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CATATAN GEOLOGI

Geological Notes

The photogeology of the Bukit Tunjung area, Chuping, Perlis

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Abstract: Photo-interpretation has delineated an apparent fault, the 'Beseri Lineament', occurring between a western belt of Permian limestones and a eastern belt of predominantly Triassic limestones. This is a dip-slip fault which has uplifted the western belt. Triassic limestones may be present in the top portions of the limestone hills of the western belt.

Abstrak: Tafsiran foto telah menandakan sesuatu sesar ketara, Lineamen Beseri, yang berlaku di antara satu jalur baratan batu kapur Perm, dan satu jalur timuran batu kapur Trias. Sesar ini merupakan sebagai sesuatu sesar gelinciran miring yang telah melempar naik jalur baratan. Batu kapur Trias mungkin berada di bahagian atasan bukit-bukit kapur di jalur ini.

INTRODUCTION

The limestone hills in the Chuping area, Central Perlis, occur in two roughly aligned NNE linear belts. The western belt is made up of Bt. Chabang, Bt. Manek, Bt. Wang Pisang, Bt. Chondong and Bt. Tunjung. The eastern belt consists of Bt. Guar Sami, Bt. Jerneh, Bt. Keteri and some unnamed hills. Bukit Keteri and Bukit Chuping which are just south of the map area, also fall into this belt.

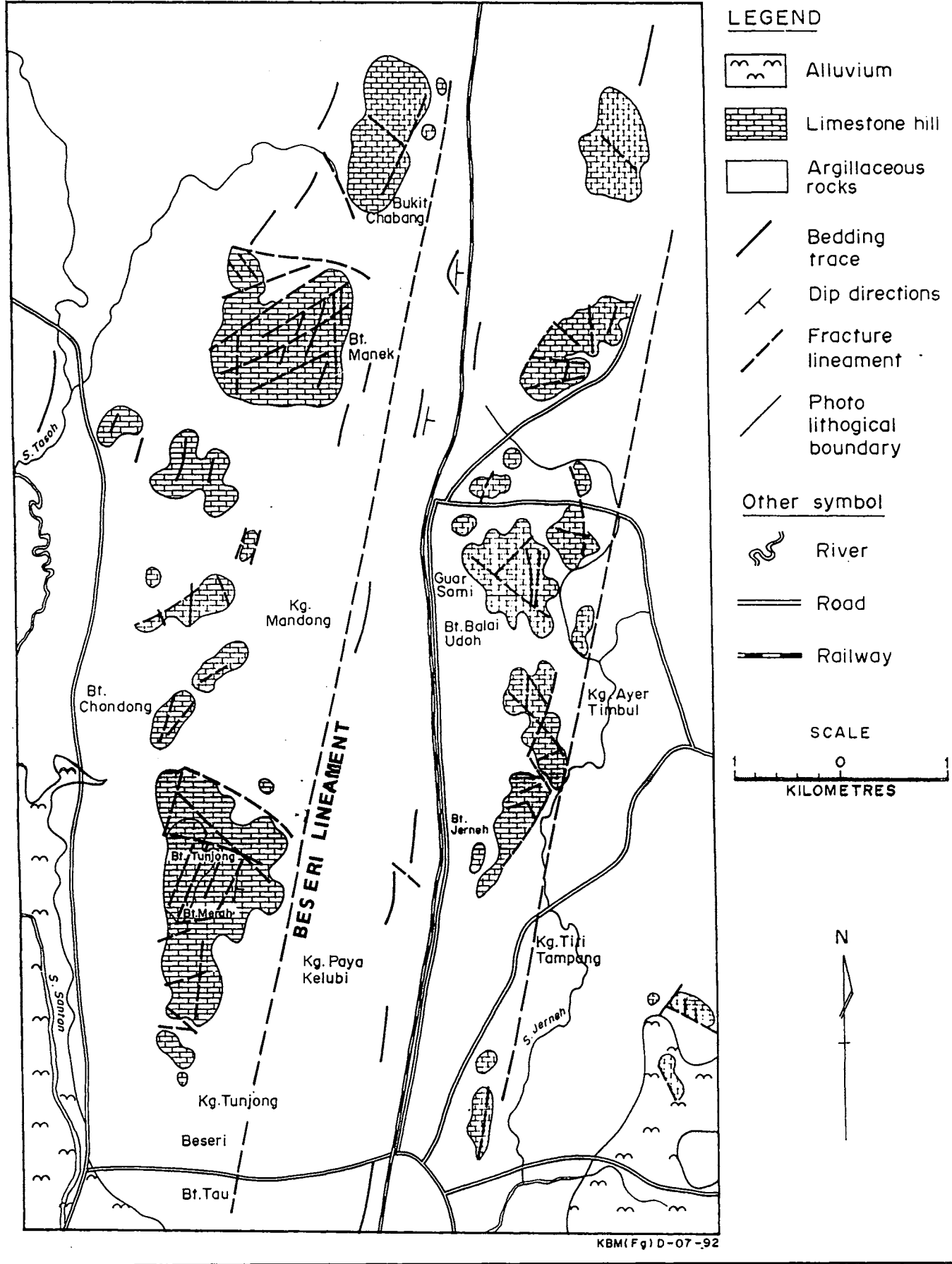
According to Fr. H. Fontaine (personal communication) most of the limestones on the east are Triassic but some range from Permian to Triassic. On the other hand, the limestones on the west are Permian, except at one locality (Bt. Tunjung) where Triassic fossils have been found. The nature of the Permian/Triassic boundary is not clear because of the poor access to the upper parts of the limestone cliffs and hills. A structural study by the remote sensing (aerial photography) method was done to obtain more information on the relationship between the Permian and Triassic limestones in this area.

