated in the offshore area east of Tanzania which is already known for its gas production. Among others, Dr. Farshori mentioned about the presence of very thick sequence of Mesozoic-Tertiary detrital sediments as well as carbonates related to the rifting of Indian continent from Africa. Several occurrence of oil seep have been reported from the concession area given to this Canadian Company. Data from several boreholes have proven the existence of thick oil shale as the source rocks, but the lack of appropriate reservoir (so far) has been the major stumbling factor which prevented Tanzania from becoming oil producing country. CANOP, however, strongly believed that with a more detailed study on the basin configuration, sedimentologically and structurally they will eventually find the much needed reservoir.

Mohd Shafeea Leman

GSM

Evaluation of low resistivity, low contrast productive reservoir in the Malaysian fields

AHMAD SHARBY

Laporan (Report)

This talk by Ahmad Sharby of PETRONAS Research & Scientific Services (PRSS) was presented by Uzaymee Yusof, who is a member of the IOR Group project. It was held on 23 April 1997 at the Geology Department, University of Malaya.

Abstrak (Abstract)

Low resistivity low contrast reservoirs are frequently interpreted as predominantly water-bearing. As a consequence they are often overlooked or down-graded in reserve estimates. The causes of low resistivity low contrast reservoirs are well known and arise principally from the presence of clay and other conductive minerals in reservoir sections and from underestimates of the true formation resistivity.

In Malaysian basins, low salinity formation water exaggerate the problem as even small quantities of clay can significantly lower resistivity. In addition, deep invasion of conductive drilling fluids can drastically lower the measured resistivity.

This study involved the rapid introduction of the recent work that has been done to identify and correct the interpretation of low resistivity low contrast reservoirs in the Malaysian basins.

GSM

Geotrop '97

The Second International Conference on Environmental Chemistry and Geochemistry in the Tropics (Geotrop '97) was held on 7–11 April 1997. It was jointly organised by the Geological Society of Malaysia, University of Malaya and the Society for Environmental Geochemistry and Health (SEGH) in collaboration with the Ministry of Science, Technology and the Environment Malaysia. The conference was attended by researchers from Malaysia, Australia, Brunei, China, Hong Kong, Jamaica, Pakistan, Singapore, Republic of Panama, Sri Lanka, Taiwan, Trinidad, USA, UK and Yemen. The Geological Society of Malaysia was represented by Prof. Ibrahim Komoo, Dr. Teh Guan Hoe and Dr. Joy Jacqueline Pereira. The conference provided an excellent platform for discussion on environmental research in countries in the equatorial belt in order to achieve an optimal balance between industrial development and ecological protection.

The conference was declared open by Y. Bhg. Dato' Law Hieng Ding, the Honourable Minister of Science, Technology and Environment. The programme commenced with a plenary lecture by Prof. B.E. Davies, Co-Chairperson of Geotrop '97. This was followed by oral presentations spread over a period of four days and a one-day field visit to the Forest Research Institute of Malaysia. About 80 papers were presented centred on the themes of remediation and waste management; atmospheric, water and marine pollution; measurements and transport of pollutants; health and exposure; and geochemistry.

In his plenary lecture, Prof. Davies reviewed the current status of knowledge concerning deficiencies and toxicities of trace elements and micronutrients in tropical soils and challenged the myth that all tropical soils are lateritic, highly leached and nutrient poor. He also touched on the special problems of zinc deficiency and aluminium toxicity in acid soils within the context of agriculture and the environment. Prof. Davies also highlighted the fact that decomposition rates were three to four times higher in the tropics compared to temperate regions. As such, deforestation and forest fires effects the micronutrients and increases the rates of soil degradation in such areas. Unfortunately, the fate of elements in soil after deforestation and forest fires are largely unknown. Prof. Davies concluded his lecture by stressing the need for more studies on micronutrient cycling in tropical forests to supplement the emerging picture of the complexities of major element cycles in that ecosystem.

The latest findings in remediation of contaminated soils were presented at this conference. One such finding is the use of inorganic additives such as zeolites, clay minerals and iron oxides in a practical and economic way to remediate metal contaminated soils. The effectiveness of the additives in laboratory and field trials with reference to the development of self sustaining ecosystems on metal polluted soils was presented and discussed. Another interesting new finding was the potential use of chemical-adsorbing magnetic particles for rehabilitation of land contaminated with pesticides such as DDT and dieldrin as well as aliphatic and aromatic hydrocarbons. In this new technology, magnetic polymer-coated beads are designed to attract oil and pesticides in contaminated soil. The beads are mixed with the contaminated soil and efficiently pick up the oil or pesticides. The beads are then removed using a magnet, along with the oil or pesticide. This method was found to be cheap and efficient and the design of the beads have since been patented.

With respect to the assessment of water pollution, an elegant technique for measuring water quality and tracing the source of metal contamination in surface and groundwater using $^{207}\text{Pb}/^{206}\text{Pb}$ isotope ratios by inductively coupled plasma mass spectrometry was presented. In this case-study of the Coeur d'Alene River and its associated water bodies, uncontaminated and contaminated surface and groundwater were found to have distinctly different $^{207}\text{Pb}/^{206}\text{Pb}$ isotopic signatures. The advantages of this technique compared to conventional water quality measurements reportedly lies in its usefulness for tracing groundwater contamination, and its ability for producing highly reproducible results for both filtered and unfiltered water samples. Other topics covered during the oral presentations include landfill design considerations for tropical conditions; biological availability and speciation of heavy elements; use of indicators and sentinel organisms to detect metal pollution; measurement and simulation of pesticides in soils; and geochemical soil and sediment surveys to detect environmental pollution.

Lively discussions were held after most papers were presented. There was a strong call for appreciating the difference of detection limits of the analytical instrument used, to that of the digested sample solution and the sample proper, with respect to geochemical analysis, in order to improve the quality of data obtained in environmental studies. In addition, there is a need to differentiate between the total content of heavy elements present in soils and sediments, to the content that is actually biologically available. An appreciation of the fact that the results of heavy elements in soils and sediments are influenced by the different size fractions that is analysed was also called for.

J.J. Pereira



The participants at the Opening Ceremony.



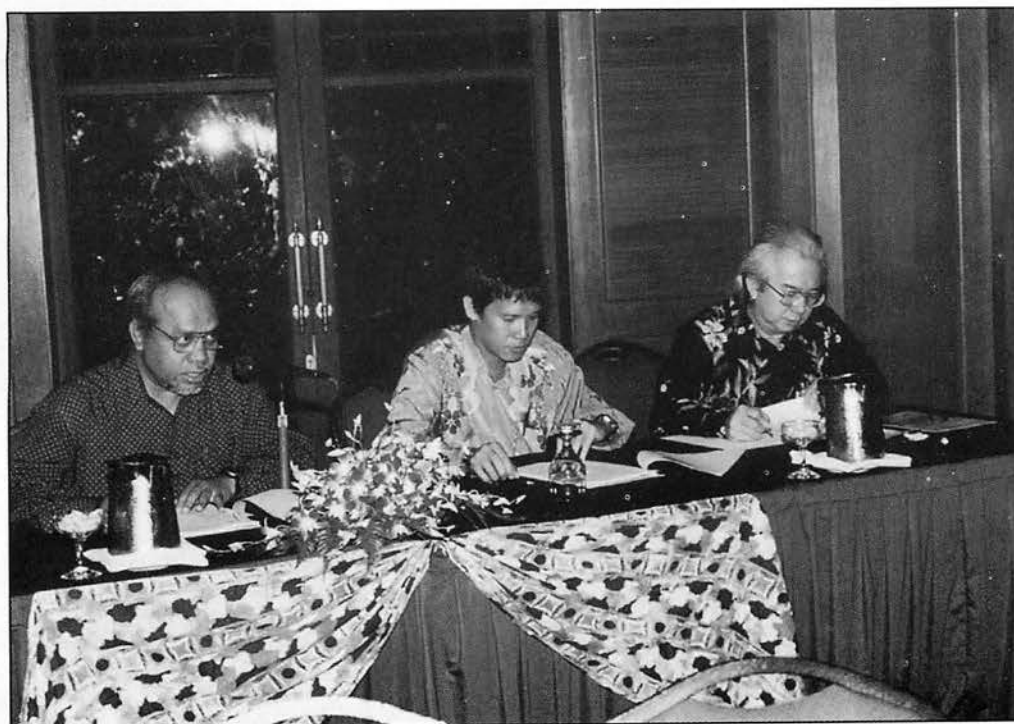
Dato' Low at the Exhibition Hall.

AGM and Annual Dinner 1997 — Report

The Society's Annual General Meeting 1997 was held on Saturday 26 April 1997 at the Hyatt Regency Saujana Hotel, Km 2, Off Sultan Abdul Aziz Shah Airport Highway, 47200 Subang, Selangor. The AGM started at 6.30 pm and was attended by 30 members. The AGM went on smoothly with the reports of the President, Secretary, Editor and Treasurer accepted after the usual discussion. The Secretary and Editor reports were read by Dr. Lee Chai Peng as the Secretary and Editor were away on official duty.

The Society's Annual Dinner was also held at the same venue, at 7.30 pm. The 60 participants were treated to a nine-course halal Chinese dinner. During the dinner the participants took the opportunity to network and renew acquaintances.

Ng Tham Fatt



The President (left), presenting his report at the AGM.

Annual Dinner 1997



Minutes of the 30th Annual General Meeting

Minutes of the 30th Annual General Meeting held at the Kelab Golf Perkhidmatan Awam Malaysia, Jalan Damansara, Kuala Lumpur at 6.15 p.m. on the 20th April 1996 (Saturday).

Present:

Khalid Ngah (Chairman)	Raghubir Rampal
Ahmad Tajuddin Ibrahim (Secretary)	Abdul Hadi Abd Rahman
Ibrahim Komoo	S.P. Sivam
Hoh Swee Chee	Effendy Cheng Abdullah
Ali Shariff	Che Noorliza Lat
Lee Chai Peng	Fateh Chand
Leong Lap Sau	Teoh Lay Hock
Jimmy K.K. Khoo	S. Paramanathan
C.S. Hutchison	Liew Kit Kong
Mior Sallehuddin	Nicholas Jacob
Ab. Rahim Samsudin	Abd. Ghani Rafek
Ibrahim Abdullah	Daud Muhamad
Gan Lay Chin	Choo Mun Keong
Mohd Shafeea Leman	Ng Tham Fatt
J.J. Pereira	Tan Boon Kong
Mohd Nazan Awang	Kadderi Md. Desa
Teh Guan Hoe	

1. Confirmation of the Minutes of the Previous AGM (1995)

The minutes of the 29th AGM were passed on the proposal of Dr. Ab. Rahim Samsudin and seconded by Dr. Abdul Ghani Rafek with the corrections listed below:

page 1, in the list of members present: **The** Guan Hoe is corrected to **Teh** Guan Hoe,

page 2, item 3.7, line 1: the Society **have** already is corrected to the Society **has** already

page 4, item 8, para 2, line 1: also **express** gratitude is corrected to also **expressed** gratitude

2. Matters Arising

2.1. Winning entries for the last photographic competition — the suggestion the these photographs be used for 1997 calendar will be considered by the Council.

2.2. Geologist's Act — IGM President informed the meeting the changes suggested by the Primary Industry Ministry legal advisor to the draft of the act and her suggestion to have accompanying explanatory notes to go with it have already been done and passed back to her. He also informed the meeting that further meetings with the Ministry officials will be held to finalise the proposed Act.

M.K. Choo suggested that the Society representative be invited to IGM Council meetings to coordinate actions.

- 2.3. Certificate for all Life Members — the certificates are still being prepared and they will be given out soon.

3. President's Report

Dr. Khalid Ngah presented his report for the 1995/96 session. He began by thanking all parties involved in the various activities organised by the Society.

The dialogue with the MPKSN was highlighted and through it a series of lecture was organised at the national Planetarium. Other public awareness programs were being planned. Activities were also organised to act as platform for mutual respects and understanding between geologists and engineers.

He mentioned that a seminar on "*Marine Sedimentation and Biota in Malaysian Geological Record*" was jointly organised by the University of Malaya, Universiti Kebangsaan Malaysia, Geological Survey of Malaysia and Petronas Research and Scientific Services. The Annual Geological Conference held in Malacca and the First Petroleum Geology Conference were organised successfully. He expressed gratitude to all sponsors/donors and their organising committees for these two conferences.

The President's Report was passed on the proposal of Mr. Jimmy K.K. Khoo and seconded by Mr. Raghubir Rampal.

4. Secretary's Report

Dr. Ahmad Tajuddin presented his report for the 1995/96 session. He reported that the Council met 11 times during the session. Total memberships of the Society shows a slight decline to 579.

Beside the two major Conferences held as already mentioned in the President's Report, there were 21 technical talks, one conference "*Persidangan Geologi di Abad ke 21*" jointly organised with the Geology Department, UKM, one seminar jointly organised with various organisations which was held in Ipoh, two site visits and one forum organised by one of our working groups. Two public lectures were held at the National Planetarium which was well attended and another one is already scheduled for end of April 1996. He informed that these lectures are part of our public awareness programme.

The meaning suggested that in future a call for AGM or EGM should include a proxy form for the benefit of those who cannot attend.

Mr. M.K. Choo suggested that the Society coordinate its activities with IGM to uplift the image of geologists so that we have some public standings.

Mr. Daud Muhamad suggested that the Society should consider employing an executive secretary considering the amount of work involved.

The Secretary's Report was passed on the proposal of Dr. Ibrahim Komoo and seconded by Mr. S.P. Sivam.

5. Editor's Report

Dr. G.H. Teh in his report stated that the *Warta Geologi* continue to come out regularly, Bulletin 36 and 37 are scheduled to be ready before the middle of 1996. A soft-cover edition of "*Geological Evolution of SE Asia*" by C.S. Hutchison was published by the Society in January 1996. The Poster on Rocks of Malaysia and the History of the Society brochure should be with the printers by the end of April 1996.

The Editor's Report was passed on the proposal of Ms. J.J. Pereira and seconded by Dr. Abdul Ghani Rafek.

6. Treasurer's and Honorary Auditor's Reports

Dr. C.P. Lee reported the financial positions of the Society continue to be strengthened with nett assets of RM585,305.99 as compared to RM516,342.00 in 1994. The relative large drop in income compared to 1994 was mainly due to the anomalous injection of funds in 1994 from our closing of the CPCEMR account and a reduction in interest on fixed deposits due to the timing of maturity dates.

Mr. S.P. Sivam voiced his unhappiness over the use of Society's fund to buy tables at dinners. Mr. Raghubir Rampal and Mr. M.K. Choo were of the opinion that there is nothing wrong with it if it helps to improve the Society's image and agreed that it should be left to the Council to decide but warned the Council not to overdo it.

The Treasurer's Report and the Honorary Auditor's Report were passed on the proposal of Dr. Ab. Rahim Samsudin and seconded by Dr. Shafeea Leman.

7. Election of Honorary Auditor 1996/97

The meeting reelected Mr. Lee Liew Fatt of S.F. Lee & Co., on the proposal of Dr. Ab. Rahim Samsudin and seconded by Dr. Abdul Ghani Rafek as Honorary Auditor for the 1996/97 session.

8. Announcement of New Council (1996/97)

The Council for 1996/97 shall be as listed below:

President	:	Khalid Ngah (PRSS)
Vice President	:	Ibrahim Komoo (UKM)
Secretary	:	Ahmad Tajuddin Ibrahim (UM)
Assistant Secretary	:	S. Paramanathan (Consultant)
Treasurer	:	Lee Chai Peng (UM)
Editor	:	Teh Guan Hoe (UM)
Councillors (2-years)	:	Abdul Ghani Rafek (UKM)
		Abdul Hadi Abd. Rahman (UM)
		Abdul Rahim Samsudin (UKM)
		Tan Boon Kong (UKM)
Councillors (1-year)	:	Khoo Kay Khean (JPKM)
		Hoh Swee Chee (PETRONAS)
		Ibrahim Abdullah (UKM)
		Mohd Shafeea Leman (UKM)
Immediate Past President	:	Fateh Chand (JPKM)

President's Report

May 1996–April 1997

I am pleased to report that the Society carried out its activities satisfactorily. Two major conferences: the Annual Geological Conference and the Petroleum Geology Conference, were organised successfully. About 120 participants attended the Annual Geological Conference in Kota Kinabalu, and 370 attended the Kuala Lumpur Petroleum Geology Conference. The successes of these conferences were made possible by the support of the Sabah state government and both oil and gas and mining companies in Malaysia. The ably stewardship of the chairmen of the two organising committees: Encik Jimmy Khoo and Encik Mohd Ali Sharif are equally recognised.

Similarly, the five working committees, each chaired by the council members or appointed members of the Society: Petroleum Geology (Encik Hoh Swee Chee), Tectonics and Structural Geology (Dr. Ibrahim Abdullah), Economic Geology (Dr. Yeap E. Beng), Stratigraphy and Sedimentology (Dr. Shafeea Leman) and Engineering Geology and Hydrogeology (En. Tan Boon Kong) and Promotion of Geosciences (Dr. Ibrahim Komoo) did their best to promote geosciences and profession, and several workshops, seminars and technical talks have been organised. The geoscience programme which attempted to promote geoscience awareness in schools, with the help of the Geological Survey Department (GSD), continued. I wish to take the opportunity to thank these chairmen for their continuous hardworking effort for making the workshops, seminars and technical talks successful. One new committee which was established last year: Environmental Geology (chaired by Dr. Nasiman) has formed its own team and it is hoped that some exciting programmes would be developed.

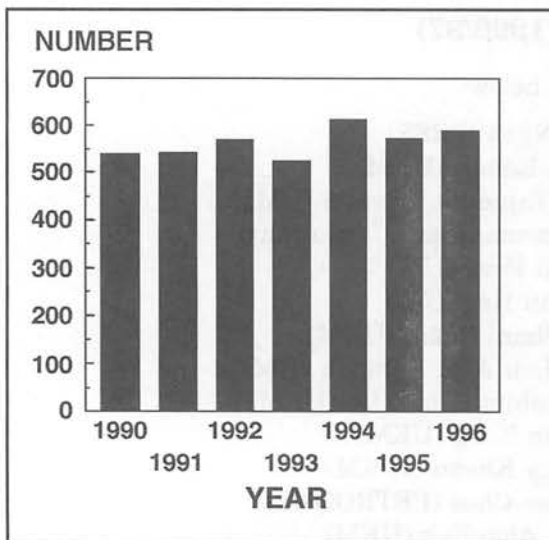


Figure 1

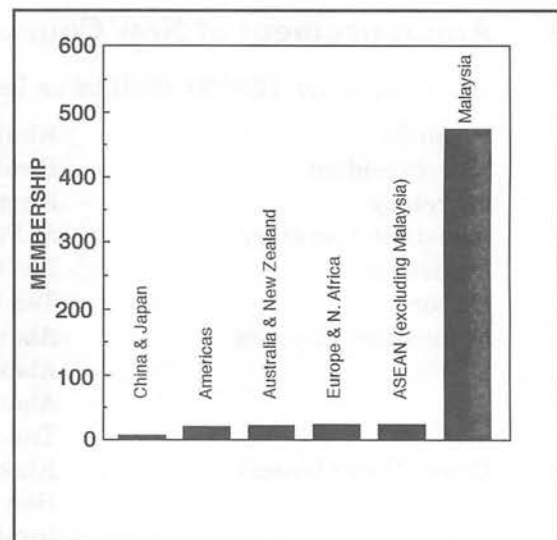


Figure 2

Every year for the past 18 years, the conference on Petroleum Geology generated good financial surpluses. This year however, the Petroleum Geology conference generated only a small surplus. This means that financing of other Society's activities would have to come from "interest on fixed deposit", which is not much, and membership subscriptions. If this small surplus is repeated, the Council would have to seek for alternative measures to support the activities. Such measures include:

1. future activities of the Society shall be self-financed, and
2. membership subscription would have to be increased.

