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PERSATUAN GEOLOGI MALAYSIA

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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.

**Kota Tampan: A Late Pleistocene palaeolithic workshop on
the shore of palaeo-Cenderoh Lake in Perak**

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In the seventies the so called Palaeolithic Tampanian culture and its Middle Pleistocene age were questioned by a number of archaeologists. In early 1987, Zuraina Majid, an archaeologist of Universiti Sains Malaysia, resurveyed the Kota Tampan area in Perak (Fig. 1) and discovered a Palaeolithic worksite close to a former excavation by Sieveking (1958) and a few hundred metres west from the initial diggings by Collings (1938). Since then, under Professor Zuraina's leadership, a team of Museum personnel, graduate and undergraduate students of USM, and several researchers from diverse fields (dentistry, chemistry, computer science, pedology, geology) has already spent several hundred man-days studying the site and surrounding areas and collecting a large amount of stone implements. Surface finds of stone artefacts were also recorded in a wide area around the site. The stone implements and the recognition of a workshop have firmly established the Palaeolithic industry at Kota Tampan.

The worksite contains boulders, gravel and palaeolithic artefacts of quartzite and silicified meta-tuffite. The boulders and gravel originally formed a natural gravel deposit of less than 2 metres thickness at a topographic break-in-slope. The clasts at the worksite are characterised by the following features (Zuraina Majid & Tjia, 1988).

1. On the top surface of the boulders are distinct percussion marks, suggesting that these boulders were used as anvils.
2. Around these anvils were found flakes and chips confirming the function of the boulders as anvils.
3. Angular chunks of quartzite and meta-tuffite were cores whose detached flakes were found

within an approximate 0.25 m radius. Some of the flakes could be matched to their respective cores.

4. The cores and anvils, for instance, show attributes that occur repeatedly in many pieces, suggesting that these are not natural occurrences but result from a definite system of production.
5. On the flakes and cores are also straight flaking surfaces, which can be produced by targeting blows onto zones of weakness or veins in the rock.
6. Several thousand flakes of the mentioned rock material (hardness around 7) were present in the excavation and their large number appears to preclude production through natural processes. Moreover, the site occupies an old lake shore and therefore a low-energy environment where attrition of boulders and gravel by natural processes are most unlikely.

Silicic volcanic ash reaching thicknesses up to 9 m (at the confluence of the Pelus river and the Perak river, Scrivenor, 1931) forms surficial deposits at many localities in the Perak river basin. In the Kota Tampan area such ash is between 1 and 3 m thick. At the Kota Tampan worksite, volcanic glass is found mixed with soil forming the groundmass in which the stone tools were found. Volcanic ash is also an important admixture of the debris that originally formed the surface layer overlying the stone-tools' horizon. This surface layer was scraped off several years ago when the general area was replanted with oil palm seedlings. In other words, it seems certain that volcanic ash covered the worksite. Collings published a section of his excavation, a few hundred metres distance from the particular worksite, showing a metre thick volcanic ash topping the stone tools.

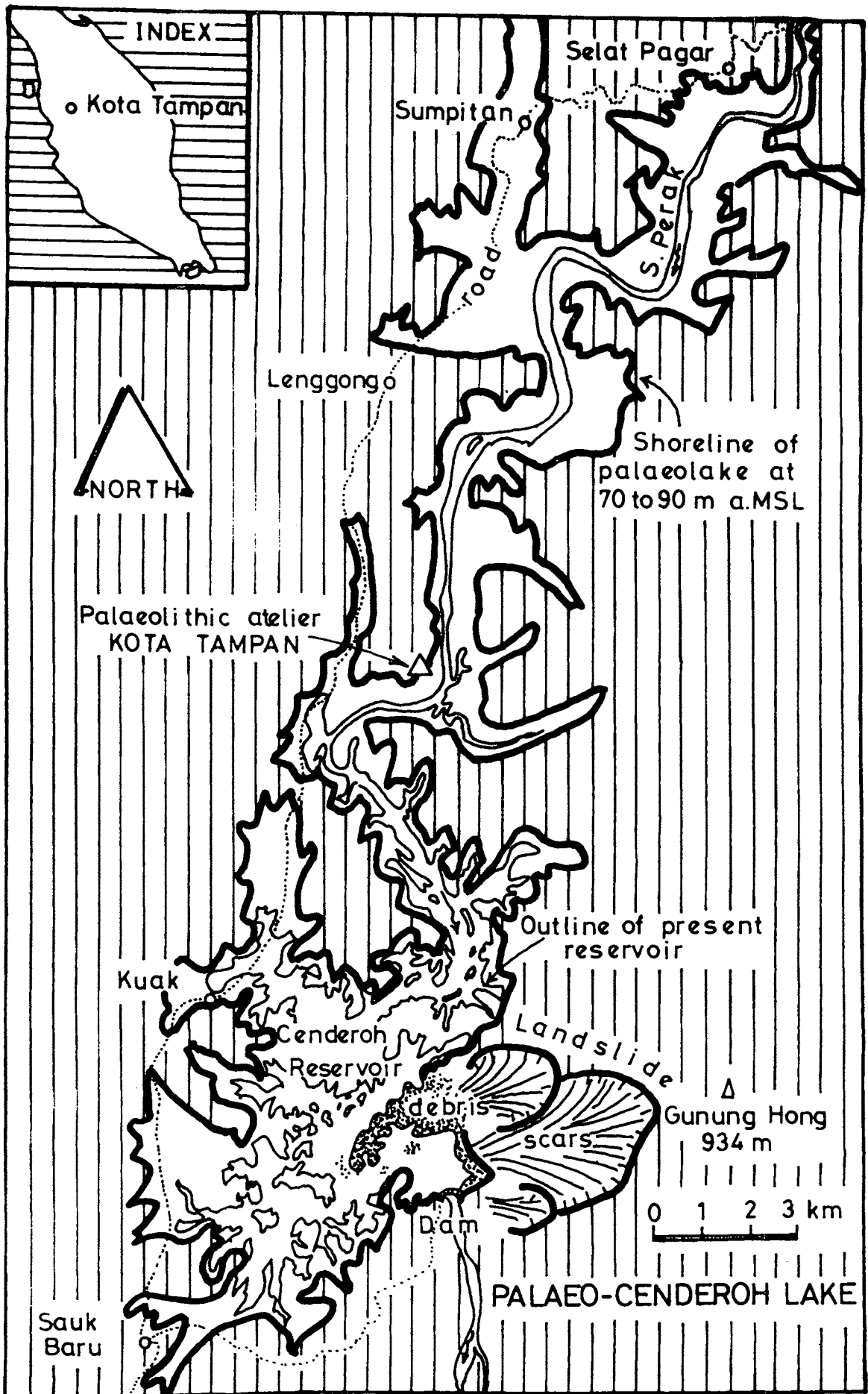


Figure 1. The extent of the Palaeo-Cenderoh Lake on which shore was located the Kota Tampan palaeolithic atelier.

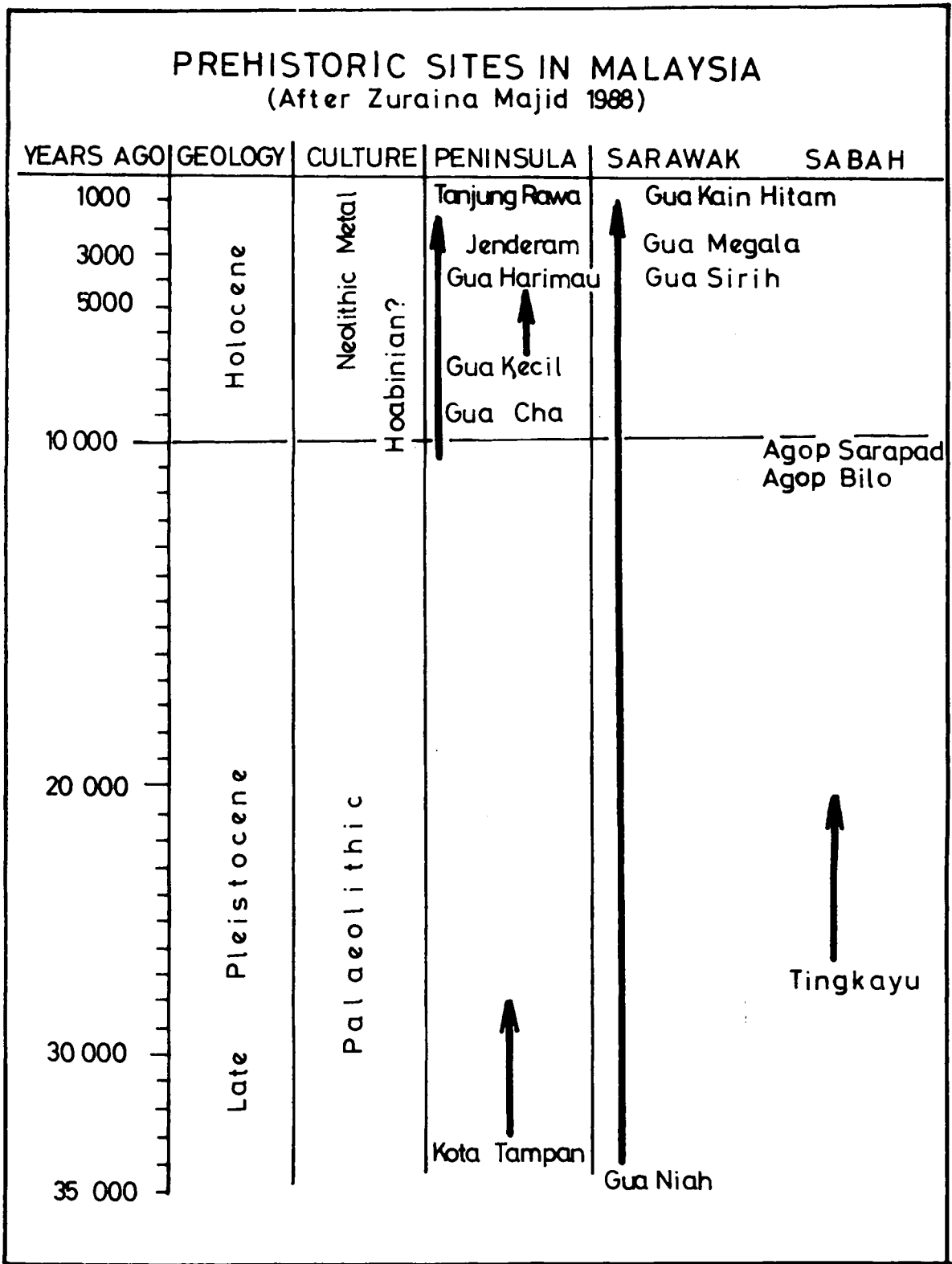


Figure 2. The prehistory chronology of Malaysia.

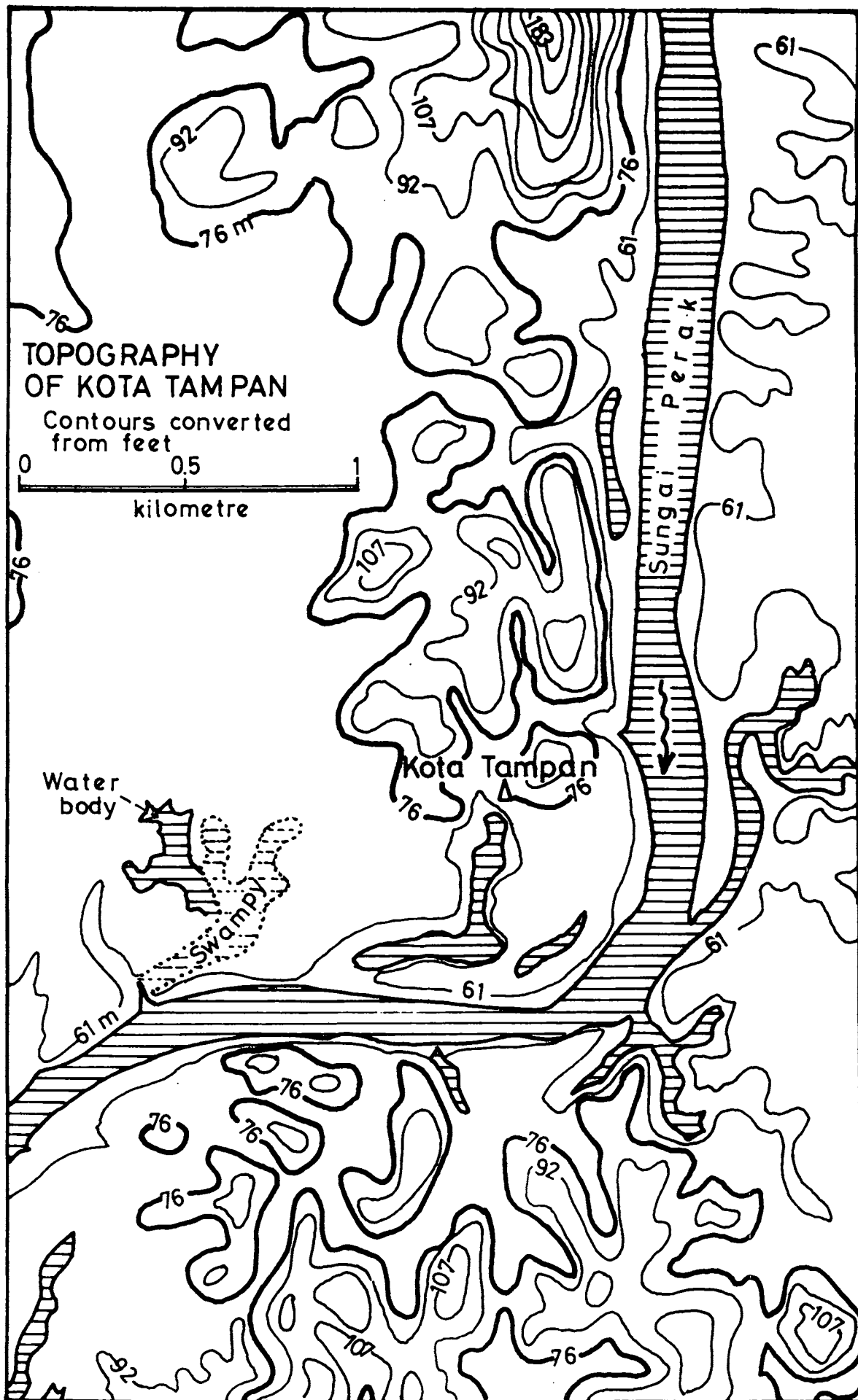


Figure 3. Topographic map of the Kota Tampan palaeolithic workshop.