PHOTOGEOMORPHOLOGY

The limestone hills form two parallel lines of mogate (tower) karsts, that rise abruptly from the surrounding flat to gently undulating pediplain which is underlain by argillaceous rocks (Kubang Pasu Formation, Jones, 1978). Generally, the limestone hills being elongated on a NNE trend, have concordant heights, like those of the limestone hills in the Kinta Valley. Very steep to vertical cliffs, some overhanging, are common, and the cliffs are invariably aligned NS to NW. A few smaller ridges of argillaceous rocks, occur in the pediplain between these two belts of limestone hills and they are also aligned NNE.

PHOTOGEOLOGY

Three photolithological units are apparent in the Chuping area. They are mogate karst limestones, the pediplain underlain mainly by argillaceous rocks, and alluvium along the main rivers to the southwest and southeast corners of the map area (Fig. 1). In addition, Bukit Tunjung appears to consist of two limestone



KBM(Fg) D-07-92

Figure 1. Photogeological map of Bukit Tunjong area, Perlis

units, namely a massive type sitting on a layer which shows a more hummocky surface. The contact between the two apparently conformably units appears to be around the 160-meter contour.

Bedding trends are not very prominent from the photographs of this area. The few dips inferred, mainly from the argillaceous unit, are at about 20-40 degree east with a general strike of NNE.

Fracture lineaments are more easily demarcated, especially in the limestone hills. Most of these are probably joints and appear to control the occurrence of cliffs and hill slopes. Two major parallel trending NNE lineaments, albeit weak in topographic expression, could be traced over 10 km in the argillaceous rocks. One of them separates the two limestone belts and can be traced through the village of Berseri in the south to Bt. Chabang in the north.

These two major lineaments probably represent two faults but their actual nature cannot be directly determined from the aerial photographs. However, the Bt. Arang Tertiary basin which lies only 5 km east of these hills is an elongated deposit whose long axis is also trending NNE. In nearby Thailand, Chaodumrong *et al.* (1983) reported that the Tertiary basins are mainly fault-bounded grabens and/or half grabens. Thus a system of parallel dip slip faults trending NNE may be present in this area, and the 'Beseri' lineament might be one of them.