The Society's membership shows some slight improvement (Figure 1), with the current number standing at 594, with about 80% Malaysians (Figure 2). This is indeed a healthy sign professionally, reflecting a global picture that the world is experiencing a shortage of geoscientists. Hopefully, this shortage would persist for some years, and subsequently would trigger more to take up geology and become members of the Society. I wish to thank many of you and the teachers of geosciences at the universities in encouraging their students to become members of the Society. However, we should not be contented with this small increase, and every effort must be made to maintain this momentum of "new membership drive".

On behalf of the Society, I would like to thank everyone present here today. I would also like to thank the universities, oil and mining companies, services companies and numerous other organisations for their kind and generous financial support to the Society and also to many other individuals who have supported the activities of the Society.

Finally, I wish to thank all Councillors who have given me their support and kind co-operation during my year as President of the Society, without whom the Society would not have achieved its objectives.

Thank you.

Khalid Ngah
President
26 April, 1997

Secretary's Report

1. The Council

Members of the Council of the Geological Society of Malaysia for the period 21 April 1996 to the 25 April 1997 are as follows:

President	: Khalid Ngah (PRSS)
Vice-President	: Ibrahim Komoo (Universiti Kebangsaan Malaysia) (resigned effective from 18.2.97)
Secretary	: Ahmad Tajuddin Ibrahim (University of Malaya)
Assistant Secretary	: S. Paramanathan (Consultant)
Treasurer	: Lee Chai Peng (University of Malaya)
Editor	: Teh Guan Hoe (University of Malaya)
Councillors (2-years)	: Abdul Ghani Rafek (Universiti Kebangsaan Malaysia) Abdul Hadi Abd. Rahman (University of Malaya) Abdul Rahim Samsudin (Universiti Kebangsaan Malaysia)
	Tan Boon Kong (Universiti Kebangsaan Malaysia) (resigned effective from 30.10.96)
Councillors (1-year)	: Khoo Kay Khean (Geological Survey Department Malaysia)
	Hoh Swee Chee (PETRONAS) Ibrahim Abdullah (Universiti Kebangsaan Malaysia) Mohd. Shafeea Leman (Universiti Kebangsaan Malaysia)
Immediate Past President	: Fateh Chand (Geological Survey Department Malaysia)

2. Council Meetings

Council Meetings were held almost every month throughout the 1996/97 session except during the fasting month. A total of 11 Council Meetings have been held. Attendance of Council Members at these meetings are satisfactory as shown in Appendix 1.

3. Membership

The total membership of the Society as at 31 December 1996 is at 594 showing an increase from the previous year's total of 579. Full Members and Life Members have increased to 343 and 97 respectively. Details of the various classes of memberships and their geographical distributions are shown in Appendix 2.

4. Society Activities

The Annual Geological Conference 1996 was successfully held at the Shangri-La's Tanjung Aru Resort, Kota Kinabalu on the 8-9 May 1996. The Conference was preceded by two one-day field trips on the 6 and 7 May 1996 studying structural geology and economic geology on the way to and around Ranau. A 3-day post-conference field trip was also held to study the geology of Gunung Kinabalu. The Young Geoscientist Award 1995 to Mr. Ng Tham Fatt was also given at this Conference. This

Conference was generously supported by mining, consulting and related services companies.

The Second Annual Petroleum Geology Conference was also successfully organised at the newly opened Renaissance Kuala Lumpur Hotel on the 9-10 December 1996. The Geoscientist Award was given away to Mohamad Yamin of PRSS at this Conference. The various winners of the 2nd Photographic Competition also received their prizes at this Conference. This Conference was generously supported by the petroleum and petroleum services companies.

The Society also jointly organised the "*Seminar Geologi dan Sekitaran*" with the Geology Department, Universiti Kebangsaan at the Puri Pujangga, Universiti Kebangsaan Malaysia. It was also attended by a number of non-geologists. We were also involved in jointly organising the "*2nd International Conference on Environmental Chemistry and Geochemistry in the Tropics — GEOTROP-97*" with the University of Malaya and the Society for Environmental Geochemistry and Health (SEGH) held at the University of Malaya on the 7-11 April 1996. Two members of the Society presented papers at this Conference. A Public Lecture was also held at the Planetarium Negara on the 15 May 1996.

The Working Groups have also organised a number of activities. Among them was the Workshop and Fieldtrip on Murau Conglomerate, Site Visit to Shah Alam Highway, Forum on Geohazards: Landslides & Subsidence and Site Visit to Putra Jaya.

The Organising Committee has already started work to organise the GEOSEA '98. The First Announcement and later the First Circular for this event have already been distributed. The Honourable Minister for Primary Industries, Y.B. Datuk Seri Dr. Lim Keng Yaik has agreed to be the Congress Patron.

A total of 24 technical talks were held during the 1996/97 session. Details of the Society's activities can be seen in Appendix 3. Among other future activities that are already scheduled or planned are the Annual Geological Conference 1997 (31 May and 1 June 1997 at the Awana Kijal Beach & Golf Resort, Kemaman, Terengganu) and the 3rd Petroleum Geology Conference (24-25 November 1997).

5. Publications

Sales of publications remain as slow as in previous years. The remaining stock and sales made during the 1996 is as shown in Appendix 4. The Society continued to maintain a publication exchange with various professional bodies and libraries from various parts of the world.

6. Acknowledgements

The Society would like to acknowledge with thanks the generous cooperation and sponsorships received from companies, professional societies, government departments and agencies, universities and institutions; the Head of the Department of Geology, University of Malaya where the Society is housed and where most of the activities were held and the numerous individuals and Councillors who have contributed in one way or another to the Society's Activities.

Ahmad Tajuddin Ibrahim
Secretary

Appendix 3

Society Activities 1996/97

No.	Date	Event/Speaker/Venue
1	24 April 1996	Technical Talk 1: <i>Refining Models of Hydrocarbon Migration and Entrapment Using Stable Isotope and Fluid Inclusion Analysis: Case Studies in Carbonate Reservoirs</i> by Dr. B.W. Sellwood, The University of Reading at the Geology Department, University of Malaya.
2	3 May 1996	Workshop on <i>Murau Conglomerate</i> jointly organised by the Working Group on Tectonics & Structural Geology and the Geology Department UKM held at the Geology Department, University Kebangsaan Malaysia.
3	4-5 May 1996	Fieldtrip on <i>Murau Conglomerate</i> in Mersing area.
4	8 May 1996	Technical Talk 2: <i>Fate of Toxic Pollutants in Contaminated Soils and Sediments: Threat Assessment and Abatement</i> by Dr. R.N. Yong, McGill University, Canada at the Geology Department, University of Malaya.
5	7 May 1996	Technical Talk 3: <i>Engineering Geology of Aggregates and Stone in Hong Kong</i> by Dr. T.Y. Irfan, Geotechnical Engineering Office, Hong Kong at the Geology Department, University of Malaya.
6	15 May 1996	Public Lecture on ' <i>Fosil dan Rekod Sejarah Silam Malaysia</i> ' by Dr. C.P. Lee at the Planetarium Negara organised by the Committee for the Promotion of Geoscience.
7	17 May 1996	Technical Talk 4: <i>Regional Gravity and Magnetic Investigations of the Eromanga Basin, NSW, Australia for Hydrocarbon Exploration</i> by Dr. Clive Foss, Encom Technology Pty. Ltd., Australia at the Geology Department, University of Malaya.
8	6 June 1996	Pre-Conference Field Trip 1 on <i>Structural Geology</i> around Ranau and Poring, Sabah.
9	7 June 1996	Pre-Conference Field Trip 2 on <i>Economic Geology</i> around Mamut.
10	8-9 June 1996	Annual Geological Conference 1996 at the Shangri-La's Tanjung Aru Resort, Kota Kinabalu.
11	10-12 June 1996	Post-Conference Field Trip to <i>Gunung Kinabalu</i> .
12	28 June 1996	Technical Talk 5: <i>Quantitative Prediction of Sandstone Reservoir Quality with the Exemplar System</i> by Robert H. Lander at the Geology Department, University of Malaya.
13	12 July 1996	Technical Talk 6: <i>Preliminary Investigations of Ground Subsidence at Persiaran Lidcol, Off Jalan Yap Kwan Seng, Kuala Lumpur</i> by Ir. Dr. Gue See Sew, SSP Geotechnics Sdn. Bhd. At the Geology Department, University of Malaya.
14	15 July 1996	Technical Talk 7: <i>Anomalous Pressure: Key to Unlocking Unconventional Hydrocarbon Resources</i> by Dr. Ronald C. Surdam at the Geology Department, University of Malaya.

Appendix 3 (cont'd) Society Activities 1996/97

No.	Date	Event/Speaker/Venue
15	19 July 1996	Technical Talk 8: <i>Project Shah Alam Expressway: Geology, Soils & Ground Treatment</i> by Dr.-Ing. V.R. Raju, Keller (M) Sdn. Bhd. At the Geology Department, University of Malaya.
16	20 July 1996	Site Visit to <i>Shah Alam Highway</i> organised by the Working Group on Engineering Geology.
17	22 July 1996	Technical Talk 9: <i>Multiple Collision on the Southeast Margin of Sundaland: The Tectonic Evolution of Sulawesi</i> by Dr. A. Barber at the Geology Department, University of Malaya, Kuala Lumpur.
18	26 July 1996	Technical Talk 10: <i>Investigations of the Debris Flow at the Genting Highland Slip Road</i> by Mr. Chow Weng Sum, Geological Survey Malaysia Ipoh at the Geology Department, University of Malaya.
19	30 July 1996	Technical Talk 11: <i>Ore Fluid Chemistry & Genetic Significance of Hydrothermal Processes: Examples from Australian & Myanmar Gold & Base Metal Deposits</i> by Dr. Khin Zaw, University of Tasmania at the Geology Department, University of Malaya.
20	10 September 1996	Technical Talk 12: <i>Investigations, Monitoring and Control of Landslides in Japan</i> by Dr. Masakazu Takahashi, OYO Corp., Tokyo at the Geology Department, University of Malaya.
21	7 October 1996	Technical Talk 13: <i>Accumulation of Organic Rich Sediments in a Dendritic Fluvial/Lacustrine Mire System at Tasik Bera: Implications for Coal</i> by Steve Philips & Marc Bustin, The University of British Columbia at the Geology Department, University of Malaya.
22	22 October 1996	Forum on ' <i>Geohazards: Landslides & Subsidence</i> ' organised by the Working Group on Engineering Geology at the Geology Department, University Malaya.
23	23 November– 1 December 1996	Fossil Hunting (National Science Fiesta) organised by the Committee for the Promotion of Geoscience at the Taman Tasik Perdana, Kuala Lumpur.
24	6 December 1996	Site Visit to <i>Putra Jaya</i> organised by the Working Group on Environmental Geology.
25	7–8 December 1996	Seminar <i>Geologi dan Sekitaran</i> at UKM Bangi jointly organised with the Geology Department UKM and the Department of Environment, Ministry of Science, Technology and Environment, Malaysia.
26	9–10 December 1996	Petroleum Geology Conference at the Renaissance Kuala Lumpur Hotel.
27	20 January 1997	Technical Talk 14: <i>Karst Topography and Limestone Caves</i> by Dr. David Shaw Gillieson of the Australian Defence Academy, Canberra, Australian at the Geological Survey Department, Ipoh.

Appendix 3 (cont'd)

Society Activities 1996/97

No.	Date	Event/Speaker/Venue
28	24 February 1997	Technical Talk 15: <i>Stability of the Slope Cuts in the Rawang-Tanjung Malim Area</i> by Mr. I.J. Sta Maria of the University of Malaya at the Geology Department, University of Malaya.
29	24 February 1997	Technical Talk 16: <i>Kajian Kestabilan Cerun Kawasan Genting Highlands</i> by Mr. Qalam Azad Rosle of the University of Malaya at the Geology Department, University of Malaya.
30	3 March 1997	Technical Talk 17: <i>Types of Carbonate Karsts in the Tropics, Their Origin, Detection and Geotechnical Significance</i> by Dr. E.B. Yeap of the University of Malaya at the Geology Department, University of Malaya.
31	3 March 1997	Technical Talk 18: <i>Treatment of Mining Slurries by Flocculation of Suspended Solids and Heavy Metals</i> by Dr. B.K. Tan of the University of Malaya at the Geology Department, University of Malaya.
32	10 March 1997	Technical Talk 19: <i>Dam-Induced Seismicity of Kenyir</i> by Mrs. Che Noorliza Lat of the University of Malaya at the Geology Department, University of Malaya.
33	10 March 1997	Technical Talk 20: <i>Cavemen of Langkawi</i> by Dr. C.P. Lee of the University of Malaya at the Geology Department, University of Malaya.
34	17 March 1997	Technical Talk 21: <i>Posers Over the Evolution of Northwest Borneo: Waltz, Jazz or Mumbo Jumbo</i> by Dr. Azhar Hj. Hussin of the University of Malaya at the Geology Department, University of Malaya.
35	17 March 1997	Technical Talk 22: <i>Paleogeographic and Tectonic Controls on Tertiary Sedimentation in Northwest Sarawak</i> by Dr. Abdul Hadi A. Rahman of the University of Malaya at the Geology Department, University of Malaya.
36	3 April 1997	Technical Talk 23: <i>Petroleum Prospect in Tanzania</i> by Dr. Mohd Zahoor Farshori jointly organised with the Geology Department, Universiti Kebangsaan Malaysia held at the Geology Department, Universiti Kebangsaan Malaysia, Bangi.
37	7-11 April 1997	2nd International Conference on Environmental Chemistry and Geochemistry in the Tropics — GEOTROP-97 jointly organised with the Soc. For Environmental Geochemistry and Health (SEGH) and the University of Malaya held at the University of Malaya.
38	23 April 1997	Technical Talk 24: <i>Evaluation of Low Resistivity, Low Contrast Productive Reservoir in the Malaysian Fields</i> by Mr. Ahmad Sharby Abd. Hamid of the PETRONAS Research & Scientific Services Sdn. Bhd. at the Geology Department, University of Malaya.

Appendix 4 Stock of Publications

BULLETIN NO./PUBLICATION	SALES 1996	STOCK REMAINING
2	5	293
3	8	300
4	7	161
5	6	64
6	76	524
7	8	338
8	5	19
11	4	98
13	4	135
15	4	56
16	5	76
17	2	143
18	3	127
19	24	637
20	24	484
21	3	251
22	3	313
23	3	313
24	3	484
25	2	263
26	4	306
27	4	187
28	3	185
29	5	179
30	7	281
31	5	193
32	5	233
33	15	353
34	11	157
35	14	161
36	600*	200
Abstracts (Bulletin 6)	—	5
Stratigraphic Correlation	38	291
Rocks and Minerals Poster	104	896
Geological Evolution of SEA (CSH)	82	518

*inclusive of free copies distributed to Members

Editor's Report 1996/97

The Society's newsletter, the *Warta Geologi*, continued to be published regularly. The latest, Vol. 23 No. 1 (Jan-Feb 1997), is with the printers. There is an urgent need for geological notes for the 1997 issues. It is hoped that more members will come forward to contribute articles, reports or other useful information.

Bulletin 36 was available in November 1996. *Bulletins 37, 38, 39 and 40* are scheduled to be available by the middle of 1997.

The *Common Rocks of Malaysia* poster was available in September 1996 and the *History of the Society* brochure is with the printers. The Society's 1997 table top calendar with a selection of photographs from the Society's previous photographic competitions was available in December 1996.

The Society is grateful to the many authors for their valuable contributions, the donors and advertisers for their valuable financial contributions to the Society's Funds.

Special thanks are due to Ng Tham Fatt and A.K. Fan for assistance in the various editorial processes. The contributions of members of the Editorial Subcommittee and reviewers and advice of members of the Editorial Advisory Board are greatly appreciated.

G.H. Teh
Editor

Treasurer's Report 1996

The Society's nett assets have increased to RM585,305.99 in 1995 from RM516,342.00 in 1994 with an excess of income over expenditure of RM63,462.50. A major contribution towards our income was RM97,576.18 from AAPG for our contribution in the organising of the AAPG-GSM Conference in 1994.

The relative large drop in income compared to 1994 is mainly caused by the anomalous injection of funds in 1994 from our closing of the CPCEMR account and a reduction in interest on fixed deposits due to timing of maturity dates. The large drop in comparative expenditure is mainly due to the timing of payments for printing the Bulletin.

The Society is most grateful and expresses its sincere thanks to our faithful supporters who have continued to contribute generously to the Society. We would also like to thank our Honorary Auditor, Mr. Lee Sin Fatt for auditing our accounts.

Lee Chai Peng
Treasurer
15.4.1997

**Auditors' Report
to the Council of Persatuan Geologi Malaysia
(Geological Society of Malaysia)**

We have audited the accounts set out on pages 2 to 3 in accordance with approved auditing standards.

In our opinion, the accounts give a true and fair view of the state of affairs of the Society as at 31st December, 1996 and of its income and expenditure and receipts and payments for the year ended on that date.