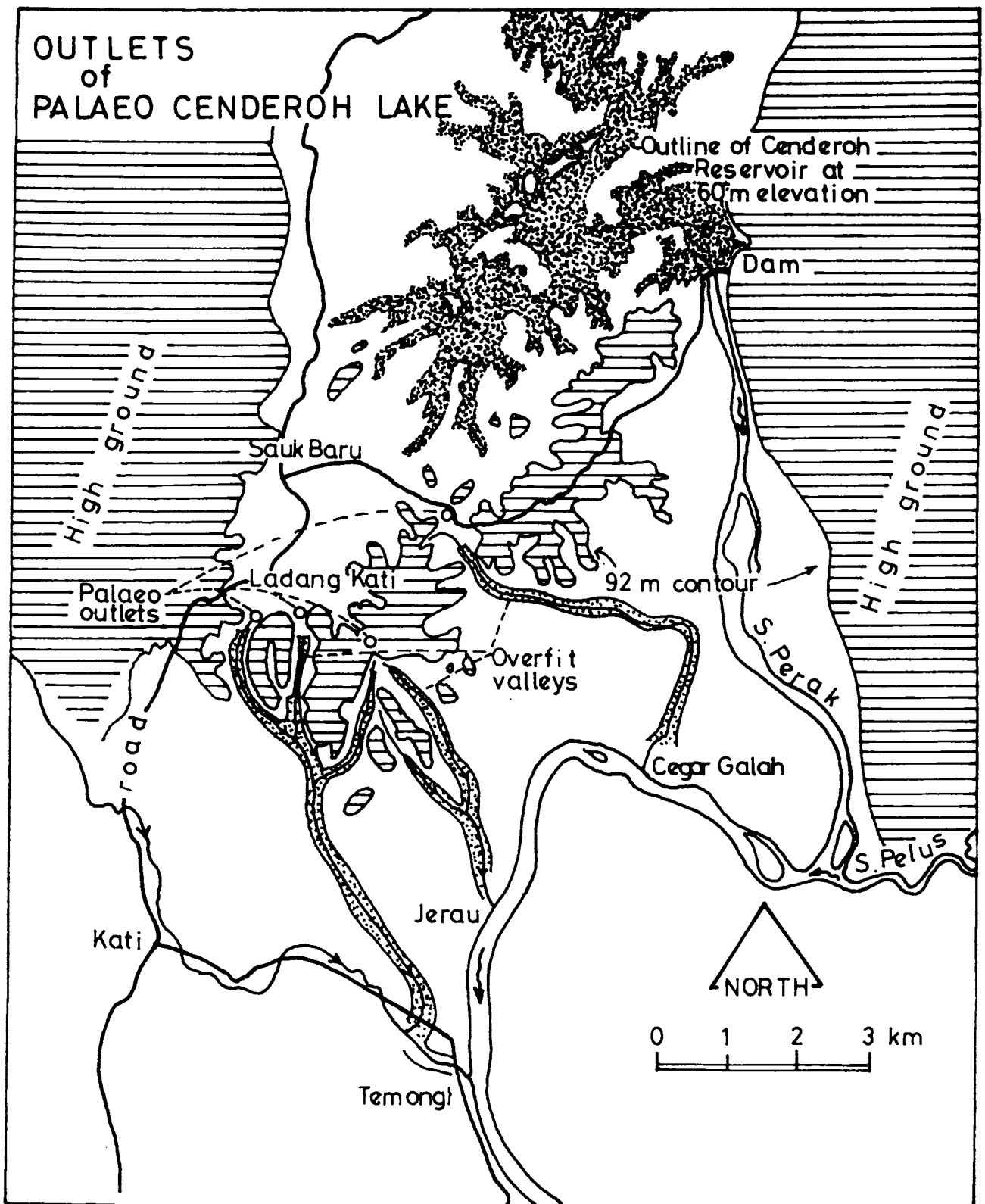


Figure 4. Palaeo-outlets and wide, abandoned channels of the old lake.

Zircons from the ash at Kota Tampan were dated at $31,000 \pm 3000$ BP by fission track method (Stauffer *et al.*, 1980). This ash has been interpreted to have originated in the Toba Lake area in Sumatra, some 250 km to the

west. The huge Toba cauldron has produced at least four catastrophic volcanic eruptions since 1.9 Ma ago, the latest being represented by silicic volcanic ash 0.03 Ma old. This age corresponds with the silicic volcanic ash at

Kota Tampan and at Ampang, Kuala Lumpur.

The importance and the chronologic position of the palaeolithic worksite at Kota Tampan is indicated in Figure 2.

GEOMORPHOLOGY

In the general area of Kota Tampan, the Perak river winds in short bends within a 6.5 km wide, NNE trending depression that is flanked by mainly granitic, hilly to mountainous topography (Fig. 1). The 1:63,360 topographic maps clearly show that steeper hill and mountain slopes suddenly change into low undulating hills at the 250-foot (75 m) contour line. This slope break has been interpreted to mark the general shoreline of an old lake that extended between Selat Pagar in the north and the hilly ridge striking northeast from Sauk Baru (Fig. 1). At present a 25 square km artificial reservoir occupies the lower end of the palaeo-lake that at times was as large as 70 square km. The Kota Tampan worksite at 235 feet (± 72 m) was at one of the fluctuating lake shores (Fig. 3). The existence of a palaeo-lake is further supported by the following.

1. On the west slopes of Gunung Hong, three large, crescentic scars form deep scallops opening towards west. The artificial dam site also lies at the foot of the scalloped slope amidst hummocky topography that contains large granitic boulders. The scallops are most probably large landslide scars; the hummocky topography and boulders at its lower end are landslide debris. Under wetter climatic conditions in the past, large scale mass movements affected the slopes of Gunung Hong and its debris dammed the Perak river at the narrows which are now artificially dammed. The natural damming created a lake, the Palaeo-Cenderoh Lake.
2. The hilly ridge trending northeast from Sauk Baru reaches up to 400 feet (120 m) but has passes at approximately 290 feet (± 95 m). These passes are interpreted to have served as outlets for the palaeo-lake (Fig. 4).
3. Immediately to the south of the above mentioned ridge are several overfit valleys through which run very small streams. The valleys may be as wide as 60 m and are now

used as wet rice fields. The present small streams running in these valleys could not have eroded the wide valleys. The upper ends of the valleys lie close to the palaeo-outlets. I interpret the wide valleys to have been carved by rivers draining the palaeo-lake through the outlets mentioned earlier (Fig. 4).

4. I assume that the palaeo-lake waters eventually also overtopped its natural dam at the foot of Gunung Hong. The landslide debris forming the dam may be expected to have been more easily eroded and undermined because of their incoherent nature. More rapid erosion of the debris resulted in lowering of the lake level, reversion of the lake outlet to the narrows occupied by the debris, and ultimately draining the lake completely. Calcareous algal crust in association with horizontal notches in Palaeozoic, crystalline limestone in the upper end of the old lake mark approximate lake levels and have radiocarbon ages of 27,000 BP and 6,700 BP (work in progress), suggesting that the palaeo-lake already existed when the volcanic ash blanketed the area some 30,000 years ago and persisted until the middle Holocene.

Geological and geomorphological studies in the general Kota Tampan area were carried out as part of Projek Arkeologi Malaysia under the leadership of Professor Zuraina Majid. A site museum will be constructed at Kota Tampan.

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CATATAN GEOLOGI

Geological Notes

Geology, mining and tailing characteristics of the Selinsing Gold Mine, Pahang : a preliminary study

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Abstract : The Selinsing Gold Mine is underlain by calcareous phyllite and limestones. The gold mineralization here is directly related to quartz veins which are hosted by the calcareous phyllite, and conform to the bedding planes, striking between 340° and 350°. The mining operations involve the extraction of gold bearing material, grinding, mechanical separation and chemical treatment. The waste products include barren soil and rock as well as tailing in the settlement ponds. Tailing characteristics, like the solid content, particle size fractions, composition and the content of some heavy metals are briefly described.

INTRODUCTION

The Selinsing Gold Mine is located about 51 km north of Raub in northwest Pahang, Peninsular Malaysia. Historically, it has produced only slightly in excess of a tonne of gold, mainly under foreign management.

The present management began operations in 1991 as a small scale eluvial mine on the northern side of a 160 meter high hill. It has since progressed on to hardrock mining. Plans are now afoot to go underground in the northern sector while simultaneously developing the southern side of the hill.

GEOLOGY AND MINERALIZATION

A major proportion of the Selinsing Mine is underlain by weathered calcareous phyllite. Floats of fresh phyllite obtained from an old shaft are dark grey, hard and thinly foliated. The north-east section is covered by hard, dark grey limestones (Fig. 1). Limestone lenses are found in the calcareous phyllite nearer to the limestone-phyllite border in the eastern part of the mine. Limestones also predominate at the base of the hill, where the mine is located. Both these rock types are part of the Raub Group.

Recent mapping has revealed a N-S trending zone of mylonitic rock exposed in the southern

part of the working area, in the northern sector of the mine. This foliated rock has all the features of a mylonite but the mechanism of deformation has yet to be ascertained. Therefore, it is referred to as mylonitic rock, a general field term as defined by Tullis *et al.* (1982).

Basically, it contains elongated clasts of phyllitic material and quartz set in a matrix of greyish fine grained material. The long axis of these clasts are parallel to the foliation, which make an acute angle to the zone of deformation. Quartz veinlets are found cutting across the clasts. Some of the ellipsoidal quartz are up to 4 cm across.

The general strike of the phyllite throughout the mine lies between 340° and 350°, with the dip usually between 65° and 81° to the east. Faulting has occurred in at least two directions. The most common are strike faults, usually coinciding with the bedding planes. These have resulted in the formation of the mylonitic rocks which are located in the southern side of the present working area. The second fault trends about 040°, causing a displacement of less than a few metres.

The gold mineralization is directly related to quartz veins. The veins generally have a thickness ranging from 2 to 15 cm and a maximum thickness of 60 cm has been observed where the

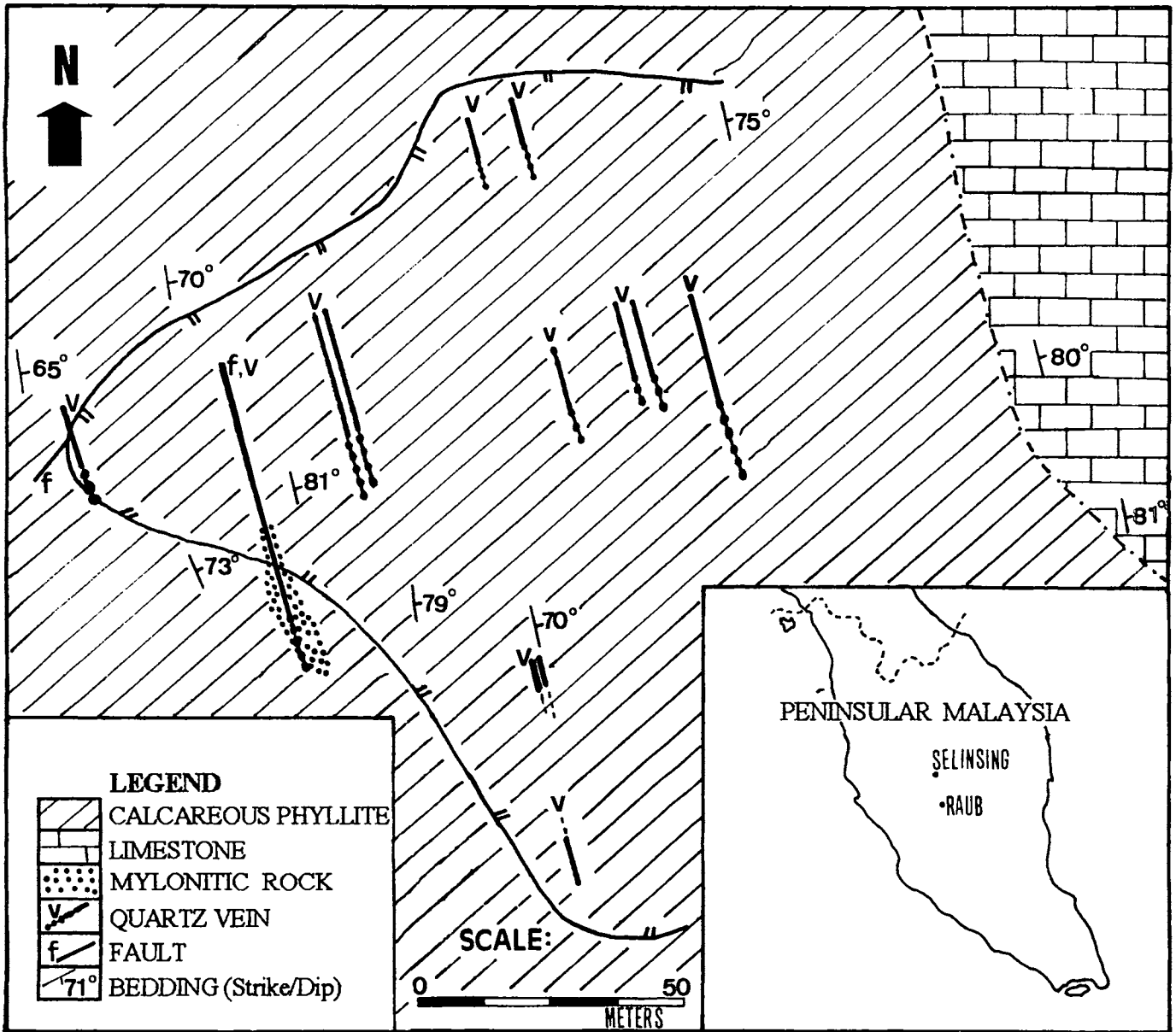


Figure 1: Sketch map showing the distribution of calcareous phyllite, limestone, mylonitic rocks, quartz veins and faults in the working area of the northern sector in the Selinsing Gold Mine.

veins swell out vertically. The vein material infills the fractures, especially faults and this is expressed by the offset of markers across the veins. They normally conform to the bedding plane. Occasionally, blocks or films of phyllite are enclosed within the vein, giving it an overall banded appearance.

MINING OPERATIONS

At present, the gold bearing quartz veins and adjacent bedrock are extracted using hydraulic excavators and hauled to the stockpile, near the processing platform, by dump trucks. The ore is

pushed on to the hopper by a tractor and then fed into the ball mill with the aid of water.

The discharge from the ball mill then passes through the trommel, where the oversized are separated and sent back to the crusher. The undersized material flows on to the *palong* (sluice box) in the form of a slurry. The gold and other heavy minerals are trapped at the wooden riffles while the lighter mineral flows down the inclined *palong*.

Upon retrieval from the *palong*, the gold and heavy mineral concentrates are separated on the shaking table. Further dressing involves

panning and treatment with concentrated nitric acid to eliminate the sulphides and other impurities. The gold is collected using mercury, where one volume of mercury generally picks up 6 to 7 volumes of gold. The mercury is then vaporised, leaving behind the gold that is subsequently cast into bars running 99.9% pure.

WASTE PRODUCTS

The waste products from the mining operations in Selinsing include both barren soil and rock and tailing found in the settlement ponds. The barren material removed in the development phases is transported by dump trucks, and used to build and repair the bunds separating and retaining the ponds. This material is also used to fill up old pits, though a small proportion is sometimes pushed down the western slope.

The gold bearing material in these mines yield a slurry with a solid content between 15–25% after wet crushing in the ball mill. This slurry then flows down the *palong* (where the gold is trapped) into the settlement ponds and separate out into slime and water, which are collectively referred to as tailing.

The water from the final settlement pond is recycled back to the processing plant after the slime settles out in the earlier ponds. At Selinsing, the first three ponds are filled with different amounts of slime (Ponds 1, 2 and 3 – Fig. 2). The water is clear in the last two ponds, and contain the least amount of suspended sediments (Ponds 4 and 5 – Fig. 2).

TAILING CHARACTERISTICS

Sampling and Analytical Methods

Slime samples were collected from Ponds 1, 2 and 3 in the Selinsing Mine (Fig. 2). Each sample is a composite of around 10–15 sampling points over an area between 100 and 500 m². The samples were collected using a plastic spade, ensuring that there was no loss of fines, and sealed in double layers of plastic bags.