CONCLUSIONS

The most significant finding of this interpretation is the delineation of the Beseri lineament. If it is a dip-slip fault, the western limestone belt might have been uplifted relative to the eastern limestone belt. It could explain why Triassic limestones are dominant to the east of the fault, and on the other hand, Permian limestones are dominant to the west. Thus, Triassic limestone might be present on top of the Permian in the limestone hills of the western

belt. Therefore, the upper portion of Bt. Tunjung, perhaps above the 160-meter contour, might be Triassic and the lower portion Permian. Palaeontological studies should be carried out on the top portions of the limestone hills in the western belt, especially on Bt. Tunjung.

REMARKS

It may be of interest to note that the Permian limestone and the Triassic limestones in this area and the Kodiang area were formally grouped by Jones (1978) as the Chuping Limestones. The type locality is Bukit Chuping which was shown by Jones (1966 & 1978), and Fontaine (1986) to contain only Triassic fossils. Permian fossils, have not been discovered. The Triassic limestones in the Kodiang area, however, has been formalized as the Kodiang Limestone by DeCoo and Smit (1975). But it also was shown by Metcalfe (1981) that the Kodiang Limestone ranges in age from Permian to Triassic.

REFERENCES

- CHAODUMRONG, DOL *ET AL.*, 1983. A Review of the Tertiary Sedimentary Rocks of Thailand. *Proceedings of the Workshop on Stratigraphic Correlation of Thailand and Malaysia*. Joint Publication of the Geological Societies of Thailand and Malaysia, V. 1, p. 151-187.
- DECOO, J.C.M. & SMIT, O.E., 1975. The Triassic Kodiang Limestone Formation in Kedah, W. Malaysia. *Geologie En. Mijnbouw*, V. 54, p. 169-176.
- FONTAINE, H., 1986. The Permian of Southeast Asia. *CCOP Technical Bulletin*, V. 18, 171 p.
- JONES, C.R., D.J. GOBBETT & T. KOBAYASHI, 1966. Summary of fossil record in Malaya and Singapore 1900-1965. *Geology and Palaeontology of Southeast Asia*, V. 2, p. 301-359.
- JONES, C.R., 1978. Geology and Mineral resources of Perlis, North Kedah and the Langkawi Islands. *Geological Survey of Malaysia, Memoir 17*, 257 p.
- METCALFE, I., 1981. Permian and Early Triassic conodonts from Northwest Peninsular Malaysia. *Geological Society of Malaysia Bulletin 14*, p. 119-126.



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CATATAN GEOLOGI

Geological Notes

Joint characteristics in granitic rocks of eastern Kuala Lumpur, Peninsular Malaysia

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Abstract: This study presents some observations on the characteristics of joints in granitic rocks belonging to the Kuala Lumpur Granite and Genting Sempah Microgranite in the eastern part of Kuala Lumpur. Joint parameters determined in the field include orientation, number of sets, set spacing, length (persistence), termination, roughness, aperture, filling and seepage. The general joint spacings were obtained from photo-interpretation.

Four major or systematic joint sets are identified. They have steep to vertical dip, and strike approximately NW-SE, N-S, E-W and NE-SW. Both the set and general spacings are not uniformly distributed. There is a higher concentration of joints at the lower spacing values (< 50 cm). Most of the joints have lengths of less than 3 m and they often terminate against other joints. The joint surfaces are commonly smooth and slightly undulating, and coated with chlorite.