Signed

S.F. LEE & CO.
(AF: 0670)
Public Accountant

Signed

LEE SIEW FATT
(1179/9/98J)
Public Accountant

Kuala Lumpur
Date: 25 April 1997

PERSATUAN GEOLOGI MALAYSIA
(Geological Society Of Malaysia)

**Income and Expenditure Account for the Year
Ended 31 December 1996**

INCOME	<u>1995</u>	<u>1996</u>
	RM	RM
Accruals	600.00	-
AAPG-GSM	97,576.18	-
Entrance fees	920.00	1,017.23
Interest on fixed deposits	16,471.32	21,835.75
Subscriptions	22,110.37	23,614.11
Sales of publications	11,589.55	7,904.34
PGC '95: Donation	-	42,924.21
Fax	-	563.16
Xerox	1,241.16	1,189.02
Souvenirs	-	111.00
Study groups	432.83	-
	<u>150,341.41</u>	<u>99,157.82</u>
 EXPENDITURE		
Audit fee	500.00	500.00
Annual dinner	3,020.00	2,880.00
Annual Conference	16,737.99	21,589.18
E-mail	-	2,985.00
Bank charges	195.76	562.10
Honorarium	9,679.00	7,001.00
Postage	8,319.10	6,480.77
Science Fun Fiesta	-	1,000.00
Printing and Stationary:		
— Miscellaneous	2,068.55	9,288.35
— Bulletin	19.90	15,080.00
— Warta Geologi	10,999.10	15,254.25
Refreshments	1,259.67	3,078.58
Refund: Professional Membership	160.00	-
Study groups	-	693.99
Sundry expenses	3,283.10	1,733.30
Speakers' account	3,918.41	5,068.89
Subscription: Professional bodies	122.57	225.58
Sirim meeting	-	101.70
Telephone	784.40	353.98
Telefax	229.50	-
Depreciation on fixed assets	3,156.25	4,360.62
Batik shirts	4,542.00	-
Souvenirs	9,957.00	-
GEOSEA: Manila	976.61	-
Academy of Sciences	1,900.00	-
Air-conditioner	4,150.00	-
Seminar Geologi Abad	1,000.00	-
Geochemistry in the tropics	-	2,000.00
Geoscientist Award	-	260.00
Photo competition	-	2,800.00
	<u>86,878.91</u>	<u>103,297.29</u>
EXCESS OF EXPENDITURE OVER INCOME:		
Transfer to capital fund	<u>63,462.50</u>	<u>-4,139.47</u>

PERSATUAN GEOLOGI MALAYSIA
(Geological Society Of Malaysia)

Balance Sheet As At 31 December 1996

	<u>1995</u>	<u>1996</u>
	RM	RM
FIXED ASSET	28,406.24	39,245.62
CURRENT ASSETS		
Fixed Deposits with licensed banks	496,787.78	508,191.11
Deposit and prepayment	1,401.39	18,380.01
Cash and bank balances	59,210.58	46,694.35
	<u>557,399.75</u>	<u>573,265.47</u>
CURRENT LIABILITY		
Other creditors & accruals	<u>500.00</u>	—
	<u>556,899.75</u>	—
NET CURRENT ASSETS	<u>585,305.99</u>	<u>612,511.09</u>
FINANCED BY:		
ACCUMULATED FUND		
Balance brought forward	505,294.66	569,257.16
Surplus/Deficit for the year	63,462.50	-4,139.47
Young Geoscientist Award	3,442.83	3,142.83
Student Loan Fund	3,405.36	2,705.36
Petroleum Geology Seminar '95/'96	9,700.64	41,545.21
	<u>585,305.99</u>	<u>612,511.09</u>

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Cameca SX100 EPMA



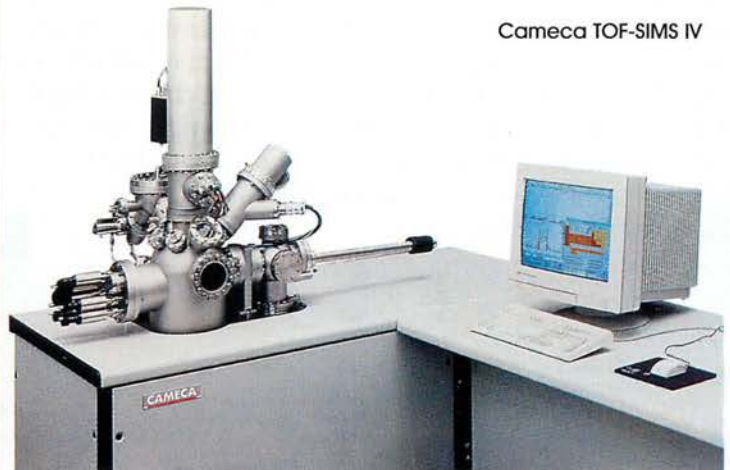
LEO 435VP Variable Pressure SEM



LEO 910 TEM



Cameca TOF-SIMS IV



● Research Optical Microscopy

● Scanning Electron Microscopy (SEM)

● Secondary Ion Mass Spectrometry (SIMS)

● Scanning Acoustic Microscopy

● Transmission Electron Microscopy (TEM)

● Electron Probe Microanalysis (EPMA)

● Infrared Microscopy

● X-Ray Microanalysis System (EDX, WDX)

● Vacuum Technology (Pumps, Leak Detectors, Components)

● XYZ Measurement Microscopy

● Scanning Probe Microscopy (STM, AFM)

● Thin Film and CD Measurement

● Confocal Laser Scanning Microscopy

● Real Time Micro-Focus X-Ray Imaging

● Image Processing and Analysis



HI-TECH INSTRUMENTS SDN BHD

9A Jalan USJ 11/3, 47620 UEP Subang Jaya, Selangor Darul Ehsan, Malaysia.
Tel : 603-737-0980 Fax : 603-737-0950

29 Lorong Helang Dua, Desa Permai Indah, 11700 Penang, Malaysia.
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Schlumberger's New Fullbore Formation MicroImager Doubles Your Coverage With Core-Like Clarity

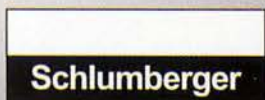
The FMI* fullbore electrical imaging tool makes evaluation of complex reservoirs simpler and quicker than ever before. Its 192 microelectrical sensors give you twice the coverage of previous tools and improved spatial resolution, to 0.2 inches.

The fullbore images enable direct structural analysis and characterization of sedimentary bodies even in extremely complex sequences. The fine detail provided by FMI images allows determination of paleocurrents and rock anisotropy, including the recognition of permeability barriers and paths. And determination of net-to-gross ratio in thin bed sand/shale sequences is automatic.

Understanding the internal structure of the rock can confirm hypotheses regarding its geological evolution and can provide valuable clues to geologists and engineers regarding local porosity and permeability changes. This is possible with the enhanced textural analysis from the new high-resolution sensors, as well as detailed evaluation of fracture networks and other secondary porosity.

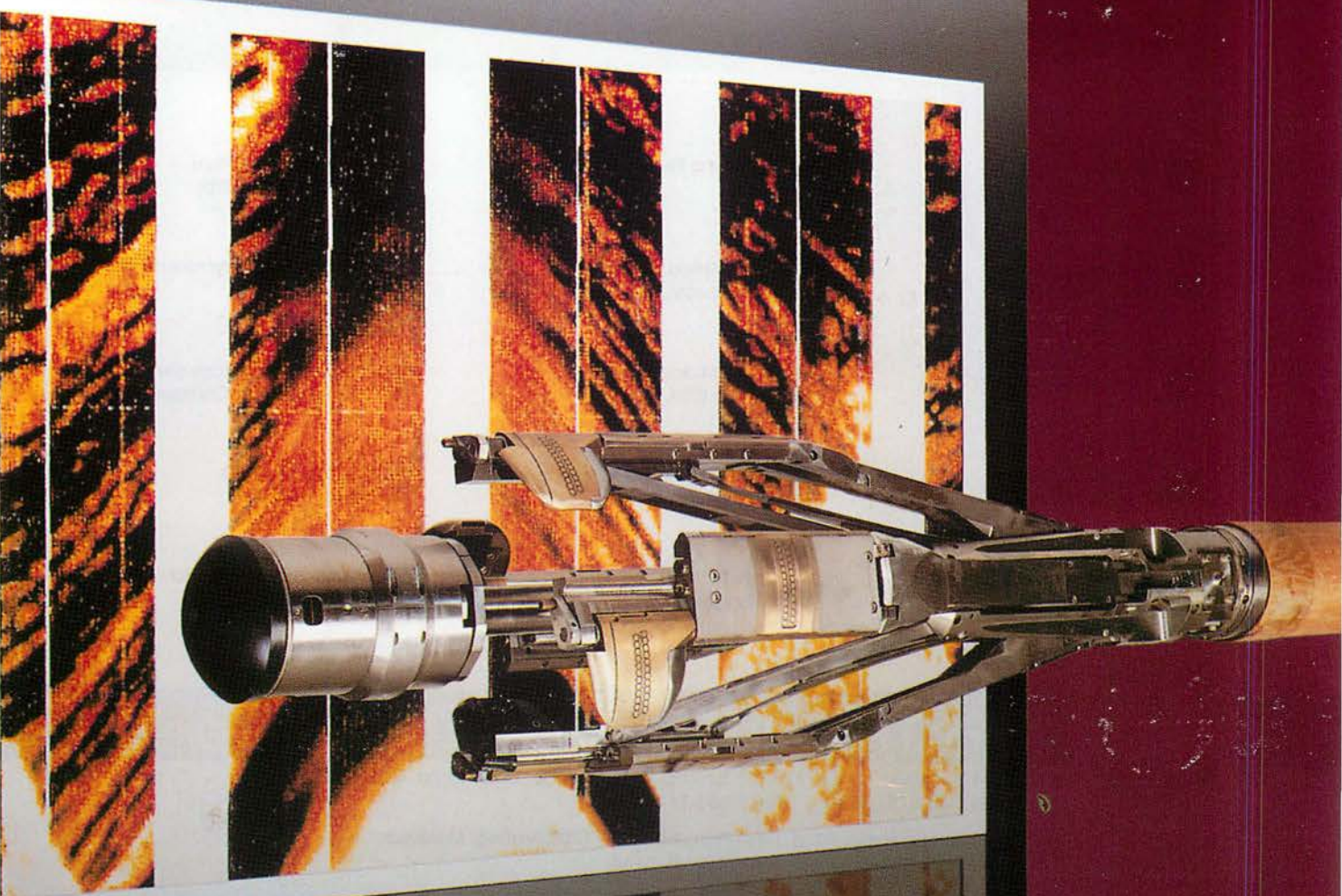
Ask to see an example of the new FMI log. You'll be looking at the clearest, most complete picture of the rock available today.

Schlumberger (Malaysia) Sdn. Bhd., 32nd Floor, Menara Promet
Jalan Sultan Ismail, 50250 Kuala Lumpur, Malaysia.
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Value is the difference.

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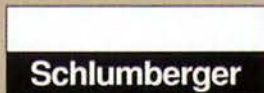
The Schlumberger Ultrasonic Borehole Imager Detects Openhole Problems and Fractures, Even in Oil-Base Muds.

Accurate, high-resolution, acoustic measurements by the UBI* Ultrasonic Borehole Imager let you examine an openhole for stability problems, deformation and fractures when nonconductive, oil-base muds prevent resistivity measurements. On the same trip, the UBI rotating transducer can check for corrosion and mechanical wear of the internal surface of the casing as the tool is pulled out of the hole.

No other borehole measurement gives you the thin-bed resolution you get with the UBI tool. The images, cross-section plots and pseudo-3D "spiral" plots generated from UBI measurements also reveal keyseats, breakouts, shear sliding and shale alteration to help you avoid the added drilling costs that result from stuck pipe and lost time or equipment. In addition, you get horizontal stress information for mechanical properties evaluations to predict breakouts and perforation stability in unconsolidated sands.

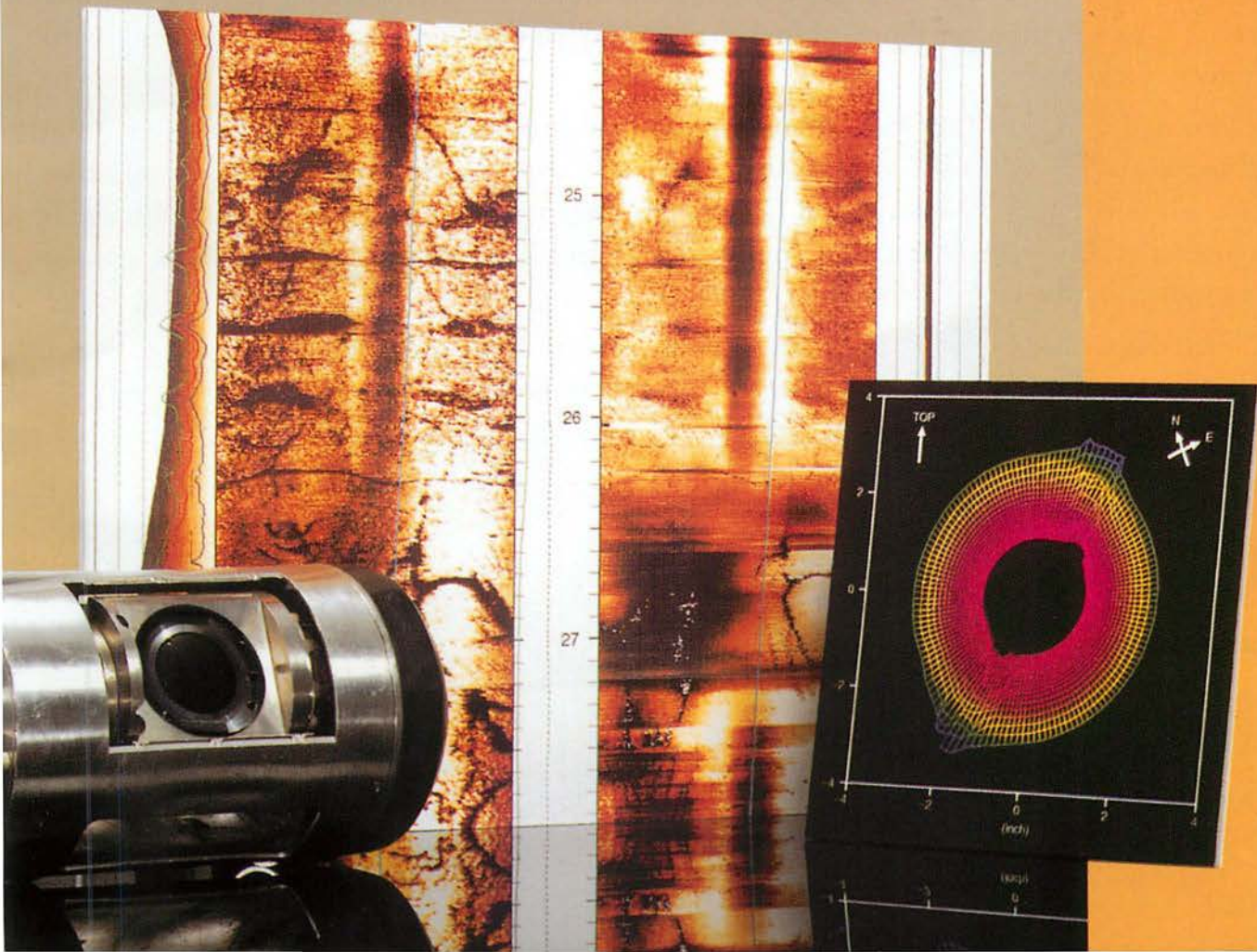
Talk to your Schlumberger representative about detecting openhole problems and fractures acoustically, even in oil-base muds. What UBI images show you could save you time, expense or possibly your well.

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Value is the difference.

Mark of Schlumberger—the UBI tool is a MAXIS 500 tool



GEOSEA '98

ANNOUNCEMENT

Ninth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia

Kuala Lumpur, Malaysia • 17–19 August 1998

The Geological Society of Malaysia is organising the GEOSEA '98 in Kuala Lumpur from 17 to 19 August 1998. The GEOSEA Congress is held triennially in Southeast Asia and it offers an excellent opportunity to exchange scientific and technical information and advancement in geology, mineral and energy resources among geoscientists from within and outside the region. The GEOSEA Congress is a premier geoscientific event in the region and has been well attended by the geoscientific community world-wide.

The technical program of GEOSEA '98 consists of oral and poster presentations on geology and related aspects of the GEOSEA core region – Brunei, Cambodia, Indonesia, Hong Kong, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Thailand and Vietnam. A scientific and technical exhibition will run concurrently with GEOSEA '98, displaying the latest state-of-the-art products and systems.

Other related activities include pre- and post-conference workshops, short courses and geological fieldtrips. Social events and tours for delegates are also available.

Make a note in your diary and join us in Kuala Lumpur for GEOSEA '98.

For further information, please contact:



The Organising Secretary,
GEOSEA '98
Geological Society of Malaysia
c/o Department of Geology,
University of Malaya,
50603 Kuala Lumpur
Malaysia
Tel: +(603) 757 7036
Fax: +(603) 756 3900
Email: geologi@po.jaring.my



GEOLOGICAL
SOCIETY OF
MALAYSIA

Look out for the First Circular
due to be out in January 1997

Council For 1997/98

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| Vice-President | : | Khoo Kay Khean
<i>(Geological Survey Department Malaysia)</i> |
| Secretary | : | Ahmad Tajuddin Ibrahim
<i>(University of Malaya)</i> |
| Assistant Secretary | : | S. Paramanathan
<i>(Consultant)</i> |
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Abdul Rahim Samsudin
<i>(Universiti Kebangsaan Malaysia)</i>
Abdul Hadi Abd. Rahman
<i>(University of Malaya)</i>
(one vacant) |
| Immediate Past President | : | Fateh Chand
<i>(Geological Survey Department Malaysia)</i> |

Common Rocks of Malaysia

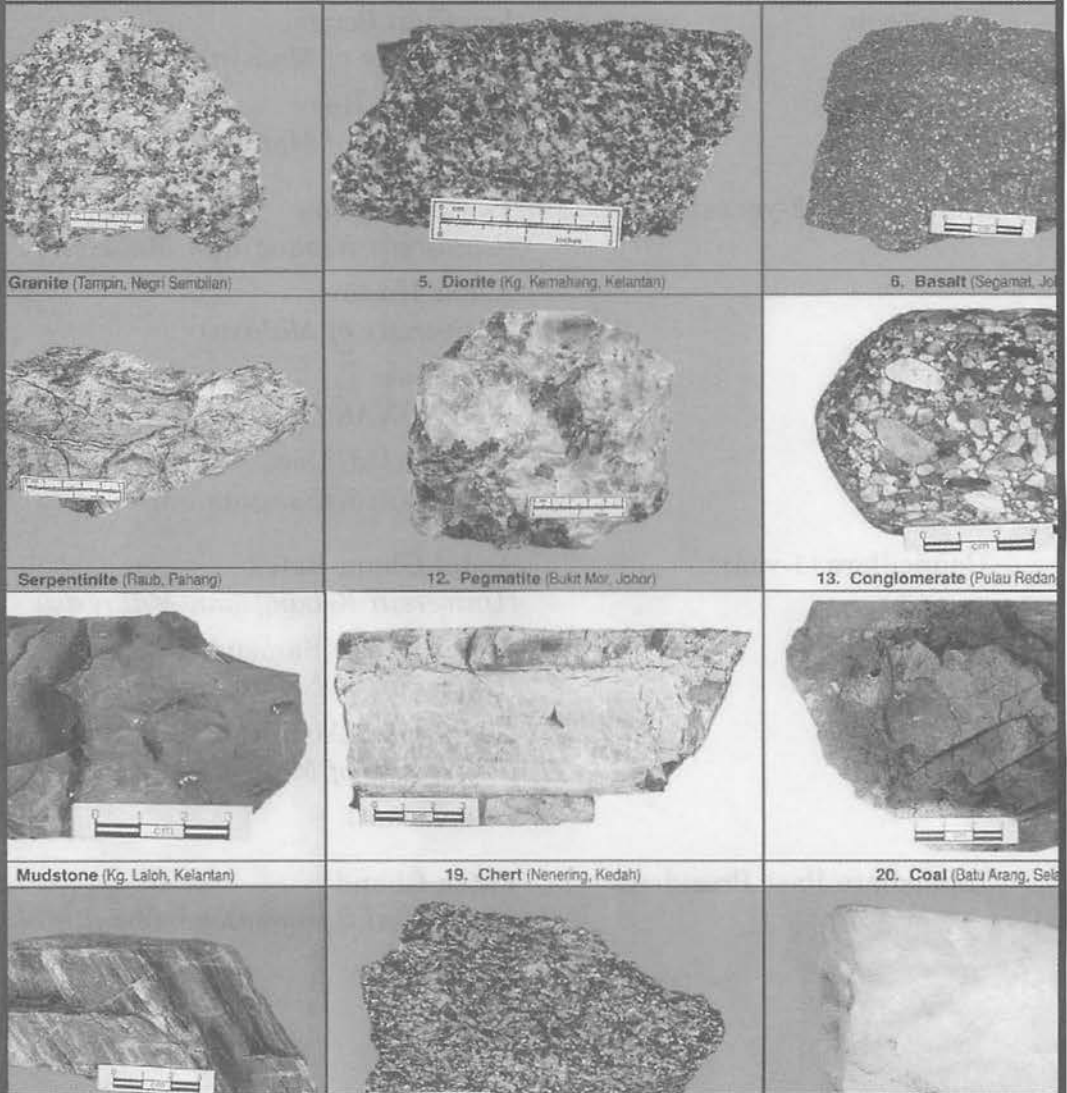
A full colour poster illustrating 28 common rocks of Malaysia. With concise description of the features and characteristics of each rock type including common textures of igneous, sedimentary and metamorphic rocks.