The solid contents were determined in the laboratory before the samples were air dried and split into two portions. The first portion was used to determine the particle size fractions using

standard methods (Yong *et al.*, 1990). The coarser fractions were then examined under a binocular microscope. The other portion was ground to pass through a 250 µm nylon sieve for the determination of total heavy metals using ICP-AES.

Water samples were collected from settlement ponds 3 and 4 as well as upstream and downstream of the river draining the mine. The samples were then filtered through 0.45 µm membrane filters to separate the suspended sediments, prior to the addition of concentrated nitric acid. This procedure was carried out within 20 hours of collection after which the samples were frozen until the analysis, using ICP-AES.

The wavelengths of emission measurements of the ICP-AES have been set at 493.41 nm, 317.93 nm, 226.50 nm, 267.72 nm, 228.62 nm, 324.75 nm, 238.20 nm, 279.08 nm, 257.61 nm, 231.60 nm and 213.86 nm for Ba, Ca, Cd, Cr, Co, Cu, Fe, Mg, Mn, Ni and Zn, respectively. The corresponding instrumental detection limit is 0.2 µg/l for Ba, Ca, Cu and Mn; 0.4 µg/l for Co and Cd; 0.5 µg/l for Cr, Fe and Zn; and 1 µg/l for Mg and Ni.

Nature of Slime

The solid content of the slime in Ponds 1, 2 and 3 have values of 75.4%, 75.2% and 72.7%, respectively. The slime in Pond 3 has a lower solid content, probably due to the fact that it is nearest to the edge of the water and is therefore more saturated with water.

The samples from the ponds in Selinsing have a maximum size of about 2 mm (very coarse sand), with the highest amount of particles falling in the medium sand fraction (250–595 µm) for samples from Ponds 1 and 2 (Fig. 3). The sample from Pond 3 has the highest amount of particles in the fine and very fine sand fraction (63–250 µm).

The generally higher content of coarser grained materials in Pond 1 is due to the fact that this pond is closest to the source (*palong*) and happens to be the first in a series of four settlement ponds. The finer particles tend to settle out further from the source, in calm waters, which would explain the higher proportion of fine and very fine sand as well as silt and clay fractions in the sample from Pond 3.

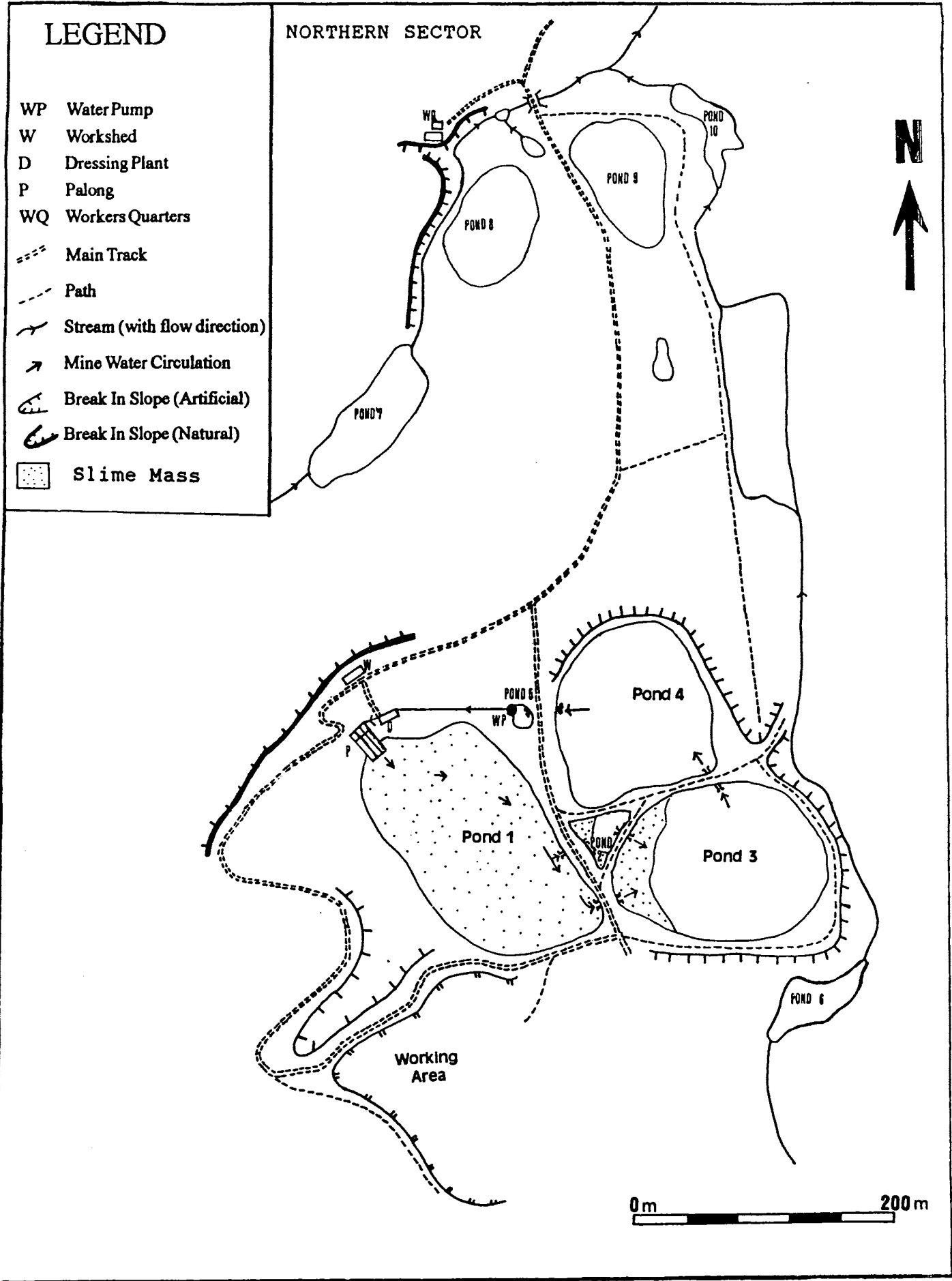


Figure 2: Sketch map showing the layout and the mine water circulation in the northern sector of the Selinsing Gold Mine.

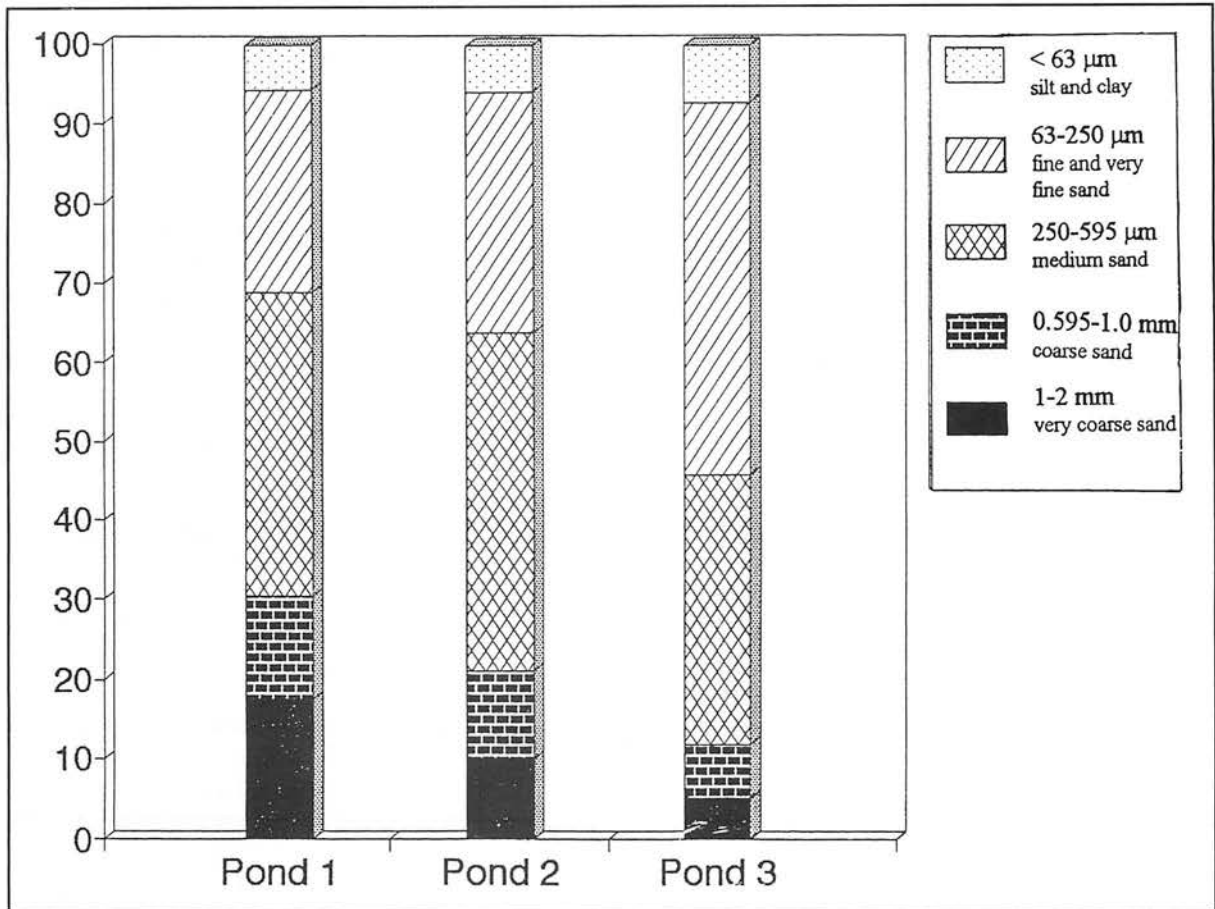


Figure 3: Histogram showing the particle size distribution of the slime from three ponds in the Selinsing Gold Mine. Pond 1 has a higher proportion of very coarse, coarse and medium sand compared to Pond 3.

The slime samples generally have angular grains, the majority being composed of quartz vein fragments (with different amounts of iron oxide coating) and subordinate amounts of rock fragments. Carbonates are also present in minute amounts where some of the grains have undergone dissolution.

Heavy Metals in the Slime

The slime samples were analysed for Ba, Co, Cr, Cu, Mn, Ni and Zn using a combined bomb digestion and fusion method of Ho *et al.* (1991). The accuracy of the analysis was validated using Standard Reference Material 2704 (Buffalo River Sediment). The results obtained are shown in Table 1.

The average values obtained for the slime samples from Selinsing are shown in Table 2, along with the average heavy metal content of soil (extracted from Rose *et al.*, 1979) and ranges

obtained for slime samples from a former tin tailing pond (from Yong *et al.*, 1991).

The heavy metal content in the slime is comparable to that of the average content in soil apart from Cu which is at least double the value of that in the average soil. Nevertheless, these values are quite conservative compared to the Cu, Mn, Ni and Zn ranges obtained for slime samples from a former tin tailing pond. However, it must be borne in mind that the tin tailing ponds have resulted from a longer period of mining activity and that the source of the slime is different from that of the slime in this gold mine.

Heavy Metals in the Water

The water samples were analysed for Ba, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Ni and Zn. The preliminary results (Table 3) indicate that apart from Fe and Mn, the heavy metals analysed conform to the domestic water standards

recommended for Malaysia (Tong *et al.*, 1986). No values were quoted for Ca and Mg in this recommendation. The higher amount of Fe and Mn in the mining ponds and rivers could be a reflection of the high rate of chemical weathering that occurs in this area.

Based on the results of the heavy metal content in the mine pond water and the river water, upstream and downstream of the mine, it is observed that there is no significant increase in the content of these elements in the river water as a result of the mining operations. The high content of Zn downstream of the mine is

probably due to the presence of man-made structures using corrugated galvanized sheets upstream from the sampling site, some of which have collapsed into the river.

Compared to the pond water, the river water, both upstream and downstream of the mine has about 10 times more Ca and 3 to 4 times more Fe and Mg. The high level of Ca is probably due to the fact that the river is draining limestones at the base of the hill to the north of the mine. As these limestones also contain high amounts of Mg, Fe and Al (Richardson, 1949), the same explanation suffices for the higher amounts of

Table 1: The average results obtained for Standard Reference Material 2704 (Buffalo River Sediment) using the combined bomb digestion and fusion method. An average from six sets of analysis is shown for this work. Standard deviations for the certified results are in parenthesis.

| Element | This Work (mg/l) | Certified Results (mg/l) |
|---------|------------------|--------------------------|
| Ba | 389.2 | 414.0 (12) |
| Co | 14.3 | 14.0 (0.6) |
| Cr | 130.7 | 135.0 (5) |
| Cu | 104.5 | 98.6 (5) |
| Mn | 534.0 | 555.0 (19) |
| Ni | 42.1 | 44.1 (3) |
| Zn | 450.9 | 438.0 (12) |

Table 2: The average results obtained for slime samples from the Selinsing Gold Mine using the combined bomb digestion and fusion method. The average soil content is extracted from Rose *et al.* (1979) and the heavy metal range in the tin tailing slime is for the upper strata of the Pengkalan Pond, after Yong *et al.* (1991).

| Element | Selinsing Slime (mg/l) | Average Soil Content (mg/l) | Tin Tailing Slime (mg/l) |
|---------|------------------------|-----------------------------|--------------------------|
| Ba | 349.0 | 300 | — |
| Co | 9.2 | 10 | 17–22 |
| Cr | 25.8 | 43 | — |
| Cu | 30.8 | 15 | 29–78 |
| Mn | 277.6 | 320 | 290–420 |
| Ni | 11.6 | 17 | 23–48 |
| Zn | 46.9 | 36 | 190–210 |

Table 3: The average heavy element content in the waters; upstream and downstream of the river draining the mine, as well as in the mine pond. The domestic water standards recommended for Malaysia are after Tong *et al.* (1986).

| Element | Upstream (mg/l) | Downstream (mg/l) | Mine Pond (mg/l) | Recommended Values (mg/l) |
|---------|-----------------|-------------------|------------------|---------------------------|
| Ba | 0.0218 | 0.0232 | 0.0122 | 1 |
| Ca | 23.0814 | 24.3782 | 2.4565 | — |
| Cd | 0.0006 | 0.0004 | 0.0003 | 0.005 |
| Cr | 0.0023 | 0.0016 | 0.0009 | 0.005 |
| Cu | 0.0026 | 0.0029 | 0.0018 | 1 |
| Fe | 0.2884 | 0.2198 | 0.0636 | 0.1 |
| Mg | 1.3167 | 1.4585 | 0.3376 | — |
| Mn | 0.0848 | 0.0821 | 0.2123 | 0.005 |
| Ni | 0.0029 | 0.0027 | 0.0037 | 0.011 |
| Zn | 0.0060 | 0.0227 | 0.0117 | 5 |

Mg and Fe in the river water. On the other hand, the materials mined and processed at the Selinsing mine are mainly quartz veins and some calcareous phyllite, thus explaining the relatively lower amounts of Ca, Fe and Mg found in the settlement pond waters.

CONCLUSIONS

The mining operation at Selinsing is geared to extract and process the gold found in quartz veins hosted by calcareous phyllite. The gold is separated by mechanical means, concentrated by gravity methods and collected using mercury after the sulphides are eliminated by nitric acid. There are two types of waste products resulting from this operation; barren rock and soil as well as tailing found in the settlement ponds.