INTRODUCTION

Joints are ubiquitous in granitic rocks of eastern Kuala Lumpur. They occur in all outcrops investigated. The characteristics of joints and other discontinuities play an important role in controlling the mechanical properties of a rock mass. The strength and deformability of a rock mass, rock slope stability, as well as the ability of a rock mass to transmit and hold fluids depend more on the discontinuity systems within the rock mass than on the rock mass itself (Hoek and Bray, 1974; Jaeger and Cook, 1979). Thus, joints or discontinuity survey is an essential part of site investigations for almost all geological engineering projects. The International Society of Rock Mechanics (ISRM, 1978) has listed 11 parameters for the quantitative description of discontinuities. Some of these parameters, including orientation, spacing and persistence, were determined for some quarry faces and road-cuts in the eastern part of Kuala Lumpur.

GEOLOGY

The area of study is located to the east of Kuala Lumpur (Fig. 1). This area is underlain by granitic rocks of the Main Range batholith which intruded into Paleozoic clastic and calcareous metasediments. The granitic rocks comprises three main bodies: the Kuala Lumpur Granite, the Genting Sempah Microgranite and the Bukit Tinggi Granite. The Kuala Lumpur Granite is the main granitic body and it is separated from the Genting Sempah Microgranite by a metasedimentary screen at its eastern margin. It is predominantly megacrystic consisting of K-feldspar megacrysts set in a medium to coarse grained allotriomorphic to hypidiomorphic groundmass. The Genting Sempah Microgranite is made up of subvolcanic (microgranodiorite) and volcanic rocks (Liew, 1983; Cobbing and Mallick, 1987). The Bukit Tinggi Granite comprises very coarse grained megacrystic biotite granite. Geochronological studies by Bignell and Snelling (1977), Liew