Laminated

Size: 94 cm x 66 cm (42" x 26")

Price: Student members RM7.00 (one copy per member, subsequent copies RM10.00 each)
 Members RM8.00 (one copy per member, subsequent copies RM10.00 each)
 Non-members RM10.00 per copy

COMMON ROCKS



Cheques, Money Orders or Bank Drafts must accompany all orders. Orders will be invoiced for postage and bank charges. Orders should be addressed to:

ORDERS

The Hon. Assistant Secretary
GEOLOGICAL SOCIETY OF MALAYSIA
 c/o Dept. of Geology, University of Malaya
 50603 Kuala Lumpur, MALAYSIA

BERITA-BERITA PERSATUAN News of the Society

KEAHLIAN (Membership)

The following applications for membership were approved:

Full Members

- | | |
|---|---|
| 1. Gregory Kyan-Nyein
34 Sexton Road, Inglewood 6052 Perth,
Australia. | 3. Badrul Hashim Ibrahim
21 Jln Hilir 3, Taman Angsana, 55100
Kuala Lumpur. |
| 2. Wan Izham Wan Ibrahim
60 Lorong Dato' Amar Off Persiaran Raja
Muda Musa, 41100 Kelang. | |

Institutional Member

1. FINA Exploration Minh Hai B.V.
c8/198, Hoang Van Thu Street, Phu Nhuan
District, Ho Chi Minh City, Vietnam.

Student Members

- | | |
|---|--|
| 1. Mohamad Faizul Saat
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 5. Rosli Adenan
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. |
| 2. Siti Hassulaini Abdul Rahman
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 6. Dzulina Mohd Ramli
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. |
| 3. Zuhaini Mohamed
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 7. Mohammed Ismael Abu-Shariah
Jabatan Geologi, Universiti Kebangsaan
Malaysia, 43600 Bangi. |
| 4. Lin Fah Kang
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | |

PETUKARAN ALAMAT (Change of Address)

The following members have informed the Society of their new addresses:

- | | |
|--|---|
| 1. Aw Peck Chin
11, Jalan Pendek, Ipoh Garden, 31400 Ipoh,
Perak. | 4. Mark Alex Sanders
17 Maes Gweryl, Gyffin, Cowwy, LL32
8RU, Wales, U.K. |
| 2. Mohd Redzuan bin Mohd Ramli
23 Persiaran Bekor 1, Taman Buluh Emas,
30100 Ipoh, Perak Darul Ridzuan | 5. Emeliana Rice-Oxley
UENC/5, Shell UK Exploration &
Production, Shell Mex House, Strand
WC2R ODX, England. |
| 3. Tim Morison
20 Kenny Street, Mosman park 6012,
Western Australia | |

PERTAMBAHAN BAHARU PERPUSTAKAAN (New Library Additions)

The Society has received the following publications:

- | | |
|---|---|
| 1. SOPAC Newsletter, vol. 13, no. 4, 1996. | 12. Bulletin of the Geological Survey of Japan,
vol. 47, nos. 9–11, 1996. |
| 2. Monthly statistics on mining industry in
Malaysia, December 1996. | 13. Katoomba: geological map 1:50,000 (1997). |
| 3. Geoscience, vol. 10, nos. 1–3, 1996. | 14. Layers of time: the Blue Mountains and
their geology. |
| 4. AAPG Explorer, January, February,
March, April 1997. | 15. Quarterly Notes: Geological Survey of New
South Wales, 1996. |
| 5. Tin International, vol. 69, no. 9, 1996. | 16. Explanatory Notes: Narramine geological
sheet 1:250,000 (1996). |
| 6. Journal of Hebei College of Geology, vol.
19, no. 5, 1996. | 17. SOPAC: proceedings of the 25th session,
1996. |
| 7. Acta Geoscientia Sinica, vol. 17, nos. 2, 3, 4,
1996. | 18. Episodes, vol. 19, no. 3, 1996. |
| 8. AAPG Bulletin, vol. 81, nos. 1, 3 & 4, 1997
and vol. 80/11, 1996. | 19. Humans and Nature, no. 7, 1996. |
| 9. American Museum Novitates, nos. 3/86 &
3/87, 1996. | 20. Nature and Human Activities, vol. 1, 1996. |
| 10. Monthly statistics on mining industry
in Malaysia, October and November
1996. | 21. U.S.G.S. Bulletin 1996: nos. 1995-M, N, O,
2125, 2000-0, 2155, 1995-P, Q. |
| 11. American Museum Novitates, nos. 3189,
3191, 3192, 3193 (1997). | 22. U.S. Geological Survey Circular: (1997):
1138; (1996): 1126. |
| | 23. U.S. Geological Survey Professional Paper:
1996: 1565-B, 1550-A, 1410-B, 1566. |

BERITA-BERITA LAIN Other News

Local News

Development of Penang Hill to be in harmony with environment

The draft of the Penang Hill Local Plan has proposed that the development of the hill be in harmony with the environment, incorporating such elements as reforestation, a cable car system, heritage area and tree-top walkways.

The plan, which took five years to complete, has suggested that the hill be promoted for its "interesting and appealing cultural history" and eco-tourism.

Chief Minister Tan Sri Dr. Koh Tsu Koon unveiled the plan at City Hall at the Esplanade for public view and comments. The draft plan also proposed improving transportation by upgrading the funicular railway and building a cable car link between the Youth Park at the foothill and "Valley of JKR" (PWD quarters) at the hilltop.

To bring in the tourist dollar, four hotels, including a "high-class hotel" will be built. There will also be two dormitories for the low-budget visitor.

The plan also calls for retail shops, a visitor information centre, and heritage walkways.

In line with the State's call for sustainable development, the plan proposes forest and tree-top walkways for nature lovers and conservationists.

A reforestation exercise and landscaping have also been mooted.

Koh, speaking to reporters, said the hill which was the "symbol of Penang" had to be developed but the State would ensure that this was done in a controlled manner.

He also said the attractions atop the hill needed to be upgraded.

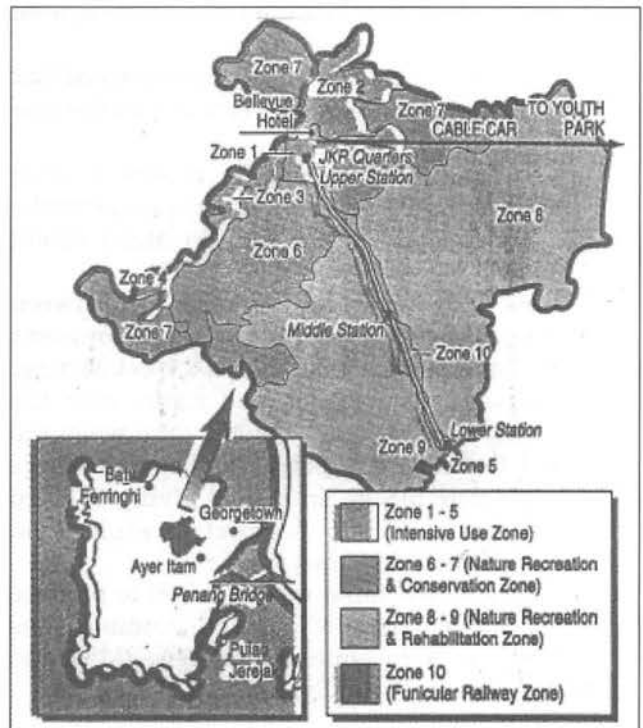
"Penang Hill is an asset to the State as it is the last tropical forest left on the island."

"We need to develop the hill and improve facilities but it must be a balanced development."

Present at the launch of the plan were State Tourism Committee chairman Datuk Kee Phaik, Penang Island Municipal Council president Dr. Teng Hock Nan, Town and Country Planning deputy director-general (development) Datuk Wan Mohamad Mukhtar Mohd Noor and Sahabat Alam Malaysia president S.M. Mohd Idris.

Koh said the draft plan would be on display for 30 days but it could be extended another 30 days if there was a need.

Meanwhile, Dr. Teng said the hill would be divided into four zones — intensive use, nature recreation and conservation, nature recreation and rehabilitations, and funicular railway.



He added that the railway would be the main mode of transport up the hill.

The draft plan, which covers 464.14 ha of Penang Hill, has identified it as an area with special characteristics in terms of flora, topography and heritage and specifies that any development must be carefully planned to preserve these identities.

The State Government had requested the Town and Country Planning Department draw up guidelines to ensure balanced and systematic development at the hill.

This was done following widespread protests against a hill development plan submitted by consortium Bukit Pinang Leisure Sdn. Bhd. in 1989.

Two environmental impact assessment reports by the consortium were also rejected by the Department of Environment in May 1991 and January 1992, respectively.

Besides the Penang Hill Local Plan, Koh said the council was also considering four other local plans. They are for Tanjung Tokong, Tanjung Bunga, Batu Ferringhi and Teluk Bahang.

On the mainland, the local plans for Bukit Mertajam and Butterworth will be ready by the end of the year.

He hoped that by the year 2000, all rapidly developing areas in the State would be covered by such plans to serve as a guideline for proper development.

NST, 1.3.1997

Mining firm hopes to break even in third year

Specific Resources Sdn. Bhd., which has invested RM75 million in exploration and mining work at the Penjom gold mine at Kuala Lipis in Pahang, is confident of recouping its investment by the third year of operation.

Avocet Mining Plc chief executive officer Jocelyn Waller said yesterday the company had extracted 300 kg of gold, valued at RM10 million, from the Penjom gold mine since it commenced operations last December.

"At the rate we are going, I am convinced that we will achieve the break even point by the year 1999," he said.

Waller was speaking to reporters after attending the official opening of the gold mine by Pahang Menteri Besar Tan Sri Mohd Khalil Yaakob.

Specific Resources is a joint venture between Pahang State Economic Development Corporation and London-based Avocet Mining.

It was given exploration rights over the estimated 1,000 sq km Penjom area when the State Government privatised several large exploration blocks in 1987, giving foreign companies access to prospective exploration areas for the first time.

He said the mine was expected to produce some three tonnes of gold per annum, thus generating a revenue of between RM80 and RM90 million annually.

"We have been able to extract 3.5 grammes of gold from every tonne of earth and the ratio is very good," he added.

Waller said the company would be investing a further RM20 million this year in the form of advance earthwork and mining.

Of the amount, RM12.5 million would be spent on drilling, employing five drill rigs on-site.

Avocet, a public-listed company with worldwide mining interest in gold and tungsten, signed a joint venture agreement with the SEDC to carry out large-scale gold exploration in Penjom in 1990. The exploration programme was successfully carried out between 1991 and 1994.

A feasibility study was commissioned in 1994 and completed in 1995. Concession of the Penjom mine started in March 1996 and the mine was commissioned last December.

Under the joint venture agreement, seven per cent of all revenue generated by Specific Resources from the mine will go directly to the Pahang Government.

"We pay a gross proceeds royalty of two per cent to the SEDC and statutory royalty of five per cent to the State Government."

The company is adopting an Australian technique, using the open cast mining method and the "carbon in leach" technology to extract the gold.

The company employs some 250 workers.

NST, 4.3.1997

Pahang gold industry poised to take off after century-long dormancy

The gold mining industry in Pahang, which came to a stop 100 years ago, is poised to take off again with the opening of three more gold mines by the middle of next year in Bukit Koman and Sungai Koyan, all in the Raub district.

Menteri Besar Tan Sri Mohd Khalil Yaakob said this yesterday when opening the Penjom gold mine in Empang Jalih, Kuala Lipis.

The mine can produce three tonnes of gold per annum, generating revenue of between RM80 million and RM90 million.

Khalil said the three mines to be opened next year would be of similar size to the Penjom mine.

Once operational, they would produce approximately RM260 million worth of gold annually, he said.

Currently, both local and foreign investors are working closely with the State Economic Development Corporation to establish the gold mining potential in six zones designated by the Government.

These zones are in Raub, Kuala Medang, Merapoh, Kuala Lipis, Mengapur and Sungai Teris, all located in western Pahang.

Khalil said these zones had been divided into 12 blocks and the SEDC had entered into several agreements with investors to prospect for gold there.

The allocation of the blocks are: Malaysian Mining Corporation Berhad (Block 1 and 2), Westralian Resources Project Limited/Maliru Sdn. Bhd. T.R.A. Mining (M) Sdn. Bhd./Damar Consolidated Exploration Sdn. Bhd. (Block 3), Euralba Mining/Canada Limited/Maliru Sdn. Bhd. T.R.A. Mining (M) Sdn. Bhd. (Block 4),

Montague Gold N.1/Maliru Sdn. Bhd. T.R.A./Damar Consolidated Exploration (Block 6), Avocet Gold Limited (Block 7), B.R.E.M./Serem (M) Sdn. Bhd./Perak Motor (Block 8), Vista Development Sdn. Bhd. (Block 9, 10 and 12) and Tekai Mining Corporation Sdn. Bhd. (Block 11).

At present, there is no taker for Block 5.

To date, he said 128 applications for prospecting licences had been forwarded by the SEDC to the Pahang Government, covering an area of 222,600 hectares.

"Of these, 24 applications, covering an area of 107,400 ha, have been approved and about RM35 million spent by the parties concerned in carrying out exploration works using modern and environment-friendly technologies."

Khalil said the result thus far had been very encouraging.

"Avocet Gold Limited and Specific Resources, which have been exploring in Block 6 have made significant finds."

Specific Resources, through the SEDC, has applied for a mining lease for an area covering 715 ha and the indication is that this area has an ore reserve of at least 2.5 million tonnes, worth RM190 million at current market value.

Khalil said this had made Specific Resources and Pahang the biggest producer of gold in Malaysia.

He was accompanied by Rural Development and Villages Growth Centre Committee chairman Datuk Omar Othman, Avocet Mining Plc chief executive officer Jocelyn Waller and Specific Resources general manager Gorden Lewis.

NST, 4.3.1997

Borneo Marble now exporting polished tiles

Borneo Marble Industries Sdn. Bhd., a subsidiary of public-listed Cash Bhd., has invested more than RM20 million in the marble industry in Lahad Datu, Sabah since opening its quarry in 1994.

It commissioned a new processing facility last year and is now producing processed marble.

The Borneo Marble factory which now

exports polished marble tiles was opened by Chief Minister Datuk Yong Teck Lee on Sunday.

"Like other natural resources, marble has been here for a long time waiting to be economically exploited," Yong said.

He said the business also created employment opportunities.

Yong said the State Government supported

business ventures of this nature as it not only benefited the company concerned but also contributed towards the State's economic stability.

He said it was high time the local companies ventured into business apart from timber and agriculture industries.

"Timber areas are not expanding so the best thing to do is seek other untapped business opportunities," he said.

He said with the opening of the marble factory, the country would no longer be depending too much on marble from Italy and other countries.

Earlier in his speech, Lee said his company

embarked on the project after a survey estimated that there was sufficient marble deposit at the 200 hectares area in Segama to justify commercial exploitation.

After opening the marble factory, Yong Proceeded to perform a ground-breaking ceremony of a RM32 million corn flour mill project near the Lahad Datu Port.

This project is a joint-venture between Sabah Economic Development Corporation (51 per cent) and a Philippine company, Manila Intermilling Corporation (49 per cent).

When operation in 1999, the mill can produce 75,000 metric tons of corn flour a year.

NST, 4.3.1997

KL to have monorail system

Kuala Lumpur will have a fully integrated transportation system with the completion of the People Mover Rapid Transit (PRT) in 1999.

KL PRT Sdn. Bhd. chairman Datuk Kamarudin Jaafar said the company was to deliver a 16 km monorail of which construction work started in December last year.

"We are going ahead full steam with the project and when completed, the PRT will complement the city's Light Rail Transit (LRT), KTM Komuter and the Express Rail Link," he said.

KL PRT signed a concession agreement with the Government on Oct 29 last year to construct the RM2 billion monorail system in the city.

Kamarudin said the monorail would serve the city centre and the Golden Triangle where business, hotel and shopping districts were located.

"It is inevitable that the construction is taking place in the busiest areas of the city but we are taking measures to minimise any inconveniences that may arise from the work," he said.

Piling works along Jalan Maharajalela began

in December and construction work on Jalan Sultan Ismail was scheduled to begin next week, he said.

This will be followed by construction work along Jalan Sultan Sulaiman and Jalan Tuanku Abdul Rahman, added Kamarudin.

He said the company would do its best to complete the stretch between Jalan P. Ramlee station in front of Shangri-La Hotel to Hang Tuah station at Jalan Hang Tuah, before the 1998 Commonwealth Games.