The physical characteristics of the tailing in the settlement ponds, like the solid content and particle size distribution of slime as well as the clarity of the water, is dependent upon the layout of the mining operation. This is exhibited by the results showing that the pond nearest to the edge of the water has the lowest solid content and that a higher amount of coarse grained samples are found nearer to the *palong*.

On the other hand, the composition and chemical characteristics of the tailing is controlled to a certain extent by the geology in the area of the mining operation. This is shown by the predominance of quartz vein fragments in the slime fraction on account of quartz veins being the main material that is mined and processed. Furthermore, the composition of the bedrock has been shown to contribute to the element content for example Ca, Fe and Mg) in water samples from the river and mine ponds.

Preliminary results indicate that the Ba, Cd, Cr, Cu, Ni and Zn contents in the waters of the settlement ponds and the river draining the mine, conform to the domestic water standards recommended for Malaysia. So far, no dramatic

increase of these metals have been observed in the river water as a result of the mining operations at Selinsing.

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* * * * *

Manuscript received 22 March 1993

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PERTEMUAN PERSATUAN **Meetings of the Society**

AGM & Annual Dinner 1993 – Report (Laporan)

It was one of those days that one dread – a thunderstorm at 5.00 pm, just when everyone is hurrying home from work. The AGM and Annual Dinner 1993 was held on a such day, 30th April 1993. Many members who headed towards town to the Malaysian Petroleum Club at Dayabumi were caught in a nightmare of a jam!

The 27th Annual General Meeting which started at 6.00 pm was attended by 22 members. The meeting went on smoothly, in a relaxed mood with the majority of the members present actively taking part in the points raised. Generally it has been a very active year for the Society. Everyone was pleased to see that the Society's publications have been brought up-to-date and the Society made some profits from co-hosting the Symposium on Tectonic Framework and Energy Resources of the Western Margin of the Pacific Basin with the Circum-Pacific Council for Energy and Mineral Resources. Among the matters brought up for the new Council to look into include more social and sport activities, souvenirs (like key chains, paper weights and the like) for sale, fieldtrips outside the country, the Young Geoscientist Award having no awards for 2 years. The Chairman, the outgoing President, Ahmad Said, ended the AGM by announcing the new Council.

The buffet style dinner which attracted 78 participants started at 8.05 pm. Because of the jam along the roads outside, the crowd for the dinner looked more respectable a half hour later.

In his speech, the outgoing President, Ahmad Said, was proud to announce that the Geological Society of Malaysia has proved to be one of the country's most active Society as reflected by its many activities and publications. He hoped that more younger geoscientists would come forward to take a more active part in the running of the Society and its activities.

In his speech, the new President, Fateh Chand, complimented Ahmad Said for having so ably guided the affairs of the Society for the past three years. It appears to be a hard act to follow but he pledged to maintain the good work.

G.H. Teh

27th Annual General Meeting



Annual General Meeting 1993

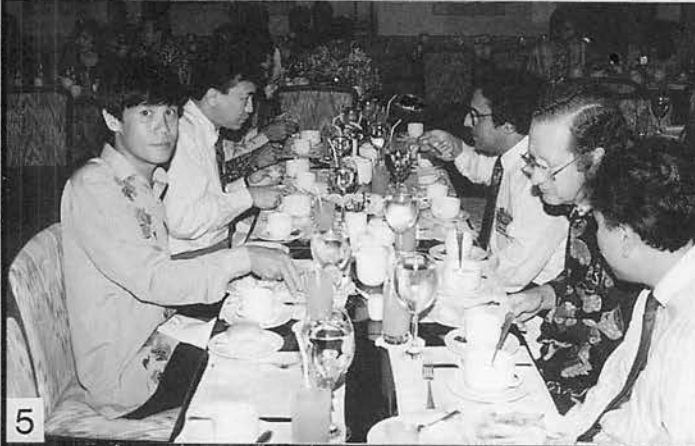
- 1 & 3. The turnout at the AGM.
 2. From left, the Secretary, the President, the Editor & the Treasurer.

Annual Dinner 1993

- 1-2. Chit-chat before dinner.

- 3-4. Help yourself to the food!
 5-14. Some busy eating, some discussing and some posing.
 15-16. The outgoing President, Ahmad Said, thanking the participants.
 17. The new President, Fateh Chand with his maiden speech.

Annual Dinner 1993



Annual Dinner 1993



Minutes of the 26th Annual General Meeting

Minutes of the 26th Annual General Meeting held at the Malaysian Petroleum Club, Podium Block, Dayabumi Complex, Kuala Lumpur at 5.45 p.m. on 25 April 1992 (Saturday).

Present:

| | |
|------------------------|-----------------------|
| Ahmad Said (Chairman) | Mohamad Shah Abdullah |
| Khalid Ngah | Teoh Lay Hock |
| Jimmy Khoo (Secretary) | Seet Chin Peng |
| Lee Chai Peng | Liew Kit Kong |
| Ahmad Tajuddin Ibrahim | C.S. Hutchison |
| Nik Ramli Nik Hassan | A.F. Williams |
| Fateh Chand | Tan Boon Kong |
| Chin Lik Suan | Ibrahim Komoo |
| Mazlan Madon | A. Aziz Hussin |
| Hamzah Mohamad | M. Selvarajah |
| Choo Mun Keong | Nicholas Jacob |
| Mohamad Ali Hasan | Lee Ah Kow |
| Teh Guan Hoe | |

1. Confirmation of the Minutes of the Previous AGM (1990/91)

The minutes of the 25th AGM were passed on the proposal of Mr. Fateh Chand and seconded by Mr. Choo Mun Keong with the following amendments: Page 2, Para 3, should read as "CPCEMR" instead of "IGCP".

2. Matters arising

- 2.1. The President informed those present that the next GEOSEA event to be held in Manila, Philippines has been rescheduled for 1993 and would not therefore coincide with the 1994 AAPG meeting in Kuala Lumpur as stated in the previous AGM minutes.
- 2.2. On Item 6, the President mentioned that the Geological Survey is currently updating the geological map of the Kuala Lumpur area. The Society would await its publication before deciding to sponsor students to map the area.
- 2.3. The President informed that the maximum amount of the Student Loan Fund has been raised to \$500.00. There were two applications for \$300 each during 1991/92. Both were approved.

Dr. Khalid Ngah enquired whether the amount currently owing the Society by past students under the Student Loan Fund can be written off and be considered as grants. After much deliberation, the members present agreed that the Fund remains status quo and that the borrower is expected to repay the loan upon employment after graduation.

- 2.4. On the matter of a publications exchange with the Indonesian Petroleum Association (IPA), the President informed that no progress was made on the matter.
- 2.5. Mr. Teoh Lay Hock suggested that the Society exhibit the submitted entries for the recent photographic competition. The President replied that this is possible as soon as the results of the contest are announced. The incoming Council would consider the proposal.
- 2.6. Dr. Hutchison suggested that a field guide book be published on the Langkawi area as there are presently many geologists familiar with the area. This suggestion was carried for the consideration of the incoming Council.
- 2.7. Mr. Fateh Chand gave a short account of the present status of the registration of the Geologist's Act. The Institute have to reach a target of 150 members before the Act can be brought up to the Minister. An appeal was made to those present to join the Institute of Geology, Malaysia (IGM) and to encourage their colleagues to join also.
- 2.8. The President informed that the Society will subsidise its members from the local universities and the Geological Survey of Malaysia to attend the Circum-Pacific Council of Energy and Mineral Resources Symposium which will be held in November 1992 in Kuala Lumpur in view of the high registration rates. Only members of current standing will be considered.

3. President's Report

Encik Ahmad Said presented his report for the 1991/92 session. He highlighted the events of the Society over the past year, its strong financial status, publications of the Society and thanked those who had helped the Society in realising its achievements over the past year and look forward to their continued support in the future.

Encik Mohamad Ali Hasan offered the Society space to exhibit the photographs from the recent photographic contest in the Geology Department, University of Malaya. Dr. Hutchison suggested that the exhibits be also displayed at the National Art Gallery, etc.

Dr. Khalid Ngah raised the issue of the Student Loan Fund again and enquired about the possibility of new loans being considered as outright grants owing to the small sums incurred and strong financial status of the Society. Dr. Ibrahim Komoo said in his opinion a loan is a loan as in the Student Loan Fund rules. However, he suggested a separate grant or scholarship be considered for implementation. The President replied that the incoming Council will deliberate on the matter.

The President's Report was passed on the proposal of En. Mohamad Ali Hasan and seconded by Dr. Ibrahim Komoo.

4. Secretary's Report

Mr. Jimmy Khoo presented his report for the 1991/92 session. He mentioned that the Council met 12 times during the year, on the current status of the various classes of membership, society's activities and publication sales. He thanked the various councillors and other individuals who had contributed their time in carrying out the Society's activities.

Mr. Seet Chin Peng enquired on the present status of the Professional class of membership. He said that these people were the first to support the Society and should not be left out now that the professional class of membership have been merged into the Full membership class. Mr. Choo Mun Keong said that this group is small with only about 50 people and as such the \$50 processing fee should be refunded. After much deliberation, the AGM members agreed that the processing fee be refunded to all those who paid for the professional membership. The new Council will discuss and pass the list of names for refund.

Dr. Ibrahim Komoo requested that during the next AGM a list of names and addresses of current members of the Society be circulated. The meeting agreed to this suggestion.

Dr. Hutchison wished the Society to record the death of Prof. K.F.G. Hosking (Honorary Member of the GSM) last year (1991) in England. The Editor said that an obituary was written in the *Warta Geologi* which was yet to be published.

Encik Mohamad Ali Hasan requested the Society to organise a geological field trip to Sumatra and also to consider giving a certificate to all Life members of the GSM. The President replied that both these requests can be considered by the new Council.

Dr. Khalid Ngah requested for a field guide or a technical paper on the trip to the Endau-Rompin area organised by the Society in June 1991.

The President replied that this has been published in one of the Society's bulletin.

Dr. Hutchison requested the Society to give away its old stock of publications as more and more new publications are printed. This will entail less stock inventory and storage space. The President replied that currently these publications are being kept in a locked room at the Geology Department, University of Malaya. The Council agreed that some of the old stock be given to 3rd and final year geology students. The incoming Council will consider the matter.

The Hon. Secretary's Report was passed on the proposal of Mr. Fateh Chand and seconded by Dr. Khalid Ngah.

5. Editor's Report

In his report, the Editor Dr. Teh Guan Hoe, stated that 2 volumes of the bulletin series have been published and that 3 other volumes are with the printers. The *Warta Geologi* for 1991 would be published soon as problems of producing them by Desk Top Publishing (DTP) are overcome.

Mr. Seet Chin Peng wondered whether it is worthwhile reporting events which have expired e.g. training courses, etc. He proposed that these be taken out at the time of publication, the events are no longer current.

Mr. Choo Mun Keong wanted to know the reason for the delay in publication. The Editor replied that all the manuscripts are on diskettes and are with the printers. As for the *Warta Geologi*, the two employees assigned to the job by the printers for DTP have left to take up other jobs.

Dr. Ibrahim Komoo said that if computerization cannot solve the delay in publications, it is best to forego it. He said that even a 5-page newsletter that is current is worthwhile to have. The President replied that the new Council will look into this problem seriously.

Dr. Nik Ramli Nik Hassan reminded the members present that the post of Editor is an honorary one unlike those in the AAPG or the Geological Society of London which pays handsomely.

Mr. Choo Mun Keong suggested that the Society should pay proper salaries, say \$1000 per month, for a full time staff to overcome the problems it is currently facing. The President assured that all suggestions will be looked into by the new Council.

The Editor's Report was passed on the proposal of Dr. Nik Ramli Nik Hassan and seconded by Mr. A.F. Williams.

6. Treasurer's and Honorary Auditor's Reports

The Treasurer, Dr. Lee Chai Peng, reported that the Society's finance is in a healthy state and thanked the petroleum and other companies who had contributed generously to the Society's publication funds. He thanked Mr. Peter Chew, the Society's Honorary Auditor for auditing the accounts.

Mr. Chin Lik Suan enquired whether the Society's funds are kept in one bank or various banks. En. Mohamad Ali Hasan requested that future AGM's should show the breakdown of office equipment and the amount of time deposits and current accounts kept at various banks. The President will refer this matter to the new Council.

A comment was raised and an amendment was made to the item "PGS '90 - donations" that it could read as "PGS '90 & '91 - donations".

Dr. Hutchison requested that incoming faxes to the Department of Geology staff including personal faxes should be free of charge. The President agreed that this proposal be carried provided that discretion be exercised as to the length and number of pages being received.

Mr. Lee Ah Kow enquired as to the large amount of cash-at-bank of \$45,380.87. The Treasurer explained that this was so because a large publication bill was not yet settled at that point in time. He added that at one stage, one of the time deposits had to be taken out before maturity date owing to insufficient funds kept at current account.

Mr. Choo Mun Keong proposed that the Society consider setting up a scholarship fund for needy and bright undergraduates. The President will ask the incoming Council to look into this.

Mr. Teoh Lay Hock proposed that long standing Full members be converted to Life membership. The meeting discussed this issue and agreed to refer it to the new Council.

The Treasurer's Report was passed on the proposal of Mr. Choo Mun Keong and seconded by En. Mohamad Ali Hasan.

7. Election of Honorary Auditor for 1992/93

The meeting recorded the Society's thanks to the Honorary Auditor, Mr. Peter Chew and re-elected him to continue as Honorary Auditor for 1992/93 on the proposal of Dr. Hutchison and seconded by Mr. Fateh Chand.

8. Other business

8.1. Dr. Khalid Ngah suggested that the Society's Constitution be amended to enable the elected office-bearers and council members to serve for 2 years before an election is held. The meeting considered this matter and agreed to continue with the present one-year term of office.

8.2. En. Mohamad Ali Hasan suggested that the Society give book prizes to the top students in Year 1 to Year 3 of the local universities. The President informed the members present that plans are underway to award a prize of \$500 for the best graduating student in the local universities and that one university may even reject the offer. However, he said that the Council will consider giving a set of bulletins to the top first to third year students in geology.

- 8.3. Mr. Choo Mun Keong and Dr. Ahmad Tajuddin suggested that the eligible age of the Young Geoscientist Award be raised to 35 years old. The meeting deliberated on the issue of the best thesis being considered but later rejected the idea as theses are not public-domain publications. Dr. Ibrahim Komoo suggested that instead of the proposer having to write a 2-page nomination for the candidate that this be cut down to nominate names first to the Nominations Committee for consideration. Mr. Choo Mun Keong said that the Committee should be active in initiating the YGA instead of waiting for nominations to arrive. The President said that all the suggestions will be discussed by the new Council.
- 8.4. Mr. Chin Lik Suan asked about the status of the National Mineral Policy to which Mr. Choo Mun Keong and Mr. Fateh Chand both elaborated on the matter.