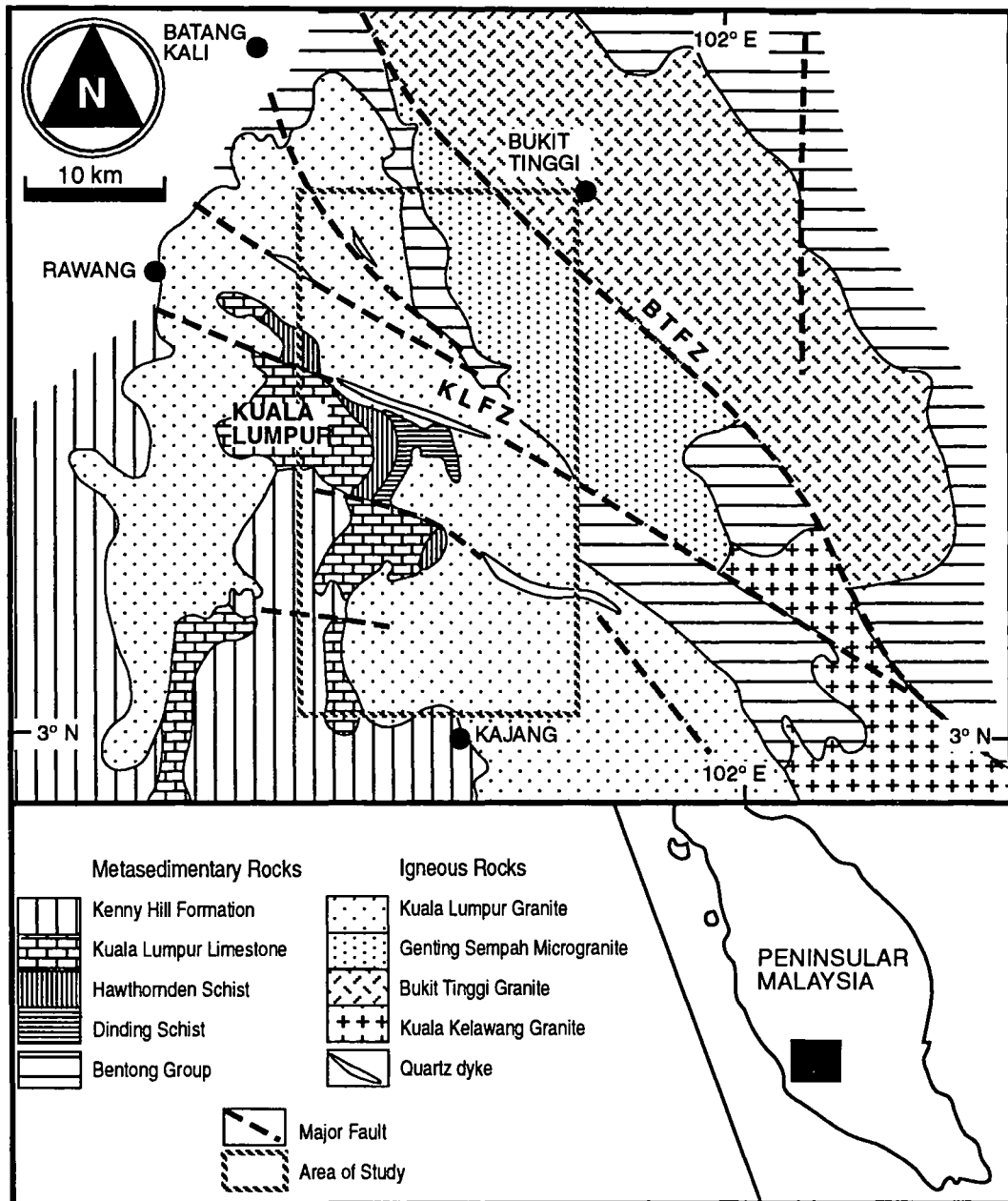


Figure 1. Sketch geological map of the Kuala Lumpur and adjacent areas. Modified after Gobbett (1964) and Cobbing and Mallick (1987).

(1983) and Darbyshire (1988) suggest a Late Triassic age of emplacement for the above granitic rocks.

The study area is cut by two major fault zones — the Bukit Tinggi Fault Zone and the Kuala Lumpur Fault Zone. Mesoscopic faults and shear zones are commonly observed. They are steeply dipping and strike mainly NW-SE, N-S and NE-SW. Faulting have given rise to a diverse assemblage of deformed rocks including

fault breccias, cataclasites and mylonites. Joints are the most conspicuous structural features in the granites. Systematic relationships between the joints and the geometry of the granite plutons, the flow structures and dikes are not observed. However, the orientation of the major joint sets and the mesoscopic faults are similar. The spacings of joints are observed to decrease towards the faults. Thus, the joints and faults are likely to be cogenetic.

ORIENTATION OF THE JOINTS

Joints mainly occur as sets of discontinuities, each set having similar orientations. There are some individual joints which are randomly orientated. At the various exposures, the orientations of the joints were measured with a Brunton compass. Large inhomogeneous exposures of the granitic rock were divided into several domains in each of which discontinuity features are more or less homogeneous. To avoid biasness, all joints within a fixed area of the rock exposures were measured. However, bias and errors do occur as the measurements were made on near vertical man-made exposures. These quarry faces and slope cuts are furthermore, somewhat disturbed by excavation and blasting works. Radial cracks were evident near the blast-holes, and measurements near the blast-holes were thus not attempted. Further away from the blast-holes, most of the dilated cracks developed due to blasting are by and large parallel to the existing joint systems. This supports Pevzner's (1974) conclusion that a new system of cracks are seldom formed during an explosion, though cracks may develop along the existing discontinuities.

Lower hemisphere equal area projections of the poles to the joint planes were made for every domain, and the results of all the domains from the same exposure were also combined to give the generalized (composite) distribution of joint orientation for the entire exposure. The pole densities were contoured using the Schmidt method (Phillips, 1971). The density maxima is taken as the modal (most common) orientation for a given joint set. A total of 26 granite exposures, 23 from within the Kuala Lumpur Granite and 3 from the Genting Sempah Microgranite, were studied. Projection of poles to joint planes for the various exposures are shown in Figure 2, and the composite plot of all the exposures in Figure 3. The pole maxima are summarized in Table 1.