"This is to allow those in the Golden Triangle to ride the monorail and then change over to the LRT at Jalan Hang Tuah to reach Bukit Jalil, the venue for the games," said Kamarudin.

On the work along Jalan Sultan Ismail, the areas affected would be the stretch between Imbi Plaza and the Yayasan Selangor building and from Park Royal to Lot 10.

Work along the affected areas would take between six and 12 months to complete, Kamarudin said.

Star, 7.3.1997

Authority: Gas discovered at Jengka-1 well

The Malaysia-Thailand Joint Authority announced that its contractors have made a new gas discovery at its Jengka-1 wildcat well, which was drilled on Jan 21.

The Jengka-1 well was drilled to a depth of 2,822 metres and four drill stem tests were conducted on its hydrocarbon potential.

The tests showed a combined gas flow rate of

48 million standard cubic feet per day, 1,451 barrels per day of condensate and 585 barrels per day of oil.

Operator, Carigali-PTTEP Operating

Company Sdn. Bhd., has plugged the well and the drilling rig *Falcon* is moving on to another exploration well Senja-1.

NST, 14.3.1997

Petronas gives incentives for oil and gas exploration

Petronas has introduced an incentive in its production sharing contracts to encourage more exploration investment and to enhance the country's oil and gas reserves.

The new "Revenue-Over-Cost" concept is aimed at rewarding efficient contractors. It takes into consideration increased risks and costs, as well as diminishing success rates in exploration activities.

"In a nutshell, it gives the contractor a quicker cash flow at the beginning of the contract period. The more efficient the contractor is, the better returns he gets and at the same time, the nation's income level is protected," Petronas president and chief executive officer Datuk Mohd Hassan Marican said yesterday.

He said Petronas had been studying ways to encourage new exploration and investment as well as technology, and to enhance Malaysia's reserves which now stood at four billion barrels of oil and 80 trillion standard cubic feet of gas.

Incentives are necessary as acreages that have been worked in the country have become very mature. Discoveries by PSC contractors under the 1985 PSC terms have been smaller despite high investment costs.

Hassan said that the incentive would apply to new PSCs, following the reblocking of acreages.

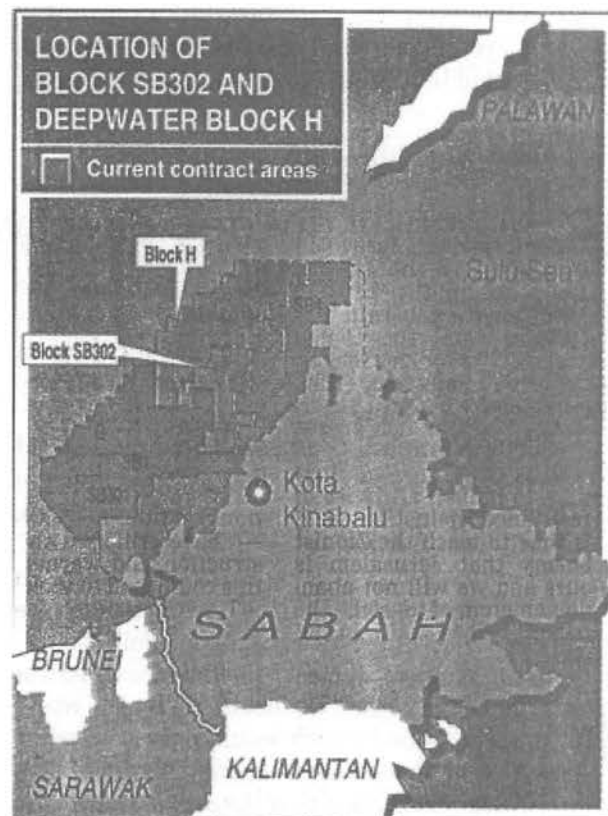
He was speaking to reporters after the signing of two PSCs between Petronas, subsidiary Petronas Carigali Sdn. Bhd. and Esso Production (Malaysia) Inc. at its headquarters in Kuala Lumpur.

The contracts are for Blocks SB302 and Deepwater Block H offshore Sabah, Esso's first PSC in deep water in Malaysia.

Esso will hold 80 per cent interest in each block while Petronas Carigali will hold the remaining 20 per cent.

Esso, which will be the operator for both blocks, has committed a minimum of RM57.3 million for the blocks.

Block SB302 which covers 4,721 sq km about 80 km offshore Sabah was previously awarded



to a British Gas-led consortium until it was relinquished this month.

The contractors will acquire and process 1,000 line-km of new 2D seismic data and 5,000 line-km of new 3D seismic data as well as re-process 8,000 line-km of existing 2D seismic data in this block.

They will also drill three wildcat wells to a minimum aggregate depth of not less than 7,000 metres and undertake a detailed review on the hydrocarbon potential of the contract area.

Their minimum financial commitment for this block is RM29.3 million. The exploration, development and production periods are five, four and 20 years respectively.

Deepwater Block H, located 135 km offshore Sabah covering 8,054 sq km is relatively unexplored. The contractors will acquire and

process 4,000 line-km of new 2D seismic data and reprocess 2,000 line-km of existing 2D seismic data.

Three wildcat wells of a combined minimum depth of at least 7,500 metres will also be drilled. A total of RM28 million has been committed for the block.

Exploration, development and production periods for the block are seven, six and 25 years respectively.

Esso chairman and chief executive Philip J. Dingle said it expected to drill at least six wells,

in total, on the two blocks after completing initial geophysical work later this year, or early next year.

Dingle called the "Revenue-Over-Cost" concept a practical approach which takes changing geological situations into consideration.

"It is fairly new, but it is not revolutionary. It is more evolutionary," he said of the incentive.

Dingle said the terms provided the framework to encourage the exploration and production of smaller oil and gas fields.

NST, 20.3.1997

Dam consultant gets directive

The State Government has ordered the consultant company involved in the development of the Sungai Chini dam to submit a report on the shortcomings in the structure of the facility so that corrective measures can be taken.

The RM7 million dam is said to have caused water to rise way above the desired level and had submerged the roots of trees along the river. As a result, many of the trees have died.

The water quality was also said to have been affected as many dead leaves had fallen into the river, thus increasing the acidity level.

Deputy Menteri Besar Datuk Hasan Arifin said the report would be discussed by the State Executive Council which would decide on what should be done to solve the problems.

"If it is established that the problems are due to a mistake by the consultant, appropriate action will be taken (against the company)," he said yesterday.

It is learnt that Prime Minister Datuk Seri Dr. Mahathir Mohamad, during his visit to Tasik Chini on Monday, had expressed his dissatisfaction with the situation and ordered immediate steps be taken to rectify the problems.

Sources said the dam was too high, resulting in the water level to increase to 2.8 metres when

the ideal level was only 1.4 m.

For boatmen ferrying tourists, the high water level makes it easier for them to navigate along Sungai Chini. Before that the river was shallow and the boatmen and their passengers had to go down into the water to push the boat along several stretches of the river.

But the high water level has also submerged the roots of many trees along the river.

Sources said the Pahang Tenggara Regional Development Authority's general manager Mohamad Yusof Johor, when briefing Dr. Mahathir, outlined three proposals to reduce the water level.

These are through hacking of the dam for the purpose of lowering it, constructing a RM3 million bypass and building a RM4.5 million water lock-gate.

The State Government announced the dam project in 1994 to replace an old dam. The project incorporated a RM660,000 transit jetty located near Sungai Chini estuary. The river is a tributary of Sungai Pahang.

The new dam was to increase the water level along the river, thus allowing boatmen to ferry tourists from the jetty to Tasik Chini with ease.

NST, 22.3.1997

Work on bridge to S'pore begins next year

The proposal to build a bridge across Tebrau Straits to replace the Johor-Singapore causeway has been approved and work is expected to begin next year.

Works Minister Datuk Seri S. Samy Vellu said the Cabinet gave the nod at a recent meeting and picked a consortium to be awarded the project.

The Economic Planning Unit (EPU) is now reviewing the detailed plan submitted by the consortium.

"The revised plans will then be re-submitted to the Cabinet for final approval," he told reporters after opening an education exhibition and seminar here yesterday.

Samy Vellu said the detailed plan comprised a perspective study and an initial plan.

"There are several aspects which need to be studied carefully, such as the bridge's location and carrying capacity."

The idea to replace the causeway with a bridge was mooted last year by Prime Minister Datuk Seri Dr. Mahathir Mohamad, who said a bridge would allow for better traffic flow in the Johor Straits.

Samy Vellu said once the revised plan was approved by the Cabinet, the Government would proceed with the financial and technical discussions.

On the second link project in Gelang Patah, Samy Vellu said he would visit the final phase of the project next month.

Star, 24.3.1997

Terengganu set to be 'Steel State' in next three years

Terengganu is set to be a 'Steel State' in the next three years with a projected turnover of RM6 billion.

State Industrial Development, Agriculture and Fishery committee chairman Datuk Mamat Ghazalee Abdul Rahman said by the turn of the next century, Terengganu would be a "Steel State" with more steel giants expected to set up their factories here.

"Currently, the State has two major steel mills, namely Perwaja Steel Sdn. Bhd. and Gunawan Iron & Steel Sdn. Bhd., both at Teluk Kalong, Kemaman," he said.

Leader Steel Holdings Sdn. Bhd., Mamat Ghazalee said, would also set up a plant on a 400-hectare piece of land in Teluk Kalong. He added that the company had invested about

RM300 million in the project.

"There is also a company from Japan — Kawasaki Steel Corporation — that has shown interest in setting up a mill here. It has identified a site in Marang."

He said this today at a Press conference after launching Tesac Malaysia Sdn. Bhd., a plant manufacturing hawser synthetic ropes mainly for ships.

Tesac Malaysia's managing director Maekawa Takeo said the company had a paid-up capital of RM3 million and produced 1,200 tonnes of ropes with a workforce of 50.

"The employees here, with the exception of a few top management staff who are Japanese, are all from Kuala Terengganu and the suburbs," he said.

NST, 24.3.1997

Water across the Main Range — Pahang proposes plan to increase state revenue

Pahang has proposed to cut across the Main Range to build dams and tunnels and lay pipes as part of the inter-state water supply project.

The project would enable Pahang, which has excessive supply, to sell untreated water to states on the west coast.

Deputy Mentri Besar Datuk Hasan Arifin said the Federal Economic Planning Unit and the Pahang Water Supply Department were studying the proposal.

"Some states have already expressed their desire to buy water from us. This will be a major part of the government's future revenue," he said in an interview here yesterday.

Hasan said Pahang had agreed in principle to supply water to Selangor on a long-term basis.

"However, the agreement would depend on the findings of the viability of the proposal to run the pipes through the Main Range."

"We will have no problem selling water. The

other states need it as they are running short of supply."

"We have not discussed the details on the rates to be charged. We want to study the infrastructural costs involved first before announcing the other details," he said.

Hasan said the study on the proposal would be completed by the end of the year.

Hasan said Pahang also had immediate plans to sell water to Malacca while it had already

started selling water to Negri Sembilan.

Last week, Works Minister Datuk S. Samy Vellu said that the proposal to centralise the management of water supply in the country had been scrapped because of opposition from states which had jurisdiction over water.

Hasan said Pahang depended on water as a revenue stream and considered the centralised management of water as against its interest.

Star, 26.3.1997

Surplus supply of cement by end-1999

Malaysia is expected to have surplus supply of cement by end of 1999 when three new plants start operations, Domestic Trade and Consumer Affairs Minister Datuk Abu Hassan Omar said yesterday.

He said two of the plants — in Negri Sembilan and Kuantan — were expected to start operating this year while the one in Gua Musang, Kelantan was expected to start by end of 1999.

He said the total production of the three plants was expected to reach four million tonnes per year, while the existing plants were capable of producing 12 million tonnes per year.

"The country's total consumption of cement is about 16 million tonnes per year," he said after attending a briefing and dialogue session with officials of Kemas, and Information and Broadcasting Departments on the zero inflation campaign here yesterday.

He said by end of 1999, Malaysia was expected to start exporting cement when all the

plants including the new ones, had expanded operations.

Abu Hassan also dismissed claims by contractors in Terengganu that there was a shortage of cement in the state.

On the low quality of imported cement, Abu Hassan said that all imported cement had been approved by Sirim and the Construction Industry Development Board.

He said the Works Department had issued a directive to all its district engineers to use imported cement for government projects in view of the shortage of local cement.

Abu Hassan also warned cement suppliers to adhere to the government directive to sell cement at the fixed price of RM10.60 per bag for local cement and RM10.60 per bag for imported cement sold at port.

He said cement would continue to be imported for at least for the next two years to overcome the shortage of cement supply locally.

S. Star, 30.3.1997

Anwar: Beris Dam is on

Deputy Prime Minister Datuk Seri Anwar Ibrahim said today that the government will go ahead with the proposed Beris Dam project but is prepared to continue negotiations with affected landowners.

According to Anwar, based on several studies the Beris area has been identified as the most suitable location for the project.

"We don't want to build the dam here if possible but we have no choice..... this is the best

location," Anwar said when he met residents of Kampung Sungai Batang, near here, during his one-day visit to Kedah.

The Beris Dam project is expected to cover 1,600 ha and cost about RM170 million.

The project will involve the resettlement of almost 3,000 settlers from 13 villages, including Kampung Sungai Batang, Kampung Batu Seketol, Kampung Perangin, Kampung Teneras and Kampung Batu 54.

The project is being opposed by a group of villagers which is asking for, among other things, a higher compensation for their land.

Anwar said the government was prepared to listen to the affected settlers, including considering their claims if they were found to be reasonable.

He said the government was sensitive to the rakyat's sentiments when it involved land acquisition.

However, Anwar said the government

decides on plans after various studies are made to ensure that the projects benefit the people.

He said the government had no intention of unnecessarily burdening the people but wanted to provide them facilities through various development programmes.

Anwar said the protests and dissatisfaction of some of the Beris residents did not differ much from the sentiments of those affected by other dam projects, including the Mengkuang Dam in Penang and Bakun in Sarawak.

Sun, 31.3.1997

Construction of East Coast highway to begin in June

The State Government today approved the acquisition of land to be affected by the proposed East Coast Highway, paving the way for the construction of the RM2.7 billion project.

Menteri Besar Tan Sri Mohd Khalil Yaakob said today the affected land was located along the alignment from Karak to Jabor.

"It comprises State and private land," he said, adding today's decision followed a request made by the Malaysian Mining Corporation-led consortium undertaking the project.

Khalil said acquisition papers would be issued as soon as possible.

He said the State Government was told that problems faced by the consortium had been ironed out and that they were ready to start with the project.

"Work on the 336 km highway from Karak to Kuala Terengganu is expected to start in June," he told reporters at Wisma Sri Pahang after chairing the State executive council meeting.

In another development, Khalil said Petronas had given its undertaking to develop a dedicated railway line between here and Kertih, Terengganu as soon as possible.

This was conveyed to him during a briefing by officers from national oil company recently.

Prime Minister Datuk Seri Dr. Mahathir Mohamad announced the railway project after opening the W.R. Grace packaging and silica

plants in Gebeng on March 17.

He had said that Petronas and KTM Berhad would discuss the implementation of the project.

Dr. Mahathir also said that the project was deemed necessary because the Government was intending to build a new railway track linking the west and east coast of the peninsula.

"Although the cost incurred may be high, we have to embark on this project due to the rapid development in the east coast. With this facility, it will be easier for people from the west coast to come to this part of the country and vice versa," he added.

Khalil said several other parties had since reaffirmed that the project would proceed.

He said the railway would complement existing mode of transport and would be mainly used for transportation of feedstock and chemicals.

"Many of the petrochemical companies operating in Kertih and Gebeng complement each other and they need an efficient mode of transportation," he said.

Khalil said the State Government supported the project as it could accelerate the growth of Eastern Corridor.

"The alignment of the railway track is expected to be a straight line along the coastal area," he said, adding that the State Government would negotiate with the affected land owners.

NST, 3.4.1997

Esso starts gas production off Terengganu

Esso Production Malaysia Inc. (EPMI), an affiliate of Exxon Corp., has started production and sales from the Lawit gas field, about 240 km off Terengganu.

Philip J. Dingle, chairman and chief executive officer of EPMI, said in a statement that by 1999 Lawit could supply about one-third of Peninsular Malaysia's gas requirements and help meet the growing demand for natural gas in the country.

The RM1.5 billion Lawit field development is EPMI's second major gas project in Malaysia under the natural gas project and sales agreement with Petronas.

EPMI had earlier developed the Jerneh field, the largest gas field in the Malay Basin. Sales of Jerneh gas began in 1992.

The Lawit development drilling, which involves 17 wells, started last January.

With the planned completion of the drilling programme by year's end, the average daily production from the field is expected to reach about 450 million standard cu ft per day (mcf).

Compression facilities will be installed next year to increase production from Lawit to its design capacity of 700 mcf. This will increase EPMI's daily gas delivery capacity to nearly 1.6 billion from 900 million cu ft now.

Gas from the Lawit field will flow to the existing onshore facilities in Kertih, where it will be transported by pipeline to the nearby Petronas gas processing plant for distribution to customers, including power plants and industrial estates along the Peninsular Gas Utilisation pipe-line route.

Dingle said the development of Lawit was a milestone for the country as it would enable increased usage natural gas resources and fuel development.

Except for the production jacket, all of the construction contracts for Lawit had been awarded to Malaysian contractors, he said.

At the peak of construction, over 4,000 workers were employed in the project, which also created many other jobs for local engineering firms and suppliers, he added.

Star, 4.4.1997

Find ways to reduce adverse effects, quarry firms urged

Quarry companies should do their best to minimise destruction to the environment by using modern and environment-friendly machinery to carry out their activities.

Works Minister Datuk Seri S. Samy Vellu said today they should explore new ways to reduce the industry's adverse impact on the environment.

He said that the majority of the 300 quarries in the country had met with the desired standards in terms of precautions against destruction of nature.

Asked if the Government had any intention of requiring the industry to use new machinery, he said *"the matter should be looked into by the Science, Technology and Environment Ministry"*.

He, however, said new mining equipment had contributed tremendously in cutting down adverse effects in quarry operations like noise, vibration and dust.

"Modern machinery which is more compact are as capable of delivering higher output."

"With advanced technology and extensive

research and development, the state-of-the-art equipment has increased productivity and reduced accidents at quarrying sites as well as diminished hazards to the environment."

"In the old days, our production rate was only 200 tonnes daily but the figure has since increased to 10,000 tonnes worth an estimated RM1.3 billion annually," he told newsmen after opening the Kuaru Asia '97 at the Golden Plus Granite Quarry in Bukit Belachan.

The four-day inaugural "International Showcase on Quarry and Infrastructural Development Technologies" is presented by the Institute of Quarrying Malaysia and is jointly organised by Vital Image and Le Proton Exhibitions.

Themed "Coping With Infrastructure's Development As We Move Towards the Next Millennium: The Challenges and Opportunities", participants will be able to explore pertinent issues, challenges and opportunities affecting the quarry industry.