9. Announcement of New Council 1992/93

The President announced the new Council for 1992/93 as follows:

| | | |
|--------------------------|---|-----------------------------------------------------------------------------------------------------------------------------|
| President | : | Mr. Ahmad Said (Petronas) |
| Vice-President | : | Dr. Khalid Ngah (PRI) |
| Secretary | : | Mr. Jimmy Khoo (Geol. Surv. Mal) |
| Asst. Secretary | : | Ahmad Tajuddin Ibrahim (UM) |
| Treasurer | : | Dr. Lee Chai Peng (UM) |
| Editor | : | Dr. Teh Guan Hoe (UM) |
| Councillors (2-years) | : | Chin Lik Suan (Quarry Contractor) Mr. Fateh Chand (Geol. Surv. Mal) Mr. S.P. Sivam (UM) Mr. Tan Boon Kong (UKM) |
| Councillors (1-year) | : | Dr. Tan Teong Hing (UKM) Dr. Abdul Ghani Mohd. Rafek (UKM) Dr. Nik Ramli Nik Hassan (Forad) Mr. Mazlan Madon (PRI) |
| Immediate Past President | : | Dr. Hamzah Mohamad |

The President thanked the Council for their services rendered during 1991/92. The meeting recorded a vote of thanks to the two outgoing Council members (Mr. Andrew Spykerman and Dr. Cheang Kok Keong). The 26th AGM of Geological Society of Malaysia ended at 7.20 p.m.

Jimmy Khoo
Hon. Secretary

28 April 1992

PRESIDENT'S REPORT

APRIL 1992 – APRIL 1993

During 1992/93, the Society continued to be active in its efforts in the advancement of the geological sciences, through its publications, conferences and technical workshops and fieldtrips. The Society also continued to grow in terms of membership and financial strength.

The Society's two main events, namely the Annual Geological Conference and the Symposium on Tectonics and Energy Resource of the Western Pacific were again successfully held with excellent papers and attendances. The Annual Conference was held in Kuantan and this was an outstanding success. We had 100 participants and 3 fieldtrips were held in conjunction with the conference. Our thanks again go to Dr. Teh Guan Hoe and his organizing committee. The next conference will be held in Langkawi from June 12-13, 1993 and the Society looks forward to your support again.

The big event of the year, the Symposium on Tectonics and Energy Resources of the Western Pacific Seminar held from 30 November - 2nd December 1992 attracted over 500 participants. The conference was an overwhelming success. It was indeed gratifying to see the response in terms of papers, delegates and sponsorship. The organization of the conference was very well done with the support of numerous people in the organizing committee and also other volunteers who devoted much of their private time and effort in organizing both the conference and exhibition. The Circum Pacific Council for Energy and Mineral Resources has highly commended the Society and indicated that this was one of the best organized conferences they had participated in. We would like to thank all the people involved especially Professor Charles Hutchison, En. Barney Mahendran, En. Ho Wang Kin, Dr. Teh Guan Hoe, Dr. Lee Chai Peng and Dr. Nik Ramli.

Apart from organizing these two main conferences, the Council continued preparation for another major conference to be co-hosted by the Society in 1994, i.e. the AAPG International Conference to be held in August 1994. This is a major event and members of the Society are again strongly urged to continue to lend their full support to ensure its success.

The Society also co-hosted a one-day technical workshop on Geology in Reservoir Evaluation/Formation Damages Studies with CoreLab on 1 July 1992. This was a successful meeting with over 30 participants and our thanks go to Dr. Nik Ramli for organising the event.

A total of 13 technical talks were also held during the past year.

The Society also continued its publication efforts with Bulletin 32 being published and 3 other bulletins in final preparation.

The Society's financial position continued to improve. The Council is indeed trying its best to optimize the usage of funds. It is planned for more funds to be utilized for advancement of geological sciences and members' suggestions are most welcome here. The Society has in the past years offered an annual book prize of RM300 to the best final geology student in the local universities.

On behalf of the Society, I would like to thank every one present here today for their kind attendance. I would also like to thank Heads of the Departments of Geology of Universiti Malaya and Universiti Kebangsaan Malaysia and the Director-General of the Geological Survey for all their kind support they have always given the Society and also the many other individuals and organizations who continue to be active supporters of the Society's activities.

I would also like to thank all Councillors and members of the Society who have given the kind cooperation and support in my past 3 years as President of the Society. I have greatly enjoyed my service as President and I hope to continue to actively serve the Society in the years to come.

Ahmad Said
President

SECRETARY'S REPORT (APRIL 1992 - APRIL 1993)

1. The Council

The following comprises the Council of the Geological Society of Malaysia for the period 25 April 1992 to 30 April 1993:

| | | |
|---------------------------|---|---------------------------------------------------------------|
| President | : | Mr. Ahmad Said (<i>Petronas</i>) |
| Vice-President | : | Dr. Khalid Ngah (<i>PRI</i>) |
| Secretary | : | Mr. Jimmy K.K.Khoo (<i>GSD</i>) |
| Assist. Secretary | : | Dr. Ahmad Tajuddin (<i>UM</i>) |
| Treasurer | : | Dr. Lee Chai Peng (<i>UM</i>) |
| Editor | : | Dr. Teh Guan Hoe (<i>UM</i>) |
| Councillors (2 years) | : | Mr. Chin Lik Suan (<i>Quarry Contractor</i>) |
| | | Mr. Fateh Chand (<i>GSD</i>) |
| | | Mr. S.P. Sivam (<i>UM</i>) |
| | | Mr. Tan Boon Kong (<i>UKM</i>) |
| Councillors (1 year) | : | Dr. Tan Teong Hing (<i>UKM</i>) |
| | | Dr. Abdul Ghani Mohd Rafek (<i>UKM</i>) |
| | | Dr. Nik Ramli Nik Hassan (<i>FORAD</i>) |
| | | Mr. Mazlan Madon (<i>PRI</i>) (until 14.1.93) |
| | | Mr. Effendy Cheng Abdullah (<i>Petronas</i>) (from 19.2.93) |
| Immediate Past-President: | | Dr. Hamzah Mohamad (<i>UKM</i>) |

2. Council Meetings:

Twelve Council meetings were held throughout the 1992/93 session as follows:

| | | |
|---------|----------|---------|
| 15.5.92 | 23.10.92 | 19.3.93 |
| 19.6.92 | 6.11.92 | 16.4.93 |
| 17.7.92 | 22.12.92 | |
| 14.8.92 | 15.1.93 | |
| 18.9.92 | 19.2.93 | |

As usual, the formation of several working groups contributed tremendously to the activities of the Society.

3. Membership:

The total membership of the Society as at 31 December 1992 is 512. There are 135 foreign memberships as compared to 377 local memberships. Details of the various classes of membership and their geographical distribution are as shown in Appendix 1.

The names and addresses of all current members are given in a separate attachment to this report.

4. Society Activities:

A record number of thirteen technical talks, one conference, two seminars, one symposium, two forums and one geological presentation attested to the varied activities organised by the Society for its members during the 92/93 session.

The Annual Geological Conference '92 held at the Merlin Inn Resort, Kuantan from 9-10 May 1992 was preceded by 2 Pre-Conference fieldtrips in the Sg. Lembing – Tasik Cini area and the Kuantan area. This was followed by a Post-Conference fieldtrip from Kuantan to Kuala Lumpur. In all, the Annual Conference '92 attracted about 100 participants.

The other highlight of the year was the Circum-Pacific Council for Energy and Mineral Resources (CPCEMR) symposium held at the Shangri-La Hotel, Kuala Lumpur from 29 Nov-2 Dec 1992 which attracted about 500 participants. For the first time, concurrent technical sessions were held as well as over 30 exhibition booths taken up by companies and geological organisations related to the petroleum industry.

The Petroleum Geology Working Group headed by Dr. Nik Ramli Nik Hassan successfully organised a 1-day seminar on *Geology in Reservoir Evaluation / Formation Damage Studies* on 11 July 1992 at the Ming Court Hotel, Kuala Lumpur which was attended by about 30 participants.

The Engineering Geology and Hydrogeology Working Group headed by Mr. Tan Boon Kong also successfully organised two forums on Dam Geology and Highway Geology. Each of these were followed by a 1-day fieldtrip to dam sites and highway projects (see Appendix 2).

5. Publications

Sales of the Society's bulletins during the year were as shown in Appendix 3. The Society continued to maintain publication exchanges with various organisations as shown in Appendix 4.

6. Young Geoscientist Award

No nomination was received for the year.

7. Acknowledgements

The Society would like to record its thanks to:

- i) The Association of Exploration Geochemists for making possible Dr. Jane Plant's distinguished lecture tour to Malaysia through the Society;
- ii) The Circum-Pacific Council for Energy and Mineral Resources for jointly organising the GSM-CPCEMR Symposium;
- iii) CoreLab for jointly hosting the Reservoir Evaluation Seminar;
- iv) the Heads of the Geology Department, University of Malaya and Universiti Kebangsaan Malaysia and Geological Survey of Malaysia for all cooperation extended and support of the Society's activities held there, and
- v) numerous other societies, institutions and individuals who have contributed in one way or another to support the Society's activities.

Jimmy Khoo

Secretary '92/'93

19.3.93

MEMBERSHIP OF THE SOCIETY
as of 31.12.1992

| Country | Full | Associate | Student | Institutional | Honorary | Life | Total |
|--------------------------|------------|-----------|-----------|---------------|----------|-----------|------------|
| Australia | 23 | | | 5 | | 3 | 31 |
| Brunei | | | 1 | | | 1 | 2 |
| Canada | 5 | | | | | | 5 |
| Europe | 10 | | | 4 | 1 | 5 | 20 |
| Indonesia | 6 | | | 2 | 1 | | 9 |
| Japan | 5 | | | 1 | 1 | | 7 |
| New Zealand | 2 | | | | | | 2 |
| Philippines | 3 | | | | | 1 | 4 |
| Singapore | 19 | 1 | | 4 | | 1 | 25 |
| Thailand | 1 | | | | | 1 | 2 |
| United Arab Emirates | | | | 1 | | | 1 |
| United States of America | 22 | | 1 | 1 | | 3 | 27 |
| Malaysia | 245 | 10 | 69 | 15 | 3 | 35 | 377 |
| TOTAL | 341 | 11 | 70 | 34 | 6 | 50 | 512 |

GEOLOGICAL SOCIETY OF MALAYSIA
SOCIETY ACTIVITIES 1992/93

| Date | Event/Venue |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. 30 Apr 1992 | : Technical Talk: <i>Aspects of Basin Analysis</i> by Prof. L.A. Frakes @ University of Malaya, Kuala Lumpur. |
| 2. 4 May 1992 | : Geological Presentation: <i>Geological Modelling and Reservoir Simulation of a Petroleum Field in Malaysia</i> by Edmund Huang, David Baxendal and Desmond Lee @ University of Malaya, Kuala Lumpur. |
| 3. 8 May 1992 | : Pre-Conference Fieldtrip 1: <i>Mineralization Sg. Lembing - Tasik Cini</i> ; Pre-Conference Fieldtrip 2: <i>Stratigraphy of Kuantan Area, Pahang</i> . |
| 4. 9-10 May 1992 | : <i>Annual Geological Conference '92</i> , Merlin Inn Resort, Kuantan, Pahang. |

GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

BULLETIN OF THE GEOLOGICAL SOCIETY OF MALAYSIA
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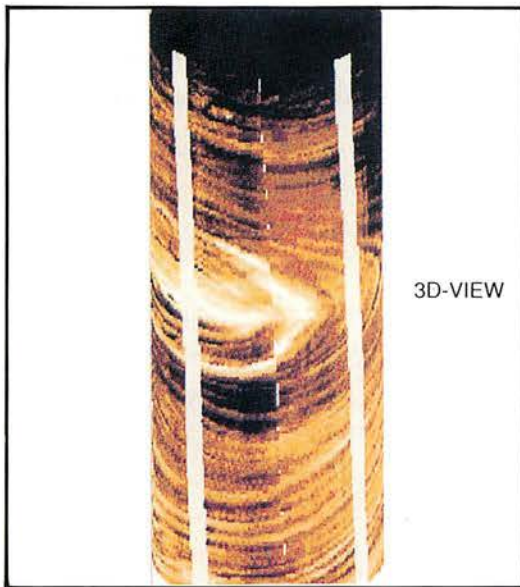
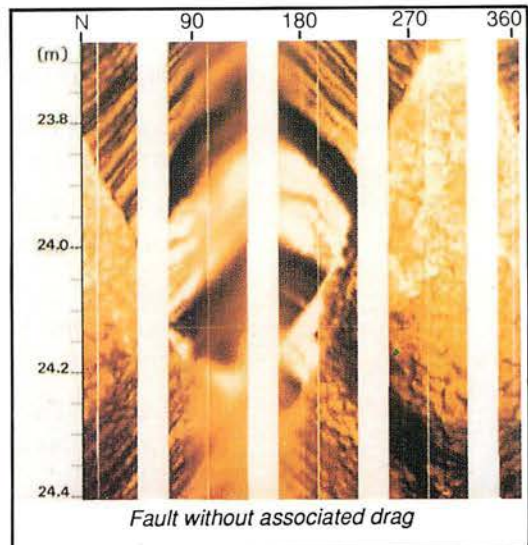
Fullbore Micro Imager*

Formation imaging using microelectrical arrays has benefited the oil industry since its introduction in the mid-80s. The FMI*, Fullbore Formation MicroImager tool, is the latest-generation electrical imaging device. It belongs to the family of imaging services provided by the MAXIS 500* system with its digital telemetry capability.

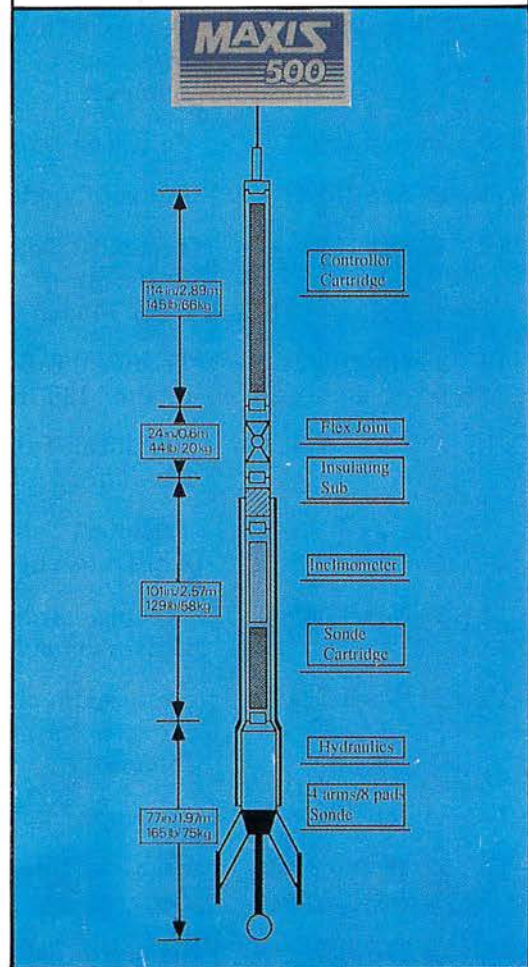
The FMI log, in conductive muds, provides electrical images almost insensitive to borehole conditions and offers quantitative information, in particular for analysis of fractures.

The FMI tool combines high-resolution measurements with almost fullbore coverage in standard diameter boreholes, thus assuring that virtually no features are missed along the borehole wall. Fully processed images and dip data are provided in real time on the MAXIS 500 imaging system.

The tool's multiple logging modes allow wellsite customization of results to satisfy client needs without compromising efficiency.