Up to 8 joint sets are present in the study area, though most exposures show between 3 to 5 joint sets. In addition to these sets, randomly orientated joints and sheet structures are also present. Two or 3 joint sets are generally common and form prominent maxima in the

projection of poles to joint planes.

Four joint sets are common to almost all the exposures and these can be considered to be the major (or systematic) joint sets which occur regionally. They are more prominent and persistent than the other more localized joints (minor or non-systematic joint sets). The four major joint sets are steeply dipping to vertical and strike approximately NW-SE, N-S, E-W and NE-SW (Figs. 2 and 3).

NW-SE striking joint set

This sub-vertical joint set is most conspicuous and forms a distinct maxima in the projection of poles to joint planes in 21 of the 26 granite exposures studied. It is the dominant joint set in more than half of the exposures. It is more prominent in the southern part of the study area (Ampang-Cheras-Kajang area). The orientation of this joint set may vary up to 20° (both in dip and strike) between different localities. The modal orientations for different localities vary from 318°/83°NE to 326°/78°SW and the mode of all exposures corresponds to 322°/vertical (Fig. 3). The spacing of joints of this set is typically less than 1 m and chlorite coating is ubiquitous on the joint surfaces.

N-S striking joint set

This joint set is also steeply dipping. The strike of the pole maxima of the projection of poles to joint planes vary between 008° and 025°, and dip angles from 70°E to 85°E. The maxima of the composite plots of all the granite exposures corresponds to 014°/76°E (Fig. 3). This joint set is conspicuous along the Karak Highway, particularly between km 23 and 29. In the southern part of the study area (Ampang to Kajang), it is usually less prominent than the NW-SE and E-W sets, though it is the dominant joint set in the Dayapi Quarry. This N-S set forms a distinct maxima in the projection of poles to joint planes of 17 exposures, and is the dominant maxima in 8 of them.

E-W striking joint set

This joint set exists in all the exposures studied, and it forms the prominent set of 12 localities. In general, it is the second most