NST, 8.4.1997

Law on minerals will 'not weaken States' control'

The Malaysian Chamber of Mines said today that the Mineral Development Act places priority on environmental concerns in the extraction of minerals

Its president, Ab. Shukor Shahar, said the legislation also took into account current mining activities.

"Mining activities will be carried out on a sustainable level and environmental issues that come with them will not be overlooked," he said in an interview.

Shukor was responding to a recent statement by Primary Industries Minister Datuk Seri Dr. Lim Keng Yaik that State Governments should adopt the Act to expedite the development of the industry.

Dr. Lim had said that if the States were slow in adopting the Act, the matter would be referred to the National Land Council, chaired by Deputy Prime Minister Datuk Seri Anwar Ibrahim.

A draft uniform State Mineral Enactment was sent to all Mentris Besar and Chief Ministers for adoption late last year.

Dr. Lim had also said that the Geological Survey Department, the Mines Department and other related agencies would organise road shows and hold dialogues with State Governments to explain the objectives of the policy.

Shukor said the parent legislation would not

"weaken the States" as its intention was to develop mining with state-of-the-art technology.

"The legislation has outlined the procedures to be adopted to enhance mining activities in the States," he said.

Land and land-based resources are under the purview of the States.

Shukor said it was a useful piece of legislation since Malaysia was aspiring to be an industrialised nation by the year 2020.

"We need to promote mining activities as these raw materials are a vital ingredient in our industrial development."

Shukor said foreign investors would be reluctant to come if Malaysia's mineral policy lacked transparency.

"How can we expect foreigners with the technological know-how to invest in Malaysia to explore for minerals when there is no clear-cut policy," he said.

He added that Malaysian investors would be discouraged from looking for strategic minerals overseas when "our house is not in order".

Shukor said there would come a time when Malaysia would have to source minerals from overseas but this could only be done if local mining companies had the capital and technology.

NST, 8.4.1997

Kualiti Alam has taken precautions at Negri plant

Kualiti Alam Sdn. Bhd. has taken all the necessary precautions at its Bukit Nanas scheduled waste management plant to protect the surrounding areas.

Science, Technology and Environment Minister Datuk Law Hieng Ding said today for off-site precautions, Kualiti Alam had drawn up an emergency rescue plan for transporting waste to the plant.

"Under the plan, Kualiti Alam has to have constant communication with its truck drivers and the highway authority."

"It must inform the authority when using a certain route and provide details such as destination of the trucks and their expected arrival time," he said after visiting the plant in Negri Sembilan.

Law said Kualiti Alam's trucks could only ply routes agreed to by Department of Environment and the police.

"These routes are the safest we can find. They may be longer and we try to keep away from residential and congested areas."

"The lorries must also travel during the day," he said.

However, Law said the waste transported was not radioactive, pathological or explosive.

Upon arrival at the plant, Kualiti Alam officials will take samples of the waste for laboratory analysis. This is to verify that the waste sent is the one declared by the generator.

"There had been cases where some people tried to smuggle in other types of waste to the plant," Law said.

While waiting for tests to be completed, the rest of the waste is taken into a quarantine area.

The truck is cleaned before it is allowed to leave.

The whole plant is water-contained to ensure the environment is protected if there is any leakage.

When it rains, water from the plant will flow directly into a retention pond. The water in this pond is checked before it is allowed to flow into nearby streams.

Law said Kualiti Alam had also set up five open and 12 underground water monitoring stations to check pollution.

Water quality in these stations is checked at least twice a month.

Kualiti Alam will also set up air monitoring stations to check emissions once the incinerator starts operation next year.

On work progress, Law said there was a slight delay in the construction of the solidification and incineration facilities.

"However, Kualiti Alam is trying its best to complete the work according to schedule," he said.

The solidification plant has to be ready by June while the incineration facility by July next year.

NST, 16.4.1997

Work on expressways to start in June, says Ong

Work to construct the RM5 billion Taiping-Banting and the RM1 billion Ipoh-Lumut toll expressways is expected to start in June.

State Infrastructure and Public Utilities Committee chairman Datuk Ong Ka Chuan said the two four-lane expressways would be completed by the year 2000 and 2004 respectively.

The first phase of the Taiping-Banting expressway, which spans 104 km from Taiping to Teluk Intan, will be completed in about four years.

The second phase spanning 114.5 km from Teluk Intan to Kapar in Klang and the remaining 37.5 km from Kapar to Banting will be completed in stages.

The Taiping-Banting expressway will be undertaken by a consortium comprising Talam Corporation Berhad, Lumut Consolidated Bhd., Kumpulan Darul Ehsan Berhad (Selangor) and the Perak State Development Corporation (SDC).

Ong said 130 km of the 256 km expressway would be in Perak and there would be six interchanges: in Hutan Melintang, Teluk Intan, Kampung Gajah, Seri Iskandar, Beruas and

Taiping.

He said the expressway was important because of Banting's proximity to the new growth centre of Sepang where the KL International Airport is being built.

Ong said other states had applied to the Federal Government to build toll expressways that would link up with the Banting-Taiping expressways.

He said the completion of the expressway would bring development to Bagan Datoh, Teluk Intan, Kampung Gajah and Lumut and open up sea-front areas for land reclamation projects.

Ong said the 70 km Ipoh-Lumut expressway would be built by a joint venture between MRCB Project Management Sdn. Bhd. and the Perak SDC.

He said the interchanges for the expressway would be sited at Simpang Pulai, Batu Gajah, Seri Iskandar, Ayer Tawar and Lumut.

He added that toll rates for the two expressways would be similar to that charged by Project Lebuhraya Utara Selatan for the North-South Expressway.

Star, 18.4.1997

Gunung Buda — a Garden of Eden

Like ants, they crawled through the entrails of the limestone massif, busily charting its guts. In some passages, squeezing through had a distinct tooth-paste-in-a-tube feel. Other passages involved clambering up and down or across spiky, sometimes crumbling rock.

When hand-grips and footholds proved inadequate or missing, ropes and bolts came in handy. At times, the intrepid men and women slid or swam, though not always of their own volition.

After five weeks, the American-Sarawakian expedition team members are proud to announce it has mapped 25.5 km of passages in Borneo's newest caving playground: Gunung Buda.

The *Buda '97 Expedition* brought to a total 55.5 km of surveyed area within the 20 sq km of limestone area north of the Mulu National Park in Sarawak.

With this new information, Buda is confirmed as an area of magnificent and fragile cave ecosystems. Besides its immense scientific, cultural and educational value, Buda holds great potential as a major adventure tourism

destination.

Although smaller than its cousins in the south, which first brought fame to Mulu Park, Buda's caves are now known to be among the world's largest, containing some of the most remarkable formations. Among these are showerheads: hollow cones of up to 1 m in diameter in ceilings from which water gushes. Showerheads are apparently unique to Mulu.

Buda can boast more of its own superlatives. For instance, the 140 m drop in the Monkeys In The Mist Cave is the deepest vertical drop in South-East Asia. Adorned with thundering waterfalls and swirling mists, the drop provides challenging rope-work and exciting connections to other passages. Meanwhile, Snail Shell, one of Buda's more beautifully decorated caves, also houses the region's greatest vertical relief at 465 m.

The '97 expedition highlight was the connection of two cave systems, Turtle and Green Cathedral, making it Buda's longest system at 25 km. Such discoveries point to potentially larger systems of up to 100 km.

Star, 21.4.1997

Prof: Granitic terrain is complex

The Highland Resort Road will be built on granitic terrain which is problematic and difficult to handle, a professor of geology said yesterday.

"Granitic terrain is known to be weak and most difficult to handle in wet, tropical areas like on the Main Range," Universiti Kebangsaan Malaysia's Prof. Ibrahim Komoo said at a seminar entitled *All You Need to Know About the Highland Resorts Road* organised by the Malaysian Nature Society Selangor Branch.

He said granitic rock was the most complex material for construction and its engineering behaviour was the least known.

"It is highly erodable and when saturated for prolonged periods it will result in landslips, debris flow and avalanche," he said.

He said Highland Towers which collapsed in 1993 was built on the same terrain.

"No suitable and effective solution has yet been found to deal with granitic material which

is why problems persist along several major highways crossing highlands," he added.

The road will link Cameron Highlands, Fraser's Hill and Genting Highlands and will be built along steep slopes of between 30 and 60 degrees.

Ibrahim said the road should be aligned along the ridges of the Main Range for optimum stability but this would not be possible because of the extreme undulating nature of the ridges and the steep gradients.

"Severe erosion will be unavoidable, and siltation may lead to flash floods in the low lying areas of Perak, Pahang and Selangor," he said.

World Wide Fund for Nature Malaysia scientific officer Bala Perumal said the Main Range was the peninsular's main source of fresh water.

He added that 90 per cent of its rivers originated from there.

Star, 28.4.1997

'Outside' sand for mega projects

Sand for the reclamation of the mega Jelutong Expressway and waterfront city projects is likely to come from the Straits of Malacca or neighbouring countries.

The developer, in its terms of reference (TOR) for detailed Environmental Impact Assessment, said the sand would be sourced from outside the Penang straits.

Jelutong Development Sdn. Bhd. (JDSB) will build the 4.7 km expressway and undertake to reclaim land for residential, recreational, commercial and industrial development.

Reclamation of the coastal area would be carried out in three parcels with a total area of 130 ha, according to JDSB in its TOR report submitted to the Department of Environment for review.

"The reclamation areas include the coastal

mudflats fronting the existing coastal road from the Penang Bridge to the Udini Interchange, the land fronting Jalan Haji Ahmad up to the Jalan Tengku outfall reserve and the parcel of land adjacent to the existing PDC reserve," the report stated.

For the expressway project, a 35-month period had been scheduled for reclamation, surcharging and shore protection works.

JDSB added that initial reclamation was likely to use the dredge and reclaim system. The new shoreline would likely be "protected by a synthetic filter media overlain by graded rocks" to prevent sand loss.

The developer said it had carried out six supporting studies as part of the feasibility and preliminary engineering design studies.

Star, 30.4.1997

**On the occasion of its 50th
Anniversary the Geological Survey of
Botswana will host an**

**INTERNATIONAL CONFERENCE
on**

**THE ROLE OF A NATIONAL
GEOLOGICAL SURVEY IN
SUSTAINABLE DEVELOPMENT**

**23rd–25th June 1998
University of Botswana
Gaborone
Botswana**

Registration fee: US\$100.

1st Circular

**ESTABLISHMENT OF THE
GEOLOGICAL SURVEY OF
BOTSWANA**

The Geological Survey of Botswana was formally constituted in 1948 as the Geological Survey of the then Bechuanaland Protectorate. I.J. Wayland, the first Director of the Survey, arrived in Bechuanaland in 1943 and was attached to the Public Works Department as the geologist in charge of groundwater investigations.

Wayland realised that there was a need for a national Geological Survey, and wrote several letters to that effect, including one to the Government Secretary on the 12th April, 1944. At the 38th session of the European Advisory Council (25th–30th March, 1946) a Mr. le Cordeur put forward a successful motion that a separate Geological Survey Department be established in Bechuanaland.

In 1947 the Director of the Colonial Geological Survey in London, Dr. F. Dixey, took an interest in the establishment of the Survey. After discussions between Dixey, Wayland, D.S. Metcalfe, H.J.R. Way and the Resident Commissioner, it was decided to set up the Headquarters of the new Geological Survey in an abandoned fur factory in Lobatse.

This conference commemorates the 50th

anniversary of the establishment of the Geological Survey of Botswana, under the theme **THE ROLE OF A NATIONAL GEOLOGICAL SURVEY IN SUSTAINABLE DEVELOPMENT**.

The conference will include technical sessions over 3 days (23rd–25th June, 1998) and pre- and post-conference field excursions of 5–6 days duration.

The US\$100 registration fee includes the conference abstract volume, conference bag, writing materials, tea and lunch.

Venue: University of Botswana, Gaborone

Language: English

CONFERENCE SESSIONS

1. Directors' perspectives of the role of a national Geological Survey in sustainable development
2. Groundwater in arid climates
3. Geophysics in mineral, groundwater and environmental investigations
4. Regional geology and mineral potential of Southern Africa
5. Contributions of mining to economic development

EXCURSIONS

1. Limpopo Belt

Participants will be taken across the Limpopo belt in Botswana, starting with the Mahalapye Complex, going through the western zone in the Topisi area, the central zone in the Selibe and Phikwe areas and going up to the western limit of the Limpopo belt in Botswana which is marked by the Magogaphate shear zone. During the field excursion, participants will have the opportunity to visit the Selibe-Phikwe Cu-Ni mines. Leaders: Mr. B.K. Paya, Dr. R. Key, Mr. L. Holzer, BCL geologists; Duration: 5 days; Cost: US\$500 approximately.

2. Greenstone belts in NE Botswana

Participants will be taken on sections across the Tati, Vumba, Matsitama and Maitengwe belts. During the field excursion, participants will tour old and existing gold mines. Leaders: Mr. T. Majaule, Mr. B. Direng, Mr. P. Akanyang, Mr. C.L. Byron, Mr. G. Gushee; Duration: 6 days; Cost: US\$600 approximately.

3. Ghanzi-Chobe Belt (GCB)

This excursion will traverse the Pan African

GCB of NW Botswana. The belt comprises a volcano-sedimentary assemblage deposited in a fault-controlled alluvial to shallow marine basin, during Meso- to Neoproterozoic times. The varied sequence of the GCB will be examined; this consists of acid and basic volcanic rocks, and associated sedimentary rocks, of the Kgwebe Fm, and a dominantly siliciclastic sedimentary sequence, with subordinate carbonate beds of the younger Ghanzi Group. Some old exploration trenches exposing sediment-hosted copper sulphide mineralization within the Ghanzi group will be visited. Leaders: Mr. B. Modie, Prof. M. Wendorff; Duration: 5 days; Cost: US\$500 plus US\$300 airfare approximately.

4. The Gaborone Granite Complex (GGC)

This excursion will include a transect through the GGC. The various volcano-sedimentary units which flank the GGC will be observed. These include the Kanye Fm, the Lobatse Volcanic Group and the Transvaal Supergroup. The structural relationships of all these units will be demonstrated during the excursion. Leader: Drs. R. Mapeo, V. Sibiya and M.P. Modisi; Duration: 5 days; Cost: see accommodation rates below.

5. Palapye Group (Waterberg) and Karoo Supergroup

Participants will have the opportunity to observe the basal Moeng Fm in the Moeng area, the

Tswapong Fm in the Mokgware Hills and Topisi area, and the Lotsane Fm in the Palapye, Topisi and Serowe areas, and possible visits to some mines. Participants will also observe Upper Karoo (Ntane Sandstone Fm and basaltic lava flows). Leaders: Mr. L.V. Ramokate, Mr. H. van Zyl; Duration: 5 days; Cost: US\$500 approximately.

Accompanying member program

A social program will be put together for accompanying members at the conference, involving trips to interesting sites in and around Gaborone.

Accommodation

Present rates in PULA per day (current exchange rate: US\$1 = P4, approximately):

1. high-end: single 200–240, double 250–350
2. regular: single 75–150, double 150–200
3. University residence: single 25

FURTHER INFORMATION

Please address all enquiries, replies and other correspondence to:

The Secretariat (Attention: Mr. B.K. Paya)
 50th Anniversary Conference,
 Department of Geological Survey,
 Private Bag 14, Lobatse, Botswana.
 Tel: (267) 331721 Fax: (267) 332013
 email: 100076.1001@compuserve.com

**Conference Announcement
CALL FOR PAPERS**

Coastal Environment 98

Environmental Problems in Coastal Regions

8–10 September 1998

Cancun, Mexico

Organised by

Wessex Institute of Technology, UK

Objectives

The importance of accurately modelling seas and coastal regions is emphasized by the need for a better understanding of their normal behaviour and response to extreme conditions. These areas, many times densely populated or sites of major industrial development, have become a major subject of international concern regarding environmental quality, due to pollution and other problems. It is clear that the related environmental problems need further study to design remedial actions, using efficient and reliable modelling and analysis tools. Computer models in combination with sensing equipment and experimental sampling techniques, provide adequate means for the study of the behaviour of water, ground and air systems, specially for the prevention of natural and man-made disasters. Furthermore, once a disaster occurs, computer models can determine the extent and consequences, aiding in the optimisation of available resources for remedial actions.

This conference will address the subject of computer modelling of seas and coastal areas under normal and extreme conditions, with particular attention to the practical applications currently carried out around the world. The first and highly successful conference was held in Rio de Janeiro, Brazil in 1996. This Meeting will be of interest to government officials, consulting engineers, university professors and researchers involved in the important field of environmental quality.

Call for Papers

Papers are invited on the topics indicated and others falling within the scope of the conference. Three copies of an abstract of no

more than 300 words, clearly stating the purpose, results and conclusion of the work to be described in the final paper, should be submitted to the Conference Secretariat as soon as possible.

Topics

- Pollution Management & Decision Analysis
- Hazard Mitigation/Risk Analysis
- Environmental Impact Assessment & Legislation
- Harbours, Ports & Marinas
- Littoral Drift
- Coastal Erosion
- Siltation & Dredging
- Oil & Spills
- Acoustic Pollution
- Pollutant Transport & Dispersion
- Remote Sensing
- Wastewater Treatment
- Sewage & Chemical Pollution
- Atmospheric Pollution & Control
- Hydrodynamic 7 Pollutant Transport Modelling
- Water Quality Models
- Case Studies

Further Information

Liz Kerr
Conference Secretariat,
COASTAL ENVIRONMENT 98
Wessex Institute of Technology
Ashurst Lodge
Ashurst, Southampton
SO40 7AA, UK

Tel: 44 (0) 1703 293223 Fax: 44 (0) 1703
292853

E-Mail: liz@wessex.ac.uk
<http://www.wesses.ac.uk>

THIRTEEN SOUTHEAST ASIAN GEOTECHNICAL CONFERENCE

16–20 November, 1998

**Taipei
Rep. of China**

Sponsored by

**Southeast Asia Society of Geotechnical Engineering
Chinese Institute of Civil and Hydraulic Engineering**

INVITATION

The Chinese Institute of Civil and Hydraulic Engineering takes great pleasure in inviting engineers, geologists, academics, researchers and other professionals in Southeast Asian region to participate in the Thirteenth Southeast Asian Geotechnical Conference to be held in Taipei, November 16th through 20th, 1998. The Conference will provide all participants a unique opportunity to exchange experience, idea and knowledge regarding current geotechnical activities in the Southeast Asian region.