"Bullseye" structure



5. 11 May 1992 : Post-Conference Fieldtrip: *Kuantan - KL Transect.*
6. 11 Jul 1992 : Seminar: *Geology in Reservoir Evaluation/ Formation Damage Studies* by CoreLab/GSM @ Ming Court Hotel, Kuala Lumpur.
7. 27 Aug 1992 : Technical Talk: *Features of Growth Faults* by Dr. John W. Shelton @ University of Malaya, Kuala Lumpur.
8. 7-8 Sep 1992 : Technical Talk 1: *Regional Geochemistry - A Basis for Development and Environmental Planning?*;
 Technical Talk 2: *Geochemistry in the Development of Metallogenic Models and Exploration Criteria for SEDEX and MVT Base Metal Deposits*;
 Seminar: *The Litho-geochemistry of Granites and Acid Volcanics; Implications of Base Metal, Tin-Uranium and Gold Exploration*
 by
 Dr. Jane A. Plant @ University of Malaya, Kuala Lumpur and Geological Survey of Malaysia, Ipoh.
9. 11 Sep 1992 : Technical Talk: *Mineral Development and Environment - A Geologist's Dilemma?* by Dr. Chris M.L. Bowler @ University of Malaya, Kuala Lumpur.
10. 28 Sep 1992 : Forum on *Dam Geology* @ University of Malaya, Kuala Lumpur.
11. 29 Sep 1992 : Damsite Visits: a) *Batu Dam*, b) *Klang Gates Dam*
12. 12 Oct 1992 : Technical Talk: *Palaeoenvironmental Analysis of Upper Miocene Sedimentary Sequence, Jerneh Field, Malay Basin* by En. Mazlan b. Hj. Madon @ University of Malaya, Kuala Lumpur.
13. 23 Nov 1992 : Technical Talk 1: *Geology of Gold Deposits in Yunan Province, China* by Prof. Liu Bingguang;
 Technical Talk 2: *Land Resources Management of the People's Republic of China* by Prof. Liu Xintu;
 Technical Talk 3: *The Role of Diagenetic Studies in Hydrocarbon Exploration* by Dr. T.R. Astin @ University of Malaya, Kuala Lumpur.
14. 24 Nov 1992 : Technical Talk: *Gold Deposits of China* by Prof. Liu Bingguang @ University of Malaya, Kuala Lumpur.
15. 29 Nov-2 Dec 1992 : Symposium on *Tectonic Framework and Energy Resources of the Western Margin of the Pacific Basin* @ Shangri-La Hotel, Kuala Lumpur.
16. 11 Jan 1993 : Forum on *Highway Geology* @ University of Malaya, Kuala Lumpur.
17. 12-13 Jan 1993 : Highway Site Visit - a) *Gopeng-Sg. Siput South*; b) *Bt. Merah / Taiping*.
18. 22 Feb 1993 : Technical Talk: *The Effects of Sealevel Fluctuations on Prograding Shorelines and Estuarine Valley-fill Sequences in the Upper Manville Sediments, Southern Alberta* by Dr. Mohd. Zahoor Farshori @ Universiti Kebangsaan Malaysia, Bangi.

STOCK OF PUBLICATIONS

| Bulletin No. | Sales 1992 | Stock Remaining |
|---------------------------|------------|-----------------|
| 2 | 15 | 322 |
| 3 | 16 | 332 |
| 4 | 15 | 191 |
| 5 | 15 | 94 |
| 6 | 67 | 626 |
| 7 | 35 | 381 |
| 8 | 15 | 48 |
| 10 | 15 | 24 |
| 11 | 16 | 121 |
| 12 | 19 | 39 |
| 13 | 36 | 152 |
| 14 | 16 | 32 |
| 15 | 14 | 74 |
| 16 | 29 | 101 |
| 17 | 15 | 162 |
| 18 | 20 | 157 |
| 19 | 23 | 684 |
| 20 | 33 | 531 |
| 21 | 10 | 278 |
| 22 | 21 | 339 |
| 23 | 15 | 332 |
| 24 | 16 | 511 |
| 25 | 18 | 286 |
| 27 | 140 | 332 |
| 28 | 155 | 217 |
| 32 | 631* | 306 |
| Field Guide 1 | 8 | 19 |
| Abstracts (Bulletin 6) | 0 | 6 |
| Stratigraphic Correlation | 35 | 464 |

* inclusive of free copies distributed to Members

List of Institutions on Exchange of Publications

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|----|----------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------|
| 1 | Akademie der Wissenschaften der DDR, Zentralinstitut für Physik der Erde, WIB B 689, Telegrafenberg, Potsdam, DDR-1561, Germany. | 12 | Freie Universität Berlin, Geologisch-Palaontologisches Institut, Altensteinstrasse 34a, 1000 Berlin 33, Germany. |
| 2 | Director of All Union Geological Library, Sredny pr. 74, 199026 Leningrad V-26, USSR. | 13 | The Library, Geological Research & Development Centre, Jalan Diponegoro 57, Bandung, Indonesia. |
| 3 | American Museum of Natural History, Serials Unit, Library, Central Park West at 79th Street, New York, N.Y. 10024-5192, USA. | 14 | The Secretary, Geological Society of Thailand, c/o Dept. of Mineral Resources, Rama VI Road, Bangkok 10400, Thailand. |
| 4 | AGID, Attn: The Editor, Dept. of Geology, University of Nottingham, Nottingham NG7 2RD, England. | 15 | Geological Survey of Malaysia, P.O. Box 1015, 30820 Ipoh, Perak. |
| 5 | Bureau de Recherche Géologique et Minières, Dept. Documentation, Section échanges, Boite Postale 6009, 45060 Orleans Cedex, France. | 16 | Geological Survey of Malaysia, P.O. Box 560, 93712 Kuching, Sarawak. |
| 6 | CICESE Library, Gifts & Exchange Unit, P.O. Box 434803, San Ysidra, Ca. 92143-4803, USA. | 17 | Geological Survey of Malaysia, Locked Bag no. 2042, 88999 Kota Kinabalu, Sabah. |
| 7 | Commonwealth Science Council, Marlborough House, Pall Mall, London SW1Y 5HX, England. | 18 | Chief of Information Dept., Institute of Geology of Foreign Countries, 2nd Novotikhvinskaya 12/22, Moscow, USSR. |
| 8 | Dewan Bahasa & Pustaka, Ketua Perpustakaan, Peti Surat 10803, Kuala Lumpur. | 19 | Librarian, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, England. |
| 9 | Elf Aquitaine (P), F-31360 Boussens, France. | 20 | The Editor, Malaysian Journal of Tropical Geography, c/o Dept. of Geography, Universiti Malaya, 59100 Kuala Lumpur. |
| 10 | Suomalainen Tiedeakatemia— Academia Scientiarum Fennica, Rauhankatu 15B, 00170 Helsinki 17, Finland. | 21 | Mineralogical Society of Poland, 30-059 Krakow, al. Michiewicza 30, Poland. |
| 11 | Central Geological Survey, Ministry of Economic Affairs, P.O. Box 968, Taipei, Taiwan, ROC. | | |

- | | | | |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------|
| 22 | Nanking Institute of Geology and Palaeontology, Academia Sinica, Chi-Ming-Ssu, Nanking, People's Republic of China. | 31 | The Director, SEATRAD Centre, Jalan Sultan Azlan Shah, 31400 Ipoh, Perak. |
| 23 | The National Geological Library, Kan Kia Ko, Fu Wai, Peking, People's Republic of China. | 32 | The Librarian, UN Offshore Mineral Prospecting, c/o Mineral Resources Dept. Private Mail Bag, Suva, Fiji. |
| 24 | National Geophysical Research Institute, Uppal Road, Hyderabad 500 007, India. | 33 | U.S.G.S. Library, Mail Stop 955, 345 Middlefield Road, Menlo Park, Ca. 94025, USA. |
| 25 | The National Library, Attn: Gifts & Exchange Section (Serials). Stamford Road, Singapore 0617. | 34 | U.S.G.S. Library (Exchange & Gift), National Center - Mail Stop 950, 12201 Sunrise Valley Drive, Reston, VA. 22092, USA. |
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| 28 | Acquisitions, Library, Oklahoma Geological Survey. The University of Oklahoma, 830 Van Vleet Oval, Room 163, Norman, Oklahoma 73069, USA. | 37 | University of Kansas Libraries, Serials/Exchange, Lawrence, Ka. 66045, USA. |
| 29 | Peking Graduate School, Peking College of Geology, Xueyuan Road, Peking, China. | 38 | The Librarian, University of Malaya, 59100 Kuala Lumpur. |
| 30 | The Librarian, Petronas, P.O. Box 12444, 50778 Kuala Lumpur. | 39 | Perpustakaan, Universiti Sains Malaysia, 31750 Tronoh, Perak. |
| 31 | Library, Scripta Geologica, P.O. Box 9517, 2300 RA Leiden, The Netherlands. | 40 | The Librarian, Institute of Geoscience, University of Tsukuba, Tsukuba-City, Ibaraki-Pref 305, Japan. |

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| 41 | Bahagian Bahan-bahan Bersiri dan Dokumen, Pepustakaan, Universiti Sains Malaysia, 11800 P. Pinang. | 51 | The Librarian, Geological Library Chamber of Geological Engineers of Turkey, P.T. 464 – Kizilay 06424 Ankara, Turkey |
| 42 | Editor, Episodes, P.O. Box 919, Herndon, Va. 22070, USA. | 52 | AAPG House of Delegates Representative P.O. Box 3146 Midland, Tx. 79702, U.S.A. |
| 43 | Peter Chew & Co., Room 2, No. 127-1, Jalan Kampong Pandan, 55100 Kuala Lumpur. | 53 | Ministry of Development Librarian Negara Brunei Darusallam 1190 |
| 44 | Ketua, Maktab Rendah Sains, MARA, Jasin, Melaka. | 54 | Head, Information Science Department, Nuclear Energy Unit Kompleks Puspatti, Bangi 43000 Kajang |
| 45 | Librarian, AAPG, P.O. Box 979, Tulsa, Okla. 74101, USA. | 55 | Geological Society of Korea, The President, Dept. of Geological Sciences, Seoul National University, Seoul 151, Korea. |
| 46 | Petromin Pub. Co. 24 Peck Seah Street, 03-00 Nelsons Bldg. Singapore 0207. | 56 | Editorial Board, Natural History Museum & Institute, Chiba, 955-2 Soba-cho, Chiba 280, Japan. |
| 47 | Gift Section, The Library of Congress, Representative, American Embassy, P.O. Box 10035, Kuala Lumpur. | 57 | Kementerian Hal Ehwal Dalam Negeri Malaysia (Bahagian Penerbitan), P.O. Box 10382, Kuala Lumpur. |
| 48 | AAPG House of Delegates Representative, 444, 17th St., Suite 728, Denver, Co. 80202, USA. | 58 | Perpustakaan Negara Malaysia, Bhg. Penyerahan Akta & Hadiah & Pertukaran, Tkt. Bawah, Lot no. G1 & G2, Blok A, Kompleks Bukit Naga, Damansara Heights, 50572 Kuala Lumpur. |
| 49 | Geological Survey of Japan, Library, 1-3 Higashi 1-chome, Tsukuba-shi, Ibaraki-ken, 305 Japan. | | |
| 50 | Department of Earth and Planetary Science Faculty of Science, Hiroshima University, Higashihiroshima 724, Japan | | |

EDITOR'S REPORT 1992/93

With the publication of Vol. 19 No. 1 (Jan-Feb 1993) of the *Warta Geologi*, the Society's newsletter has been brought up-to-date.

The Society's Bulletin that have been published since the last AGM include *Bulletin 29* (July 1991), *Bulletin 30* (April 1992), *Bulletin 31* (July 1992) and *Bulletin 32* (November 1992).

Starting with Vol. 17 No. 1 (1991) of the *Warta Geologi* and *Bulletin 32*, the formatting and camera-ready contents of the Society's publications are now finalised on the Society's own DTP (Desktop Publishing) equipment.

I would like to record my thanks to Ng Tham Fatt for his dedicated contribution and help in up-grading the format of our publications and A.K. Fan for helping with the voluminous amount of input.

The help of members of the Editorial Subcommittee in proof-reading and the Editorial Advisory Board in reviewing is greatly appreciated. The Society is grateful to the many authors for their contributions, and in addition the donors and advertisers for their valuable contributions to the Society's Funds.

G.H. Teh
Editor

TREASURER'S REPORT 1992

The Society's financial position has continued to grow in strength. Its nett assets are worth RM483,592.70 in 1992 as compared to RM454,622.35 in 1991. We registered an excess of income over expenditure of RM37,526.90 for the year.

A major item of expenditure last year was the purchase of a computer system with laser printer for RM26,289.00 to upgrade the Society's publishing and publicity efforts. The main items of expenditure are still for the Society's publications and its Annual Conference.

The Society is most grateful to its faithful supporters who once again donated generously especially for the GSM-CPCEMR Symposium on Tectonic Framework and Energy Resources of the Western Margin of the Pacific Basin which was held in place of the annual Petroleum Geology Seminar last year.

On behalf of the Society, I wish to thank all donors and members who have contributed financially to the Society last year. We would also like to express our heartfelt thanks to our Honorary Auditor, Mr. Peter Chew for his help and advice with the Society's accounts.

C.P. Lee
Treasurer

17 March 1993

**PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA**

BALANCE SHEET AS AT 31 DECEMBER 1992

| FIXED ASSETS | 1992 | 1991 |
|----------------------------------------|---------------------|---------------------|
| Office equipment | RM 59,848.87 | RM 33,559.87 |
| Less: Accumulated depreciation | <u>36,187.77</u> | <u>33,558.87</u> |
| | 23,661.10 | RM 1.00 |
| CURRENT ASSETS | | |
| Fixed Deposits | RM414,776.93 | RM391,901.17 |
| Cash at bank | 22,326.05 | 45,380.87 |
| Petty cash | 616.19 | 1,179.11 |
| Expenses prepaid: | | |
| —Telephone deposit | 300.00 | 300.00 |
| —Institute Geologist Malaysia | 389.70 | 389.70 |
| —CPCMR Symposium | 15,170.50 | 15,170.50 |
| —Telefax deposit | 300.00 | 300.00 |
| —AAPG | 884.83 | — |
| —Batik Shirts | 5,020.00 | — |
| —Langkawi Fieldguide | 147.40 | — |
| | <u>RM459,931.60</u> | <u>RM454,621.35</u> |
| | <u>RM483,592.70</u> | <u>RM454,622.35</u> |
| <i>Represented by:</i> | | |
| CAPITAL FUND | | |
| Balance as at 1.1.91 | RM435,797.85 | RM391,442.96 |
| Add: excess of income over expenditure | <u>37,526.90</u> | <u>44,354.89</u> |
| | 473,324.75 | 435,797.85 |
| Student Loan Fund | 6,954.91 | 6,654.91 |
| PGS 91 (donations) | — | 8,856.55 |
| Young Geoscientist Award | 3,313.04 | 3,313.04 |
| | <u>RM483,592.70</u> | <u>RM454,622.35</u> |

**PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA**

**INCOME AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED 31 DECEMBER 1992**

| INCOME | 1992 | 1991 |
|-------------------------------------------|--------------|--------------|
| Entrance fee | RM 980.00 | RM 992.28 |
| Subscriptions | 24,655.91 | 25,422.67 |
| Fixed deposits interest | 22,772.86 | 16,943.39 |
| Sales of publications | 14,616.46 | 10,058.71 |
| PGS '91 - Donations | 53,754.06 | 61,019.51 |
| Xerox | 1,359.65 | 421.76 |
| Telefax | 499.57 | — |
| | RM118,638.51 | RM114,858.32 |
| LESS EXPENDITURE | 1992 | 1991 |
| Bank charges | RM 490.14 | RM 1,169.10 |
| Depreciation on office equipment | 2,628.90 | 1,799.87 |
| Honorarium | 5,414.00 | 5,274.00 |
| Postage | 5,065.07 | 3,388.92 |
| Printing & Stationary: | | |
| —Miscellaneous | 2,073.05 | 2,885.90 |
| —Newsletters | 1,330.00 | 8,915.00 |
| —Bulletins | 38,717.20 | 22,267.99 |
| Refreshments | 628.50 | 1,242.93 |
| Subscription to professional bodies | 65.29 | 172.29 |
| Sundry expenses | 965.00 | 2,837.15 |
| Best Student Award | 3,000.00 | — |
| Telephone expenses | 508.63 | 640.56 |
| Speakers' account | 4,879.58 | 1,739.38 |
| Annual Dinner | 1,704.51 | 1,080.00 |
| Annual Conference | 9,984.01 | 13,832.38 |
| National Mineral Policy | — | 646.90 |
| Telefax expenses | — | 421.53 |
| Study Groups | 8.98 | 2,189.53 |
| Photo competition | 3,648.75 | — |
| | RM81,111.61 | RM 70,503.43 |
| EXCESS OF INCOME OVER EXPENDITURE: | | |
| Transfer to capital fund. | RM37,526.90 | RM44,354.89 |

Report of the Auditors to the Members of the Geological Society of Malaysia

To

The Members of the
Geological Society of Malaysia

We have obtained all the information and explanations necessary for the purpose of this audit and in our opinion, the accounts for the year ended 31st December 1992 give a true and fair view of the state of the Society's financial affairs.