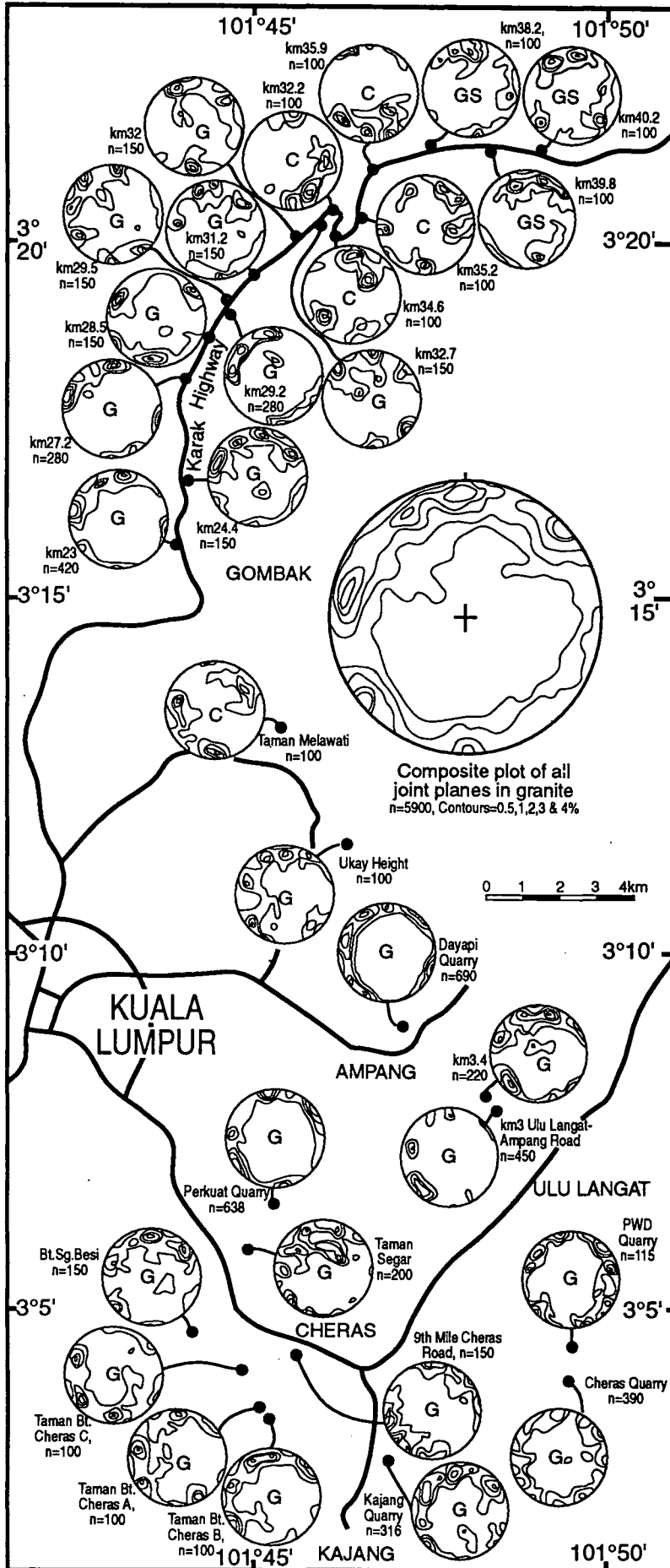


Figure 2. Orientation of joints in the eastern Kuala Lumpur area. Lower hemisphere equal area projection of poles to joint planes contoured at 1, 3, 5 and 7 percent per 1 percent area. C=country rock; G = Kuala Lumpur Granite; GS = Genting Sempah Microgranite and n = number of readings.

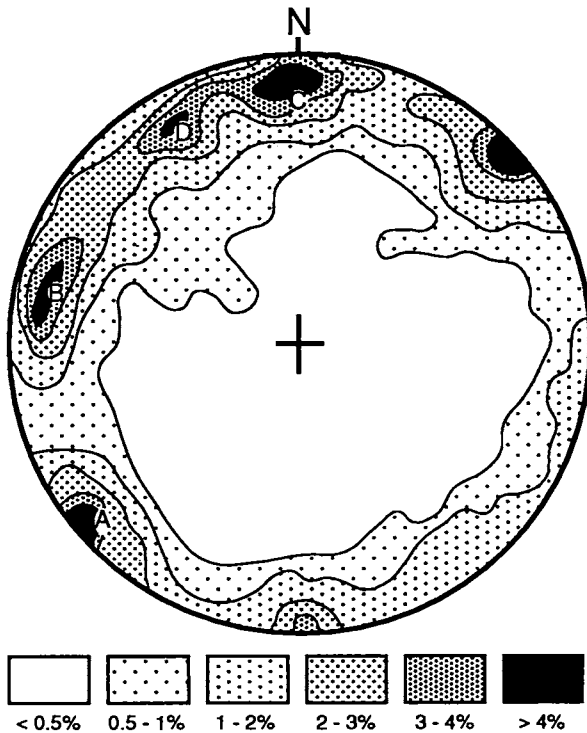


Figure 3. Composite plot of all joints measured in granitic rocks. Joint maxima are: A:322°/90°; B:014°/78°SE; C:088°/82°S and D:056°/76°SE. Lower hemisphere equal area projection contoured at 0.5, 1, 2, 3 and 4 percent per 1 percent area. Number of readings is 5900.

prominent set, after the NW-SE set in the Ampang-Cheras-Kajang area and after the N-S set along the Karak Highway. The strike of the pole maxima vary between 080° and 100°, with the dip being more variable, between 74°N and 72°S. The modal orientation of this joint set in the composite plots is 088°/78°S (Fig. 3).