INTRODUCTION

The Conference is jointly organized by the Chinese Institute of Civil and Hydraulic Engineering, and the Southeast Asian Geotechnical Society. It is the Thirteenth in the series of Southeast Asian Geotechnical Conferences. The first Southeast Asian Conference was held in Bangkok, 1967; the second in Singapore, 1970; the third in Hong Kong, 1972; the fourth in Kuala Lumpur, 1975; the fifth in Bangkok, 1977; the sixth in Taipei, 1980; the seventh in Hong Kong, 1982; the eighth in Kuala Lumpur, 1985; the ninth in Bangkok, 1987; the tenth in Taipei, 1990; the eleventh in Singapore, 1993; and the twelfth in Kuala Lumpur, 1996.

Engineers and researchers engaged in the field of geotechnical engineering are welcome to submit their papers and attend the Conference. The Conference will also provide a forum for discussion of recent developments and major construction projects in geotechnical engineering.

CONFERENCE THEMES

Main theme of the Conference is Geotech 2000+, whilst subject areas for discussion comprise the followings:

1. Ground property characterization and laboratory testing
2. Ground improvement and reinforcement
3. Design, construction and performance of deep foundations
4. Underground works in difficult ground
5. Environmental geotechnology
6. Geotechnical earthquake engineering
7. Land reclamation
8. Recent developments in geotechnical engineering

Papers on other areas of geotechnical engineering relevant to the Southeast Asian region are also welcome.

VENUE AND DATE

The Conference will be held at the International Convention Center in Taipei from November 16th to 20th, 1998.

OFFICIAL LANGUAGE

The official language of the Conference is English.

PARTICIPANTS

The Conference is mainly held for engineers in the Southeast Asian region, but anyone interested is welcome to participate. Special programs will be arranged for persons accompanying the participants.

GUEST SPEAKERS

Prominent persons in the field of geotechnical engineering will be invited to address the Conference.

PRELIMINARY REGISTRATION

In order to facilitate the planning of the Conference, those likely to attend are requested to complete and return the Preliminary Registration Form-I as soon as possible. Details regarding registration fees will be given in Bulletin #2. Early-bird savings are planned for pre-registration in 1997.

CALL FOR PAPERS

Papers fall within the Conference themes and related areas, which contribute to the advancement of theory and practice of geotechnical engineering, are invited. Papers will be accepted on the basis that they have not been published nor will they be published elsewhere before the publication of Conference proceedings in November, 1998.

SUBMISSION OF ABSTRACTS AND PAPERS

Intending authors are invited to submit three copies of about 300 words abstract of original unpublished papers by August 1st, 1997, they are also requested to complete and return Form-II together with their abstracts.

Abstracts will be subjected to a critical review. Intending authors will be notified of the preliminary acceptance of abstract by October 1st 1997. The completed manuscript will be due in the Conference office in proper format no later than May 1st, 1998. Final acceptance of the paper will be based on review of the completed manuscript.

In accepting a paper for publication in the Conference Proceedings, the committee may take into consideration the author's possibility to

attend.

ADDITIONAL INFORMATION

Information regarding registration fees, proceedings of the conference, accommodations, social events, accompanying persons' program, exhibition, weather condition and possible tours will be given in Bulletin #2 and sent to persons who have returned the Preliminary Registration Form-I and others who may be interested to know.

Instruction on the preparation of final manuscripts will be sent to intending authors whose abstracts have been accepted.

Relevant information can also be accessed through Internet at URL: "http://www.pcc.gov.tw/~seagc13/"

MILESTONES

Aug 1st, 1997	Submission of Abstracts
Oct 1st, 1997	Acceptance of Abstracts
Nov 1st, 1997	Distribution of Bulletin #2
May 1st, 1998	Completed Manuscript Due
Sept 1st, 1998	Acceptance of Full Paper
Oct 1st, 1998	Closing Date for Pre-Registration
Nov 16th-20th, 1998	Conference Dates

CORRESPONDENCE

Correspondence and inquiries relating to the Conference should be addressed to:

Dr. John Chien-Chung Li
 Secretary General/SEAGC 13
 c/o Public Construction Commission,
 Executive Yuan
 Fl. 9, No. 4, Chung Hsiao West Road, Sec. 1
 Taipei, Taiwan
 Republic of China
 Tel: 886-2-388-4962
 Fax: 886-2-388-4959
 E-Mail: seagc13@mail.pcc.gov.tw

KALENDAR (CALENDAR)

1997

May 9-11

SECOND BRITISH COLUMBIA PALEONTOLOGICAL SYMPOSIUM. Vancouver, British Columbia, Canada. (Vancouver Paleontological Society, Centre Point Post Office, P.O. Box 19653, Vancouver, BC V5T 4E7)

May 11-14

NEVES CORVO FIELD CONFERENCE (Meeting of SEG), Lisbon, Portugal. (F.J.A.S. Barriga, GEOFCUL, Edificio C2, Piso 5, Campo Grande 17000 Lisbon, Portugal. Phone: 351 1 750 0066; telefax: 351 1 759 9380; e-mail: Fernando.Barriga@fc.ul.pt; www: [http/NevesCorvo.geo.fc.ul.pt](http://NevesCorvo.geo.fc.ul.pt))

May 19-21

OTTAWA '97 (Geological Association of Canada, 50th Anniversary Celebrations), Ottawa, Canada. (Conference Secretariat, Ottawa '97, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario, Canada K1A 0E8. Phone: 613 947 7649; telefax: 613 947 7650; e-mail: ottawa97@emr.ca; www: <http://www.emr.ca/~ottawa97/ftp:nrcan.gc.ca>, directory gsc/ottawa97)

May 21-23

PETROLEUM SYSTEMS OF S.E. ASIA & AUSTRALASIA (International Symposium), Jakarta, Indonesia. (Jim Howes, ARCO Indonesia. Phone: 62-21-521-8108; telefax: 62-21-521-9063; e-mail: jhowes@is.arco.com)

May 25-30

GEOCHEMICAL EXPLORATION (18th International Symposium of AEG), Jerusalem, Israel. (IGES Secretariat, P.O. Box 50006, Tel Aviv, 61500 Israel. Telefax: 972 3 5140000; e-mail: iges@mail.igs.gov.il)

May 25-28

GLOBAL WARMING (International Conference and Exposition), New York, N.Y., by Global Warming International Center. (Singyan Shen, Chair, International Program Committee, c/o GWIC, 22W381 75th St., Naperville, III. 60565-9245. Phone: 630/910-1551; telefax: 630/950-1561)

May 26-30

EUROPEAN ASSOCIATION OF GEOSCIENTISTS AND ENGINEERS (EAGE) (59th Conference), Geneva, Switzerland. (EAGE, E.H. Bornkamp, P.O. Box 298, NL 3700 AG Zeist, Netherlands. Phone: 31/3069 62 655; telefax: 31/306962 640)

June 1-6

SEDIMENTATION, SEDIMENTARY EVENTS AND HYDROCARBON SYSTEMS (Annual joint CSPG-SEPM Convention), Calgary, Canada. (CSPG Office, 505 206 7th Avenue SW, Calgary, Alberta, Canada T2P0W7)

June 2-6

BASEMENT TECTONICS (International Conference), Blacksburg, Va. (A.K. Sinha, Dept. of Geological Sciences, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061-0420. Phone: 540/231-5580; telefax: 540/231-3386; e-mail: searches@vtvmi.cc.vt.edu)

June 15-18

SOUTH AMERICAN SYMPOSIUM ON ISOTOPE GEOLOGY, São Paulo, Brazil. (Professor Miguel A.S. Basei, P.O. Box 11348, São Paulo, Brazil. Phone: (55-11) 818 3994; telefax: (55-11) 8183993; e-mail: baseimas@usp.br)

June 15-21

CLAY CONFERENCE, Ottawa, Canada. (J.B. Percival, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario, K1A 0E8. Phone: 613/992-4496; telefax: 613/943-1286; e-mail: percival@gsc.emr.ca)

June 17-22

THE HISTORY AND DYNAMICS OF GLOBAL PLATE MOTIONS (Conference), Marshall, Calif. (AGU Meetings Dept., 2000 Florida Ave., Washington, D.C. 20009. Phone: 202/462-6900)

June 18-19

LATE QUATERNARY COASTAL TECTONICS, London UK. (Claudio Vita-Finzi, Geological Sciences, University College, Gower St., London WC1E 6BT. Phone: 44 171 3877050 ext. 2383; telefax: 44 171 3887614; e-mail: ucfbvcf@ucl.ac.uk)

June 22-25

ROCK SUPPORT — APPLIED SOLUTIONS FOR UNDERGROUND STRUCTURES (International Symposium), Lillehammer, Norway. (Mrs. Siri Engen, Norwegian Society of Chartered Engineers, P.O. Box 2312, Solli, N-0201 Oslo, Norway. Fax: +47 22 94 75 02)

June 23-27

ENGINEERING GEOLOGY AND THE ENVIRONMENT (International Symposium of IAEG), Athens, Greece. (Symposium Secretariat, P.O. Box 19140, GR-117 10 Athens, Greece. Telefax: 301 381 3900; 301 924 2570)

July 7-10

REMOTE SENSING TECHNOLOGY, MEASUREMENTS AND ANALYSIS (3rd International Conference), Copenhagen, Denmark. (Robert Rogers, ERIM Conferences, Box 134001, Ann Arbor, MI 48113-4001, USA. Phone: 313 994 1200; telefax: 313 994 5123; e-mail: raeder@erim.org; WWW: <http://www.erim.org/CONF/>)

July 9-12

MINING PHILIPPINES: PHILIPPINES MINERALS EXPLORATION, MINING EQUIPMENT, AND TECHNOLOGY (Exhibition and Conference), Manila, Philippines. (Stephen Luff. Telefax: 44 171 413 8222)

July 12-14

LANDSLIDE HAZARD ASSESSMENT (International Symposium), Xian, China by Japan Ministry of Education, Science, Culture and Sports and others. (K. Sassa, Disaster Prevention Research Institute, Kyoto University, Uji, Kyoto 611, Japan. Phone: 81/774 0789; telefax: 81/77 432 5597)

July 12-17

VERTEBRATE MORPHOLOGY (5th International Congress), Bristol, UK. (J.M.V. Raynor, School of Biological Sciences, University of Bristol, BS8 1UG, UK. Phone: 44 117 928 111; telefax: 44 117 025 7374; e-mail: icvm97@bristol.ac.uk)

July 14-17

GEOMECHANICS AND GROUND CONTROL IN MINING AND UNDERGROUND CONSTRUCTION (International Conference), Wollongong, NSW, Australia. (Naj Aziz, Dept.

of Civil and Mining Engineering, University of Wollongong, Wollongong, NSW, Australia 2522. Telefax: 61 42213238; e-mail: n.aziz@uow.edu.au)

July 18-20

WATER POLLUTION MODELING, MEASURING AND PREDICTION (4th International Conference). (Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA, UK. Phone: 44 1703 292853; e-mail: WIT@wessex.witcmi.ac.uk; WWW: <http://www.witcmi.ac.uk>)

July 20-27

DEVONIAN CYCLICITY AND SEQUENCE STRATIGRAPHY (Subcommission on Devonian Stratigraphy Symposium and field trips), Rochester, New York, USA. (William Kirchgasser, Department of Geology, SUNY Potsdam, Potsdam, NY 13676-2294, USA. Phone: 315 267 2295; telefax: 315 267 3170; e-mail: kirchgwt@potdams.edu)

July 27-31

OSTROCODA (13th International Symposium), Greenwich, UK. (ISO '97), School of Earth Sciences, University of Greenwich, Medway Towns Campus, Chatham Maritime, Kent ME4 4AW, UK. E-mail: iso97@greenwich.ac.uk)

July 28 - August 1

LEARNING ABOUT THE EARTH AS A SYSTEM (Second International Conference on Geoscience Education), University of Hawai'i, Hilo. (Dr. M. Frank Watt Ireton, GeoSciEd II Local Arrangements Coordinator, American Geophysical Union, 2000 Florida Avenue, NW, Washington, DC 20009. E-mail: fireton@kosmos.agu.org)

July 30 - August 9

CELEBRATION OF THE BICENTENARY OF CHARLES LYELL AND JAMES HUTTON, London and Edinburgh, UK. (P. Jackson, BGS, Keyworth, Nottingham NG12 5GG. Phone: 0115 936 3100; telefax: 0115 936 3200)

August

GRANITES AND ASSOCIATED MINERALIZATIONS (2nd International Symposium), Salvador, Brazil. (SGM-2nd ISGAM, General Secretariat, Av. 3, 390, Plataforma IV, CAB 41746-900, Salvador, Bahia, Brazil. Telefax: 5571 231 5655)

August 4-8

SEG/EAGE ISTANBUL '97 INTERNATIONAL GEOPHYSICAL CONFERENCE AND EXPOSITION, Istanbul, Turkey. (SEG, PO Box 702740, Tulsa, Oklahoma 74170, USA)

August 11-13

RESEARCH AND EXPLORATION — WHERE DO THEY MEET? (4th Biennial Meeting of the Society Applied to Mineral Deposits). (Congress Office/SGA Meeting 1997, University of Turku, Lemminkaisenkatu 18-18B, FIN-20520 Turku, Finland. Phone: + 358-21-333 6342; telefax: +358-21-333 6410; e-mail: cescon@utu.fi)

August 17-21

PALEOFORMAMS '97, Bellingham, Washington, USA. (Charles A. Ross, Department of Geology, Western Washington University, Bellingham, WA 98225-9080, USA. Phone: 360 650 3634; telefax: 360 650 3148; e-mail: rossjrp@henson.cc.wvu.edu)

August 18-29

INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR (29th General Assembly), Thessaloniki, Greece. (29th IASPEI general assembly geophysical laboratory. University, GR-54006. Thessaloniki, Greece. Phone: 30/31 998 528; e-mail: iaspei@olymp.ccf.auth.gr)

August 19-20

MINERAL EQUILIBRIA AND DATA BASES (International Meeting), Helsinki, Finland. (Pentti Hölttä, Geological Survey of Finland, SF-02150 Espoo, Finland. Phone: 358 0 469 32312; telefax: 358 0 462205)

August 28 - September 3

GEOMORPHOLOGY (4th International Conference of International Association of Geomorphologists), Bologna, Italy. (Planning Congressi, srl Via Crociali 2, I-40138 Bologna, Italy)

September 1-5

GEOLOGY AND ENVIRONMENT (50th Geological Congress of Turkey), Istanbul, Turkey. (Secretary GEOENV '97, PK 464, Kizilay, 06424 Ankara, Turkey. Phone: 90 312 4343691; telefax: 90 312 4342388; e-mail: jdogan@et.cc.hun.edu.tr)

September 1-5

IEC '97: FIFTH INTERNATIONAL ECLOGITE CONFERENCE, Ascona, Switzerland. (Professor V. Trommsdorff and Dr. R. Schmid, Mineralogy IEC 97, ETH centre, 8092 Zurich, Switzerland. Phone: XX41 1 632 3791; telefax: XX41 1 6321088; e-mail: rolf@erdw.ethz.ch; information and preliminary registration up to 31 October 1996 via <http://www/erdw.ethz.ch/~rolf/>)

September 2-4

PALAEONTOLOGY AND STRATIGRAPHY OF SOUTH AMERICA (2nd European Meeting), in conjunction with the 18th IAS Regional Meeting on Sedimentology), Heidelberg, Germany. (Peter Bengtson, Geologisch-Palaontologisches Institut, Im Neuenheimer Feld 234, D-69120 Heidelberg, Germany. Phone: 49 6221 548293; telefax: 49 6221 548640; e-mail: Peter.Bengtson@urz.uni-heidelberg.de; WWW: <http://ix.urz.uni-heidelberg.de/~dc8/geo/1st-sam.html>)

September 2-4

SOUTH ATLANTIC MESOZOIC CORRELATIONS (Regional Meeting of IGCP Project 381), Heidelberg, Germany. (Peter Bengtson, Geologisch-Palaontologisches Institut, Im Neuenheimer Feld 234, D-69120 Heidelberg, Germany. Phone: 49 6221 548293; telefax: 49 6221 548640; e-mail: Peter.Bengtson@urz.uni-heidelberg.de; WWW: <http://ix.urz.uni-heidelberg.de/~dc8/geo/1st-381.html>)

September 1-5

GEOLOGY AND ENVIRONMENT (Int'l. Symposium), Istanbul, Turkey, by the Chamber of Geological Engineers. (I. Yilmazer, GEOENV '97, P.K. 464 Kizilay, 06424 Ankara, Turkey. Phone: 9-0-312-4343601; telefax: 9-0-312-4342388; e-mail: jdogan@et.cc.hun.edu.tr)

September 7-10

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Conference and Exhibition), Vienna, Austria. (AAPG Convention Department, Box 979, Tulsa, OK 74101, USA. Phone: 1/918 560 26 79; telefax: 1/918 560 26 84)

September 9-12

OFFSHORE EUROPE '97 (Oil and Gas Exhibition and Conference), Aberdeen, Scotland, UK. (Offshore Europe Partnership, Ocean House, 50 Kingston Road, New Malden, Surrey KT3 3LZ, UK)

September 10-15

FAULTS AND SUBSURFACE FLUID FLOW: FUNDAMENTALS AND APPLICATIONS TO HYDROGEOLOGY AND PETROLEUM GEOLOGY (Geological Society of America Penrose Conference), Albuquerque and Taos, New Mexico. (William C. Haneberg, New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, 2808 Central Avenue SE Albuquerque, NM 87106. E-mail: haneberg@nmt.edu)

September 11-14

ALEWECA — ALPINE EVOLUTION OF THE WESTERN CARPATHIANS AND RELATED AREAS (International Conference held on the occasion of the 100th anniversary of the birth of Professor D. Andrusov), Bratislava, Slovakia. (Dr. Józef Hok, Slovak Geological Society, Mlynská Dol, 1, SK-81704, Bratislava, Slovak Republic. Phone: +42-7-3705445; telefax: +42-7-371940; e-mail: hoc@guds.sanet.sk)

September 14-18

EXPLORATION '97 (4th Decennial International Conference), Toronto, Canada. (I. MacLeod, Geosoft Inc., Suite 500, 204 Richmond Street W, Toronto, Ontario ON M5H 2G4, Canada)

September 15-25

SOUTHERN NEW ENGLAND OROGEN, AUSTRALIA (SCCS Field and General Meeting 1997), Armidale, Australia. (Dr. Ian Metcalf, Department of Geology and Geophysics, University of New England, Armidale, NSW 2351, Australia. Phone: 61 67 73 2860; telefax: 61 67 73 3300; e-mail: imetcalf@metz.une.edu.au)

September 16-19

PLACERS AND WEATHERED-ROCK MINERAL DEPOSITS (11th International Symposium), Moscow-Dubna, Russia. (N. Patyk Kara, Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry of RAS, Staromonetny per., 35, Moscow, 109017,

Russia. Phone: 007 095 2308427; telefax: 007 095 230 2179; e-mail: pkara@igem.msk.su)