Signed

PETER CHEW & CO.
AF 0186
PUBLIC ACCOUNTANTS

Chew Sek Hong,
506/3/94 (J/PH)
PUBLIC ACCOUNTANT

Kuala Lumpur
12 April 1993

BERITA-BERITA PERSATUAN News of the Society

KEAHLIAN (Membership)

The following applications for membership were approved:

Full Members

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Ahmad Sabri Razak Core Lab., Lot 10B, Jalan 51A/223, 46100 Petaling Jaya 2. Zainuddin Md. Yusoff Geo-Environment Sdn. Bhd., Suite 804, IGB Plaza, Jalan Ipoh, Kuala Lumpur. | <ol style="list-style-type: none"> 3. Zakaria b. Endut Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi 4. Mohamed Asri b. Omar Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi 5. Othman b. Ibrahim Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Student Members

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Aziman b. Madun Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi 2. Zamani Ahmad b. Mansor Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi | <ol style="list-style-type: none"> 6. Yusri b. Zakariah Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi 7. Che Ibrahim b. Mat Saman Jabatan Geologi, Universiti Malaya, 59100 Kuala Lumpur. 8. Bujang Sabah Jabatan Geologi, Universiti Malaya, 59100 Kuala Lumpur. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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PERTUKARAN ALAMAT (Change of Address)

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

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Tako Koning Texaco Nigeria, 150 Alhambra Circle, P.O. Box 343300, Coral Gables, Florida USA 33134 2. Denis Tan Sarawak Shell Berhad (XGR), 98100 Lutong | <ol style="list-style-type: none"> 3. Karl Hiller c/o BGR, Stilleweg 2, 3 Hannover 51, Germany 4. Engku Nasir Syed Mohamad Halliburton Services (M) Sdn. Bhd., W/ house 8, Door 1, Kemaman Supply Base, 24000 Kemaman, Terengganu |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>5. Abdul Razak Abu Bakar P.O. Box 1917, 98008 Miri, Sarawak</p> <p>6. Lee Fook Weng 15 Jalan 105/6, Taman Midah, Kuala Lumpur</p> | <p>7. H.D. Tjia Petroleum Research Scientific Services, Lot 1026 PKNS Ind. Est., 54200 Ulu Klang</p> <p>8. Jean Hodgson Librarian, Australian Geological Survey Organisation, GPO Box 378, Canberra ACT 2601, Australia</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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PERTAMBAHAN BAHARU PERPUSTAKAAN
(New Library Additions)

The Society has received the following publications:

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Commonwealth Science Council, Jan-Feb 1993.</p> <p>2. National Science Museum, Bulletin, vol. 18, no. 4, 1992.</p> <p>3. AAPG Explorer, Jan, Feb & March 1993.</p> <p>4. Seatrad Bulletin, vol. XIII, no. 2, 1992.</p> <p>5. Service Geologique de Belgique, Prof. Paper 1992/7 - no. 257, 1992/8 - no. 258 & 1993/1 - no. 259.</p> <p>6. U.S. Geological Survey Yearbook, fiscal year 1991, 1992.</p> <p>7. Books about Singapore, 1993.</p> <p>8. Explanatory text of the geologic map of Taiwan: Yuli, scale 1:50,000 1992.</p> <p>9. Geological Survey of Japan, bulletin nos. 8-12, 1992.</p> <p>10. AAPG Bulletin, vol. 77/2, 1993.</p> <p>11. Journal of the Faculty of Science, The University of Tokyo, vol. 22, no. 3, 1992.</p> | <p>12. Oklahoma Geology Notes, vol. 52, nos. 4-6, 1992.</p> <p>13. Bureau de recherches geologiques et minieres: Scientific Report 1990/1991.</p> <p>14. Statistics on Mining Industry, 1990.</p> <p>15. Memoires pour Servir a l'Explication des Cartes Geologiques et Minieres de la Belgique, no. 33, 1993.</p> <p>16. U.S. Geological Survey, Bulletin: 1992: 1808-N, 1917-H, 1970-A, B, 1984, 1900, 1917-F, 2021-A, 2009, 2016, 2010, 1988-B, 2021-B, 2023-A, 2013, 2033, 2030; 1991: 1985.</p> <p>17. U.S.G.S. Prof. Paper: 1992: 1506-E, 1404-A, 1500-A-J, 1410-A, 1520, 1517, 1405-A, 1522, 1518.</p> <p>18. U.S.G.S. Circular: 1991: 1072; 1992: 1093, 1077, 1087, 1089.</p> <p>19. Earthquakes & Volcanoes, vol. 23, no. 2 & 3, 1992.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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- 37 An integrated approach to reservoir petrophysical parameters evaluation
Elio Poggiagliolmi and Dominic Lowden
- 51 Units of measurement in petroleum geoscience: towards the elimination of ambiguity
N.S. Haile
- 63 Cross-border correlation of geological formations in Sarawak and Kalimantan
Robert B. Tate
- 97 Shallow marine seismic survey over Saracen Bank, offshore Sabah
Eileen M.C. Lau, R.C. Hoogenboom and J. Smethurst
- 107 Recent developments in petroleum geochemistry
Douglas W. Waples
- 123 Geochemistry of selected crude oils from Sabah and Sarawak
Awang Sapawi Awang Jamil, Mona Liza Anwar & Eric Seah Peng Kiang
- 151 A time migration before stack
Richard Cooper & Malcolm Hobson
- 165 Palaeoenvironments of the Lower Miocene to Pliocene sediments in offshore NW Sabah area
Emeliana D. Rice-Oxley

Editor
G.H. TEH



NOVEMBER 1991

No. 28

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University of Malaya
59100 Kuala Lumpur
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- 1 **New insight into the recent evolution of the Baram Delta from satellite imagery**
Bruno Cline & John Huong
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John A. Hill
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Duncan C. Barr
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D.M. Angstadt
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Ismail Che Mat Zin
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J.B. Blanche & J.D. Blanche
- 155 **An organic petrological and organic geochemical study of North Sea Middle Jurassic Brent coals and coaly sediments**
Abdullah, W.H.
- 165 **Integration of 3-D and site survey seismic data in analysis of near-surface hazards to platform location at Dulang Field, Malay Basin**
Zuraida Mat Isa, F.W. Richards & Hamzah Yunus
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Mohammad Yamin Ali
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Abdul Jalil Muhamad & Mohd Jamaal Hoesni
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M.B. Idris
- 247 **Multiple aliasing problems in marine data**
P. Chia, C.O. Kuek, P. Ward & K.S. Lee
- 261 **Petrographic and diagenetic studies of the reservoir sandstone of the Malay Basin**
Chu Yun Shing

Editor : G. H. Teh



NOVEMBER 1992

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University of Malaya
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Fourth Annual Archie Conference

November 1-4, 1993

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Problems and Solutions

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Applications: Materials, Standards, Environmental, Economic, Legal.

Case Studies: Geothermal field or Plant; for example, Make-up drilling and Reinjection Strategies.

DEADLINES

1. Submission of title: 26 May
2. Notification of acceptance: 23 June
3. Final paper: 18 August
4. Workshop: 10-12 November (inclusive)

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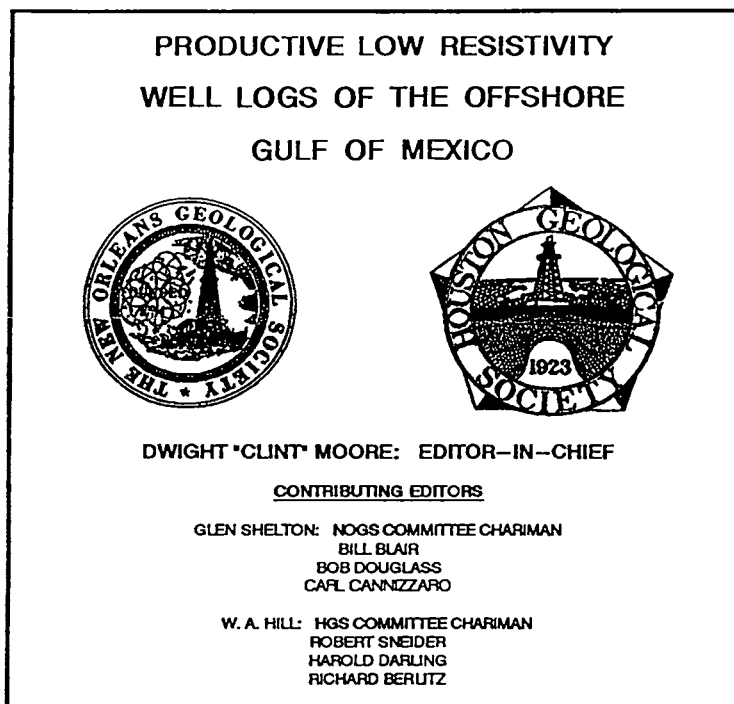
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1993

→→→ July 1993←←←

July

ENVIRONMENTAL CONTEXT OF HUMAN EVOLUTION (International Scientific Congress and Exhibition), The Netherlands and Indonesia. (Dr. Hans Beijer, Geological Survey of The Netherlands, P.O. Box 157, NL-2000 AD Haarlem, The Netherlands. Telefax: 31 23 351614)

July 5-8

ROCKFRAGMENTATION BY BLASTING (4th International Symposium), Vienna, Austria. (Dr. H.P. Rossmann, Institute of Mechanics, Technical University Vienna, Wiedner Hauptstraße 8-10/325, A-1040 Vienna, Austria. Phone: (222) 588 01 5514 or 5519; telefax: (222) 587 5863)

July 5-9

FLUVIAL SEDIMENTOLOGY (5th International Conference), Brisbane, Australia. (Continuing Professional Education, The University of Queensland, Queensland 4072, Australia. Phone: 61 7 365 7100; telefax: 61 7 365 7099; telex: UNIVQLD AA40315)

July 5-16

VERY LOW GRADE METAMORPHISM: MECHANISMS AND GEOLOGICAL APPLICATIONS (IGCP Project 294 Thematic Meeting and Field Excursions), Xi'an, People's Republic of China. (Dr. Wu Hanquan, Xi'an Institute of Geology and Mineral Resources, 116 Easy Youyi Road, Xi'an 710054, People's Republic of China)

July 17-24

GEOLOGICAL AND LANDSCAPE CONSERVATION, int'l. mtg., Great Malvern, U.K. (Margaret Phillips, The Company, St. John's Innovation Centre, Cowley Road, Cambridge CB4 4WS. Phone: (0223) 421124. Fax: (0223) 421158)

July 18-23

INTERNATIONAL FEDERATION OF SCIENCE EDITORS, mtg., Santa Maria Imbaro, Italy. (c/c n 17171/1, Consorzio Mario

Negri Sud, Cassa di Risparmio Provincia di Chieti, Succursale di Lanciano (Chieti) - Italy) (December '92)

July 18-23

CLAY CONFERENCE (10th International Conference in conjunction with Commission VII of the International Soil Science Society), Adelaide, South Australia. (Dr. Tony Eggleton, Geology Department, ANU, GPO Box 4, Canberra, ACT 2601, Australia)

July 25-30

ORIGIN OF PARENTAL ANORTHOSITE MAGMAS, TECTONIC AND METAMORPHIC PROCESSES IN THE EVOLUTION OF ANORTHOSITES (Conference), Kadalaksha, Kola Peninsula, Russia. Sponsored by International Geological Correlation Programme Project 290. (Michael Higgins, Sciences de la Terre, Université du Québec à Chicoutimi, Chicoutimi, Québec G7H 2B1, Canada. Phone: (418) 545-5012)

→→→ August 1993←←←

August

INTRAPLATE VOLCANISM: THE POLYNESIAN PLUME PROVINCE (International Workshop), Tahiti, French Polynesia. (Workshop Tahiti 1993, C. Dupuy, Centre Géologique et Géophysique, Case 060, Université de Montpellier II, place E. Bataillon, 34095 Montpellier Cedex 5, France. Phone: (33) 67-634-983; telefax: (33) 67-523-908)

August 1-5

HYDROMETALLURGY, int'l mtg., Salt Lake City, by Society for Mining, Metallurgy, and Exploration, and the Minerals, Metals, and Materials Society. (SME, Box 625002, Littleton, Colo. 80162. Phone: 303/973-9550. Fax: 303/979-3461)

August 1-6

GEOCHEMISTRY OF THE EARTH SURFACE (3rd International Symposium), University Park, Pennsylvania, USA. (Lee Kump, Department of Geosciences, Pennsylvania State University, 210 Deike Bldg., University Park, PA 16802, USA. Phone: (814) 863-1274; telefax: (814) 865-3191)

August 4-7

PALEOZOIC MICROVERTEBRATES (IGCP Project-328) (2nd International Symposium), Berlin, Germany. In conjunction with the birthday anniversary of Professor Walter Gross. (Dr. S. Turner, Queensland Museum, P.O. Box 3300, South Brisbane, Qld 4101, Australia. Telefax: 617 846 1918. Or Prof. H. Jaeger, Museum für Naturkunde, Invalidenstr. 43, 00-104 Berlin, Germany)

August 8-12

STRATIGRAPHIC RECORD OF GLOBAL CHANGES: CLIMATE, SEA LEVEL, AND LIFE (SEPM Meeting), University Park, Pennsylvania, USA. (Mike Arthur, Department of Geosciences, Pennsylvania State University, University Park, PA, 16802, USA. Phone: (814) 865-6711)

August 11-15

GEOSCIENCE IN URBAN DEVELOPMENT (International Conference), Beijing, China. (Professor Wang Sijing, Chairman LANDPLAN IV, Institute of Geology, Academia Sinica, P.O. Box 634, Beijing 100029, China. Phone: 86-1-2027766; telefax: 86-1-4919140; telefax: 22474 ASCHI CN c/o Institute of Geology)