September 21-27

GROUNDWATER IN THE URBAN ENVIRONMENT (27th IAH Congress) (Professor J.D. Mather, Geology Dept., Royal Holloway and Bedford New College, Egham, Surrey TW20 0EX, UK. Telefax: 784 471780)

September 23-28

TECTONICS OF CONTINENTAL INTERIORS (Geological Society of America Penrose Conference), Brian Head Resort near Cedar City, Utah. (Michael Hamburger, Dept. of Geological Sciences, Indiana University, Bloomington, IN 47405, USA. E-mail: hamburg@ucs.indiana.edu)

September 30 - October 3

CONCEPTS AND MODELS FOR SUSTAINABLE WATER RESOURCES MANAGEMENT (FRIEND '97 Conference on Regional Hydrology), Postojna, Slovenia. (Dr. M. Brilly, FGG Hydraulics Division, Hajdrihova 28, 6100 Ljubljana, Slovenia. Phone: (386) 61 1254 333; telefax: (385) 61 219 987; e-mail: mitja.brilly@uni-lj.si)

September 30-October 5

MAIN CHANGES IN THE MARINE AND TERRESTRIAL ATLANTIC REALM DURING THE NEOGENE (2nd Regional Congress), Salamanca, Spain. (Departamento de Geología (Palaeontología, Facultad de Ciencias, Universidad de Salamanca, 37008 Salamanca, Spain. Phone: 34 23 294497; telefax: 34 23 394514; e-mail: Civis@gugu.usal.es/Angel@gugu.usal.es)

October 5-10

ENVIRONMENTAL GEOCHEMISTRY (4th International Symposium), Vail, Colorado, USA. (R.C. Severson or L.P. Gough, US Geological Survey, DFC, Box 25046, MS 973, Denver Colorado 80225, USA. Telefax: (1) 303 236 3200)

October 6-10

MATHEMATICAL METHODS IN GEOLOGY (Part of the Mining Příbram Symposium), Prague, Czech Republic. (V. Nemeč, Krybnicum 17, 100 00 Praha 10-Strasnice, Czech Republic. Phone: 422 7811801; telefax: 42306 23169)

October 12-16

TECHNOLOGY AND GLOBALISATION: LEADING THE PETROLEUM INDUSTRY INTO THE 21ST CENTURY (15th World Petroleum Congress), Beijing, China. (Organising Committee, c/o China National Petroleum Corporation, P.O. Box 766, Liu Pu Kang, Beijing 100724, China)

October 20-22

IMPROVED OIL RECOVERY (9th European Symposium), The Hague, The Netherlands. (IOR '97, EAGE, P.O. BOX 298, 3700 AG Zeist, The Netherlands)

October 20-23

GEOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING, Denver, Colorado, USA. (GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301, USA. Phone: 800 472 1988)

October 26-29

PETROLEUM GEOLOGY OF NORTH-WEST EUROPE (5th Conference and Exhibition), London, UK. (CASIL, 4 Cavendish Square, London, W1M 0BX, UK. Phone: 44/171 499 0900; telefax: 44/171 629 3233)

November 3-5

TECTONICS OF EAST ASIA (International Conference & Sino-American Symposium), Chungli, Taiwan. (Dr. Ching-Hua Lo, Department of Geology, National Taiwan University, 245 Choushan Road, Taipei 106, Taiwan, ROC. Telefax: 886-2-3636095; e-mail: lo@sun03.gl.ntu.edu.tw; www: <http://sun03.gl.ntu.edu.tw/tea.html> or Dr. Jean Crespi, Department of Geology and Geophysics, University of Connecticut, Storrs, CT 06269-2045, U.S.A. Phone: 860-486-0601; telefax: 860-486-1838; e-mail: crespi@geol.uconn.edu)

November 12-14

THE 19TH NEW ZEALAND GEOTHERMAL WORKSHOP (Workshop), New Zealand. (c/o Geothermal Institute, The University of Auckland, Private Bag 92019, Auckland, New Zealand. Telefax: 64-9-373 7436; e-mail: geo.wshop@auckland.ac.nz)

November 17-19

APPLIED GEOLOGIC REMOTE SENSING (12th International Conference and Workshop), Denver, Colorado, USA. (Robert Rogers, ERIM, Box 134001, Ann Arbor, MI 48113 4001 USA. Phone: (1) 313 994 1200; telefax: (1) 313 994 5123; e-mail: raeder@erim.org)

November 17-21

DEEP FOUNDATIONS, EXCAVATIONS, GROUNDIMPROVEMENT & TUNNELLING, (Symposium), Bangkok, Thailand. (Prof. A.S. Balasubramaniam, The Hon. Secretary General Southeast Asian Geotechnical Society, c/o Asian Institute of Technology, P.O. Box 4, Klong Luang, Pathumthani 12120, THAILAND. Phone: (66-2) 524 5519, (66-2) 524 5537; telefax: (66-2) 516 2126, (66-2) 524 5523)

November 30 - December 3

PERMIAN OF EASTERN TETHYS: BIOSTRATIGRAPHY, PALAEOGEOGRAPHY & RESOURCES (International Conference), Melbourne, Australia. (The Secretariat, Permian of Eastern Tethys Conference, School of Aquatic Science & Natural Resources Management, Deakin University, Rusden Campus, 662 Blackburn Road, Clayton, Victoria 3168, Australia. Phone: 61-3-9244 7429; telefax: 62-3-9244 7480; e-mail: asnrm@deakin.edu.au)

1998

CANADIAN INSTITUTE OF MINING, METALLURGY AND PETROLEUM (100th annual general meeting), Quebec, Canada. (John Gaydos, Meetings Manager, Canadian Institute of Mining and Metallurgy, 1 Place Alexis Nihon, 1210-3400 de Maisonneuve Boulevard West, Montreal, Quebec H3Z 3B8, Canada. Phone: (514) 939-2710; telefax: (514) 939-2714)

10TH IAGOD SYMPOSIUM, Australia. (Professor I.R. Plimer University of Melbourne, Parkville, VIC 3052, Australia. Phone: 613 3446520; telefax: 613 3447761)

January 28-30

EXPLORATION METHODS '98: PATHWAYS TO DISCOVERY (International Meeting following annual Cordilleran Roundup), Vancouver, Canada. (BC and Yukon Chamber of Mines, Attn. Technical Chair, 840 West Hastings St., Vancouver, British Columbia, Canada V6C 1C8. Telefax: 604 681 2363)

March 23-24

ASIA PACIFIC CONFERENCE ON INTEGRATED MODELLING FOR ASSET MANAGEMENT (Conference), Kuala Lumpur, Malaysia. (SPE Kuala Lumpur Office, Lot F1/01, First Floor, Citypoint, Kompleks Dayabumi, Jalan Sultan Hishamuddin, 50050 Kuala Lumpur, Malaysia. Phone: 6-03-294-7211; telefax: 6-03-294-5158)

April 13-17

15TH INTERNATIONAL SEDIMENTOLOGICAL CONGRESS, Alicante, Spain. (15th International Sedimentological Congress, Departamento de Ciencias de la Tierra y Medio Ambiente, Facultad de Ciencias, Campus de San Vicente de Raspeig, Universidad de Alicante, Apardo 99, 03080 Alicante, Spain. Phone: 34 65903552; telefax: 34 65903552; e-mail: ctierra@vm.cpd.ua.es)

April 13-17

KIMBERLITES (5th International Conference), Cape Town, South Africa. (J.J. Gurney, 71KC, Department of Geological Sciences, University of Cape Town, Private Bag, Rondebosch 7700, South Africa. Phone: 27 21 531 3162; telefax: 27 21 650 3783; e-mail: 71KC@GEOLOGY.UCT.AC.ZA; URL: <http://www.uct.ac.za/depts/geolsci/71KC/>)

April 19-23

COMPUTER APPLICATIONS IN THE MINERALS INDUSTRY — APCOM '98 (27th International Symposium), London, UK. (Conference Office, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK. Phone: +44 (0)171 580 3802; telefax: +44 (0)171 436 5388; e-mail: 106115.233@compuserve.com)

April 20-22

GEO '98 (Middle East Geosciences Exhibition and Conference), Bahrain. (Stephen Key,

Arabian Exhibition Management WLL, P.O. Box 20200, Manama, Bahrain. Phone: 973 550033; telefax: 973 553288)

April 20-23

HYDROLOGY, WATER RESOURCES AND ECOLOGY IN HEADWATERS (International Interdisciplinary Conference — Head-Water '98), Merano, Italy. (HeadWater '98, c/o European Academy, Weggensteinstrasse 12/A, 1-39100 Bozen/Bolzano, Italy. Phone: 39 471 30 61 11; telefax: 39 471 30 60 99; e-mail: HeadWater98@ms.sinfo.interbusiness.it)

June 8-12

EUROPEAN ASSOCIATION OF GEOSCIENTISTS AND ENGINEERS (EAGE) (60th Conference), Leipsig, Germany. (EAGE, E.H. Bornkamp, P.O. Box 298, NI 3700, AG Zeist, The Netherlands. Phone: 31/3069 62 655; telefax: 31/3069 62 640)29)

June 23-25

THE ROLE OF A NATIONAL GEOLOGICAL SURVEY IN SUSTAINABLE DEVELOPMENT (International Conference), Gaborone, Botswana. (The Secretariat (Attention: Mr. B.K. Paya), 50th Anniversary Conference, Department of Geological Survey, Private Bag 14, Lobatse, Botswana. Phone: (267) 331721; telefax: (267) 332013; e-mail: 100076.1001@compuserve.com)

June 28 - July 5

GONDWANA 10, Cape Town, South Africa. (Organising Committee Gondwana 10, Department of Geological Sciences, University of Cape Town, Rondebosch, South Africa. Phone: 27 21650 3171; telefax: 27 21650 3167)

June 29 - July 2

15TH CARIBBEAN GEOLOGICAL CONFERENCE, Kingston, Jamaica. (Dr. Trevor Jackson, c/o Department of Geography and Geology, University of the West Indies, Kingston 7, Jamaica. Telefax: 809 927 1640)

June 29 - July 18

8TH INTERNATIONAL PLATINUM SYMPOSIUM (IAGOD/CODMUR), Johannesburg, South Africa. (Dr. C.A. Lee, P.O. Box 68108, Bryanston, South Africa. Phone: 1127 373 2580; telefax: 1127 836 0371; e-mail: cle@amplats.co.za)

10TH IAGOD SYMPOSIUM, Broken Hill, Australia. (Professor I.R. Plimer, University of Melbourne, Parkville, VIC 3052, Australia. Phone: 613 3446520; telefax: 613 3447761)

August 9-15

INTERNATIONAL MINERALOGICAL ASSOCIATION: IMA '98 (17th General Meeting), Toronto, Canada. (Professor A.J. Naldrett, Department of Geology, University of Toronto, Canada M5S 3B1. Phone: (416) 978 3030; telefax: (416) 978 3938; e-mail: ima98@quartz.geology.utoronto.ca)

August 17-19

GEOSEA '98 (Ninth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia), Kuala Lumpur, Malaysia. (The Organising Secretary, GEOSEA '98, Geological Society of Malaysia, c/o Department of Geology, University of Malaya, 50603 Kuala Lumpur, Malaysia. Phone: +(603) 757 7036; telefax: +(603) 759 3900; e-mail: geologi@po.jaring.my)

August 17-20

THE JURASSIC SYSTEM (5th International Symposium), Vancouver, Canada. (P.L. Smith, Earth and Ocean Science, University of British Columbia, 6339 Stores Rd., Vancouver, BC, V6T 1Z4 Canada. Phone: (604) 822-6456; telefax: (604) 822 6088; e-mail: psmith@cos.ubc.ca; WWW: <http://www.eos.ubc.ca/jurassic/announce.html>)

September 8-10

COASTAL ENVIRONMENT 98 — ENVIRONMENTAL PROBLEMS IN COASTAL REGIONS (Conference), Cancun, Mexico. (Liz Kerr, Conference Secretariat, COASTAL ENVIRONMENT 98, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK. Phone: 44 (0) 1703 293223; telefax: 44 (0) 1703 292853; e-mail: liz@wessex.ac.uk; <http://www.wesses.ac.uk>)

September 14-17

MODERN EXPLORATION AND IMPROVED OIL AND GAS RECOVERY METHODS (2nd International Conference), Kraków, Poland. (DEXTER Congress and Symposium Bureau, Wroclawska 37A, 30-011 Kraków, Poland. Phone: 48 12 340 808; telefax: 48 12 336313; e-mail: kongresy@dexter.krakow.pl)

October 26-29

GEOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING, Toronto, Ontario, Canada. (GSA Meetings Department, P.O. Box 9140, Boulder CO, 80301 USA. Phone: 800 472 1988)

October/November

PHYSICAL, CHEMICAL AND BIOLOGICAL ASPECTS OF AQUIFER-STREAM SEDIMENT INTERRELATIONS (28th IAH Congress) (Dr. J. Rosenschein, USGS MS 414, National Center, Reston Va 22092, USA; Telefax: 703 648 5722)

November 16-20

THIRTEEN SOUTHEAST ASIAN GEOTECHNICAL CONFERENCE (Conference), Taipei, Republic of China. (Dr. John Chien-Chung Li, Secretary General/SEAGC 13, c/o Public Construction Commission, Executive Yuan, Fl. 9, No. 4, Chung Hsiao West Road, Sec. 1, Taipei, Taiwan, Republic of China. Phone: 886-2-388-4962; telefax: 886-2-388-4959; e-mail: seagc13@mail.pcc.gov.tw)

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August 4-12

AFRICA, CRADLE OF HUMAN KIND DURING THE QUATERNARY (XV INQUA Congress), Durban, South Africa. (Professor T.C. Partridge, Climatology Research Center, University of Witwatersrand, 13 Cluny Rd, Forest Town, Johannesburg 2193, South Africa. Phone: +27 11 646 3324; telefax: +27 11 486 1689; e-mail: 141tcp@cosmos.wits.ac.za)

August 14-25

CARBONIFEROUS-PERMIAN (XIV International Congress), Calgary, Alberta, Canada. (Dr. Charles Henderson, Associate Professor, Department of Geology and Geophysics, The University of Calgary, N.W. Calgary, Alberta, Canada T2N 1N4. Phone: 403 220 6170; telefax: 403 285 0074; e-mail: henderson@geo.ucalgary.ca)

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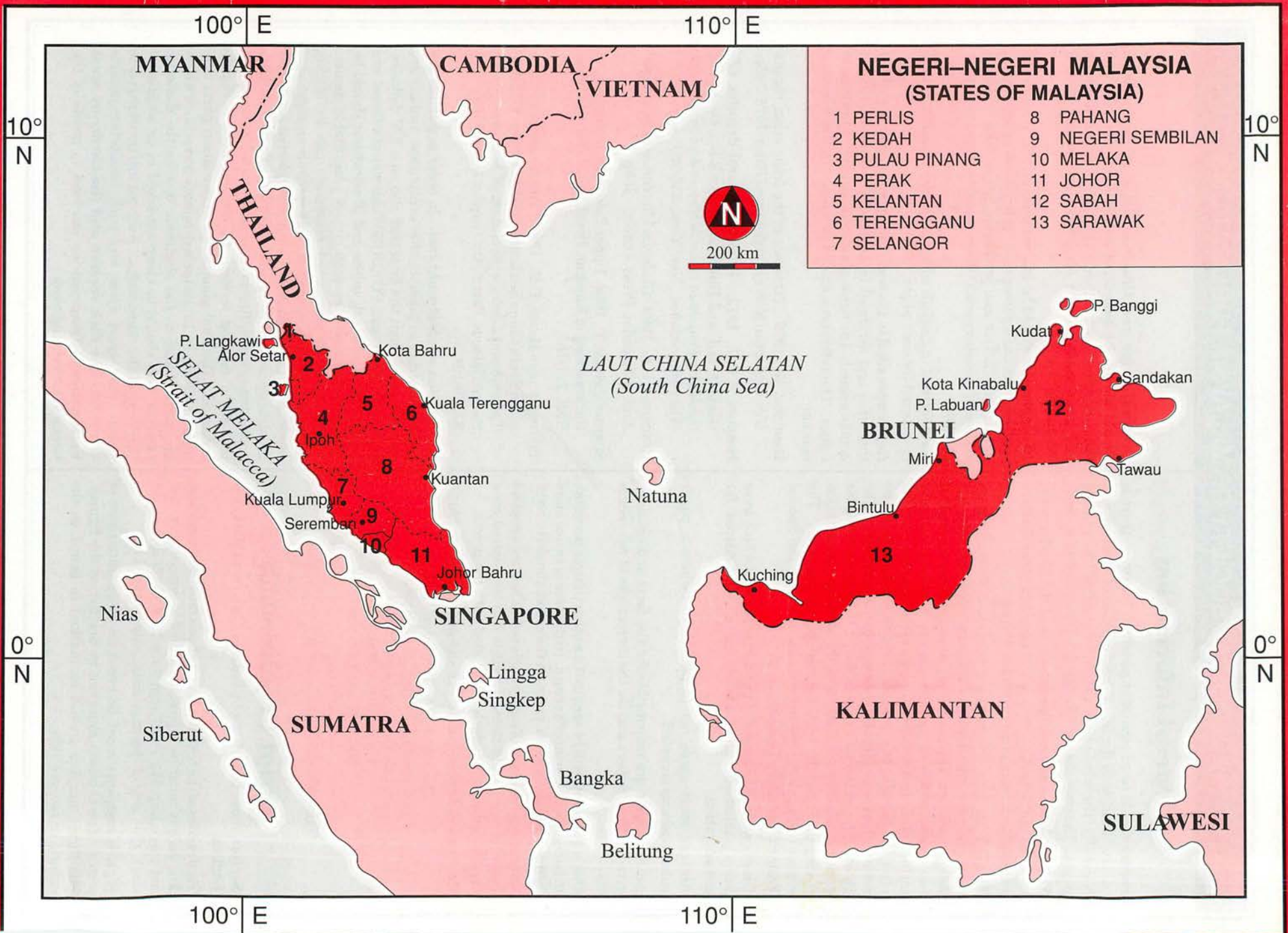
HOSKING, K.F.G., 1973. Primary mineral deposits. In Gobbett, D.J. and Hutchison, C.S. (Eds.), *Geology of the Malay Peninsula (West Malaysia and Singapore)*. Wiley-Interscience. New York, 335-390.

HUTCHISON, C.S., 1989. *Geological Evolution of South-east Asia*. Clarendon Press, Oxford. 368p.

SUNTHARALINGAM, T., 1968. Upper Paleozoic stratigraphy of the area west of Kampar, Perak. *Geol. Soc. Malaysia Bull. 1*, 1-15.

TAYLOR, B., AND HAYES, D.E., 1980. The tectonic evolution of the South China Sea basin. In: D.E. Hayes (Ed.), *The Tectonic and Geologic Evolution of Southeast Asian Sea and Islands, Part 2. Am. Geophy. Union Monograph 23*, 89-104.

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