August 15-19

CARBONIFEROUS TO JURASSIC PANGAEA: A GLOBAL VIEW OF ENVIRONMENTS AND RESOURCES (International Symposium), Calgary, Alberta, Canada. (Dr. Benoit Beauchamp or Dr. Ashton Embry, Geological Survey of Canada, 3303 33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7190; telefax: (403) 292-4961)

August 23-29

GEOMORPHOLOGY (3rd International Conference), Hamilton, Ontario, Canada. (3rd International Geomorphology Conference, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1, Canada. Phone: (416) 525-9140, ext. 4535; telefax: (416) 546-0463; E-mail: GEOMORPH)

August 23-29

COASTAL SEDIMENTOLOGY (Meeting), Hamilton, Ontario, Canada. (William F. Tanner, Dept. of Geology B-160, Florida State University, Tallahassee, FL 32306, USA) Phone: 904/644-3208)

August 28-September 15

LANDSLIDES (International Meeting and Workshop), Czech and Slovak Federal Republic. (ICFL-C.S. Landslides '93, c/o NOVOSAD IG/EG, I. Sekaniny 1801, CS-70800 Ostrava 4, Czechoslovakia. Phone: (42-69) 473028; telefax: (42-2) 381848)

→→→ September 1993←←←**September 5-11**

NUCLEAR-WASTE MANAGEMENT, int'l mtg., Prague, Czech and Slovak Federal Republic, by American Society of Mechanical Engineers. Czech and Slovak Mechanical Engineering Society, and the Czech and Slovak Nuclear Society. (Radovan Kohout, Ontario Hydro (H11 A2), 700 University Ave., Toronto, Ontario M5G 1X6. Phone: 416/592-5384. Fax: 416/592-4485)

September 6-8

STRUCTURES AND TECTONICS AT DIFFERENT LITHOSPHERIC LEVELS (International Conference), Graz, Austria. (Wolfgang Unzog, Department of Geology, University of Graz, Heinrichstrasse 26, A-8010 Graz, Austria. Phone: 43 316 380 5584; telefax: 43 316 38 28 85)

September 8-13

JURASSIC GEOLOGY (Arkell International Symposium), London, UK. (Dr. Stewart Brown, Conference Secretary, Petroleum Science and Technology Institute, 25 Ravelston Terrace, Edinburgh EH4 3EX, UK. Phone: 031 451 5231; telefax: 031 451 5232)

September 8-17

LAYERING IN IGNEOUS COMPLEXES - WAGER AND BROWN 25th ANNIVERSARY COMMEMORATIVE MEETING (Symposium), Johannesburg, South Africa. (Professor R. Grant Cawthorn, Department of Geology, University of the Witwatersrand, P.O. Wits 2050, Republic of South Africa. Phone: 11 716 2711 or 2608; telefax: 11 339 1697 or 430 1926)

September 14-16

AFRICAN GEOLOGY (16th International Colloquium), Ezulwini, Swaziland. (The Chairman or Secretary, Organizing Committee, 16th Colloquium of African Geology, P.O. Box 9, Mbabane, Swaziland. Phone: 42411; telefax: 45215; telex: 2301 WD; telegram: GSM)

September 15-17

MINING DEVELOPMENT, int'l mtg., Philadelphia, by Society for Mining, Metallurgy, and Exploration. (SME, Meetings Department, Box 625002, Littleton, Colo. 80162. Phone: 303/973-9550. Fax: 303/979-3461)

September 21-23

ANDEAN GEODYNAMICS (2nd International Symposium), Oxford, UK. Sponsored by University of Oxford and Institut Francais de Recherche Scientifique pour le Développement en Coopération (Orstom). (Pierre Soler, ISAG 93, Orstom, CS1, 213 rue Lafayette, 75480 Paris Cedex 10, France. Telefax: 33 1 48 03 08 28)

September 25-October 1

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR (Meeting), Canberra, Australia. (IAVCEI ACTS, GPO Box 2200, Canberra ACT 2601, Australia. Phone: 61 6 257-3299. Fax: 61 6 257-3256)

September 27-30

ENVIRONMENTAL BIOGEOCHEMISTRY (11th International Symposium), Salamanca, Spain. (Dr. J.F. Gallardo Lancho, I.E.T./CSIC, Aptdo. 257, Salamanca 37071, Espana, Spain. Phone: (923) 219606; telefax: (923) 219609)

September 27-29

GLOBAL BOUNDARY EVENTS (Interdisciplinary Conference of IGCP Project 293, Geochemical Marker Events in the Phanerozoic), Kielce, Poland. (Barbara Studencka, Muzeum Ziemi PAN, A1.Na Skarpie 20/26, 00-488 Warszawa, Poland. Phone: (4822) 217-391; telefax: (4822) 297-497. Or Helmut H.J. Geldsetzer, Geological Survey of Canada, 3303-33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7155; telefax: (403) 292-5377)

September 28-October 1

ENVIRONMENTAL POLLUTION (International Conference), Barcelona, Spain. (ICEP Conference Office, ICTR Secretariat, 11-12 Pall Mall, London SW1Y 5LU, UK. Phone: 44 71 930-6825; telefax: 44 71 976-1587; telex: 925312 REICO)

→→→ October 1993←←←**October 4-9**

BASIN INVERSION (International Conference), Oxford, UK. (James G. Buchanan, British Gas Exploration and Production Limited, 100 Thames Valley Park Drive, Reading, Berkshire RG6 IPT, UK. Phone: 0734-353222; telefax: 0734-353484; telex: 846231)

October 10-15

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY (Silver Anniversary Meeting), Prague, Czechoslovakia. (John C. Davis, Kansas Geological Survey, University of Kansas, Lawrence, KS 66047, USA. Phone: (913) 864-3955; telefax: (913) 864-5317; E-mail: john_davis.moore_@msmail.kgs.ukans.edu. Europe, Africa, and Asia: Jan Harff, Institute for Baltic Sea Research, Seestr. 15, 0-2530 Warnemuende, Germany. Phone: 49 381 58 261; telefax: 49 381 58.336; E-mail: harff@geologie.io-warnemuende.dbp.de)

October 11-24

INTERGEMS '93 (2nd International Symposium on Precious and Decorative Stones), Prague, Czechoslovakia. Sponsored by Czech and Slovak Geological Services and Museums. (Secretariat INTERGEMS, Malostranske nam. 19, CS-11821 Praha 1, Czechoslovakia. Phone: 535 357; telefax: 533 564)

October 17-20

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Meeting), The Hague, The Netherlands. (AAPG, Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555; telefax: (918) 584-0469)

October 18-23

NEW DEVELOPMENTS IN GEOTHERMAL MEASUREMENTS IN BOREHOLES (Meeting), Klein Koris, Germany. (Prof. E. Hurtig, GFZ Potsdam, Telegrafenberg A45, 0-1561 Potsdam, Germany. Phone: 49 331 310 347; telefax: 49 331 310 610; E-mail: gth@gfz-postsdam.dbp.de)

October 25-28

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Boston, Massachusetts, USA.

(Vanessa George, GSA, P.O. Box 9140, Boulder, CO 80301, USA. Phone: (303) 447-2020)

October 27-28

PALYNOLOGY, CLIMATE AND SEQUENCE STRATIGRAPHY OF THE PLIOCENE, mtg., Baton Rouge, La., by the American Association of Stratigraphic Palynologists. (John Wrenn, Amoco Production Co., Box 3092, Houston, 77253. Phone: 713/556-2297. Fax: 713/584-7468). Deadline for abstracts: Aug. 31.

→→→ November 1993←←←

November 5-21

CIRCUM-PACIFIC AND CIRCUM-ATLANTIC TERRANE, Int'l mtg., Guanajuato, Mexico. (David G. Howell, USGS, MS 902, 345 Middlefield Road, Menlo Park, Calif. 94025. Fax: 415354-3224)

November 15-30

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAMME, mtg., Santiago, Chile. (M. Vergara, Universidad de Chile, Departamento de Geologia y Geofisica, Casilla 13518-Correo 21, Santiago, Chile. Fax: 56-2-6963050)

November 15-30

LOW TEMPERATURE METAMORPHISM: PROCESSES, PRODUCTS AND ECONOMIC SIGNIFICANCE (IGCP Project 294 Thematic Meeting), Santiago, Chile. (Professor M. Vergara, Universidad de Chile, Departamento de geologia y Geofisica, Casilla 13518-Correo 21 Santiago, Chile. Telefax: 56 2-6963050)

1994

Jan 27-28

DYNAMIC GEOTECHNICAL TESTING, symposium, Reno, Nev. (Dorothy Savini, American Society for Testing and Materials, 1916 Race St., Philadelphia, 19103-1187. Phone: 215/299-5413)

June 5-11

GEOCHRONOLOGY, COSMOCHRONOLOGY AND ISOTOPE GEOLOGY (ICOG-8), mtg.,

Berkeley, Calif. (Garniss H. Curtis, Institute of Human Origins-Geochronology Center, 2453 Ridge Road, Berkeley, 94709. Phone: 415/845-4003. Fax: 415/845-9453)

June 6-10

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (56th Annual Meeting and Exhibition), Austria Center, Vienna, Austria. (Evert Van der Gaag, Business Manager, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, the Netherlands. Phone: (03404) 56997; telefax (03404) 62640; telex:33480)

June 12-15

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, ann. mtg., Denver. (AAPG, Box 979, Tulsa, Okla. 74101. Phone: 918/584-2555. Fax: 918/584-0469)

July 1-5

HYDROMETALLURGY, int'l mtg., Cambridge, England, by Society of Chemical Industry and Institution of Mining and Metallurgy. (SCI, 14/15 Belgrave Square, London, England SW1X8PS. Phone: 071 235 3681. Fax: 017 823 1698) [December '92]

Aug 21-24

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS. Int'l. mtg., Kuala Lumpur, Malaysia. (AAPG Box 979, Tulsa, Okla. 74101. Phone: 918/584-2555. Fax: 918/584-0469)

1995

Mar 5-8

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, ann. mtg. Houston. (AAPG, Box 979, Tulsa, Okla. 74101. Phone: 918/584-2555. Fax: 918/584-0469)

May 29-June 2

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (57th Annual Meeting and Exhibition), Glasgow, UK. (Evert van der Gaag, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, The Netherlands. Phone: (03404) 56997; telefax: (03404) 62640; telex: 33480)

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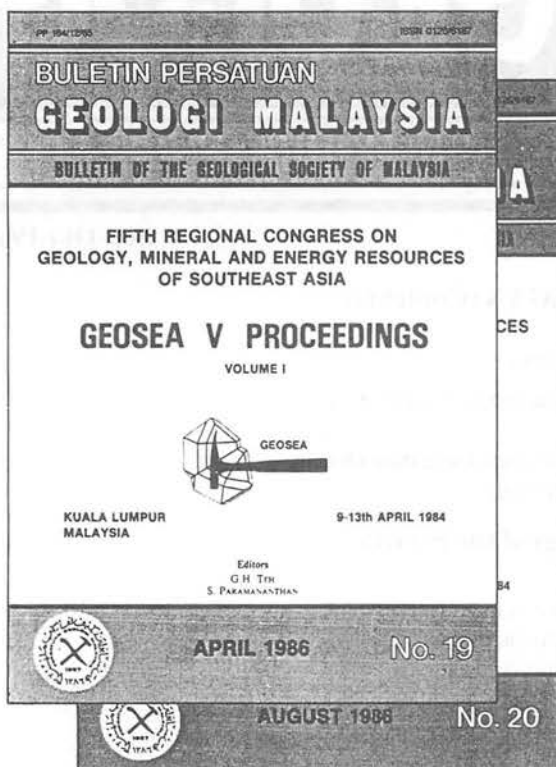
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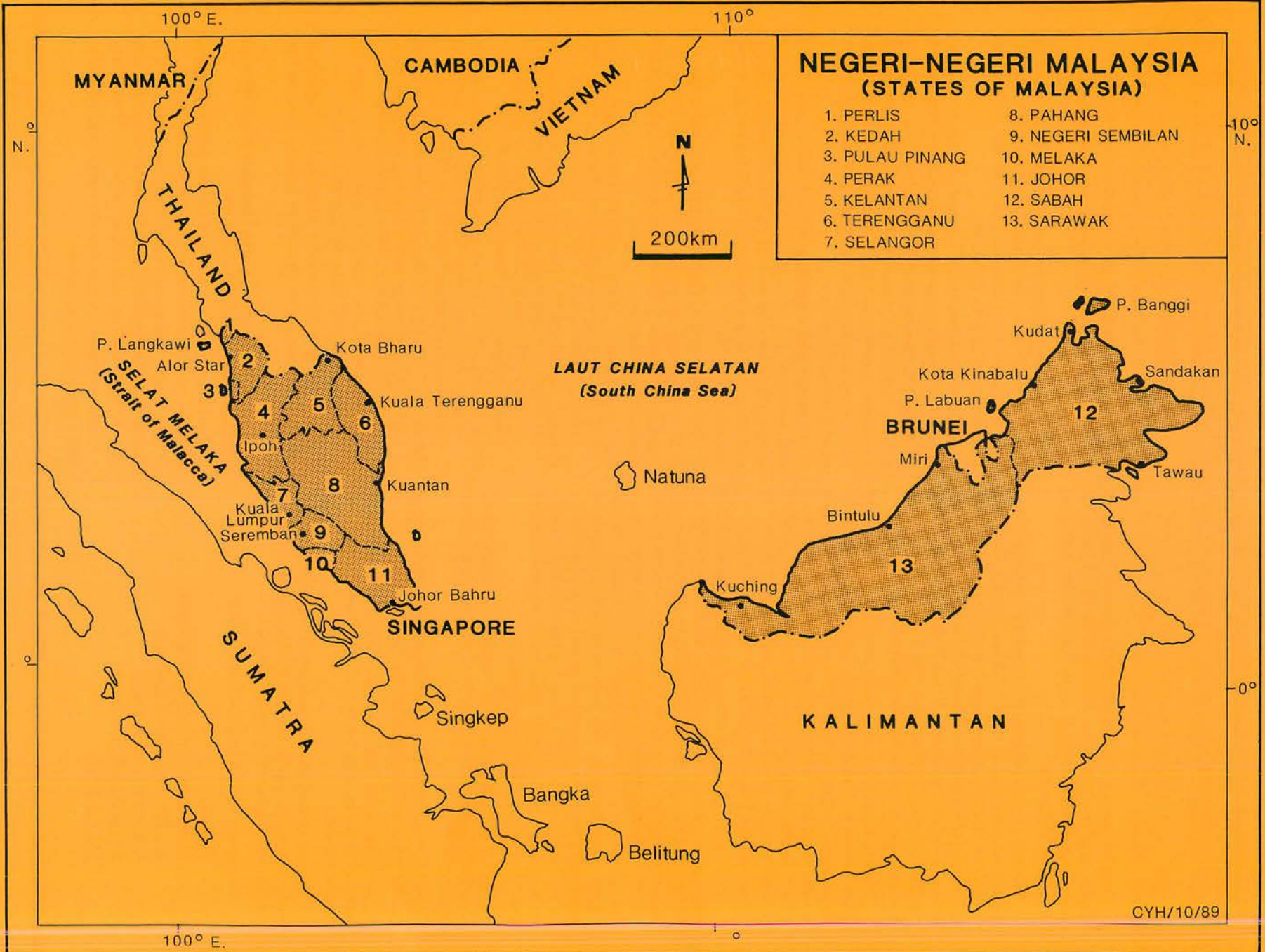
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