NE-SW striking joint set

In comparison with the previous major joint sets, this NE-SW joint set is less prominent. It forms a distinct joint set in about two-thirds of all the granite exposures studied, mainly along the Karak Highway. The strike of the pole maxima vary between 052° to 060°, and the dips between 70°NW and 72°SE. The modal orientation of this joint set in all the granite exposures corresponds to 52°/74°SE (Fig. 3).

Minor joint set

Minor joints seldom form distinct maxima

in the projection to poles to joint planes. Typically, the length of the minor joints is less than 3 m with spacing of mainly between 30 cm and 1 m. They often terminate against the major joints.

Sheet structures

Sheet structures or sheeting joints are observed in most exposures. They are sub-parallel to ground surfaces and may be gently curved. In the projection of poles to joint planes, sheet structures rarely form a maxima, probably due to their inconsistent orientations, which may deviate as much as 40° from one end of the joint to the other. They also have wide spacings, ranging from 50 cm to more than 2 m.

SPACING

Set joint spacing

The joint spacings were measured directly in the field and also determined from photographic prints of representative rock faces. Field measurements were made along several linear scanlines to obtain the *set joint spacing* (S) which is the perpendicular distance between two adjacent joints of the same set. The apparent set joint spacing was measured with a measuring tape and was later converted to true spacing using the equation $S = S' \cos \theta$; where S is the spacing, S' is the apparent spacing, and θ is the smallest angle between the scanline and the pole to the joint plane (Hudson and Priest, 1983).

The set spacings of the major joint sets were determined from 5 localities (Fig. 4). The minimum spacing (S_{\min}), maximum spacing (S_{\max}), modal spacing (S_{mod} = spacings having the highest frequency of occurrence), mean spacing (S^- = sum of spacings divided by the number of measurements) and standard deviation (s) were determined. These parameters are shown together with the joint spacing distribution bar charts in Figure 4. From the results, it is obvious that the joints are not uniformly spaced, and the differences between the spacing parameters of various joint sets are not significant. The majority of the joint spacings are less than 50 cm. The modal spacing ranges from 5 to 45 cm, but more than half of

Table 1: Summary of the orientation of joint sets in granitic rocks of eastern Kuala Lumpur. The density maximas are considered as the modal orientation of the joint sets. n is the number of measurements.

KUALA LUMPUR GRANITE			KUALA LUMPUR GRANITE			KUALA LUMPUR GRANITE			
Location (n)	Joint Set (maxima)	Maxima (%)	Location (n)	Joint Set (maxima)	Maxima (%)	Location (n)	Joint Set (maxima)	Maxima (%)	
Perkuat Quarry (638)	A (324°/90°)	12	Bt. Sg. Besi Quarry (150)	A (140°/80°SW)	11	Karak Hy. km 29.2 (280)	A (008°/80°E)	6	
	B (080°/82°S)	8		B (090°/78°E)	10		B (035°/82°SE)	9	
	C (008°/85°E)	7		C (018°/78°E)	6		C (082°/80°S)	7	
		D (058°/74°SE)		4	D (098°/28°S)		2		
				E (084°/36°S)	3				
Taman Segar (200)	A (144°/36°SW)	5	Kajang Quarry (316)	A (144°/80°SW)	8	Karak Hy. km 29.5 (150)	A (048°/86°SE)	10	
	B (099°/80°S)	7		B (084°/72°S)	6		B (092°/86°S)	10	
	C (070°/82°S)	4		C (032°/70°SE)	4		C (324°/72°NE)	6	
	D (038°/58°SE)	3		D (060°/74°SE)	4		D (006°/78°E)	5	
		E (318°/83°NE)		4	E (348°/72°E)	2	E (055°/40°SE)	4	
					F (262°/30°N)	3			
9th mile Cheras Road (150)	A (352°/86°E)	6	Ulu Langat -Ampang Rd. km 3 (450)	A (308°/78°NE)	8	Karak Hy. km 31.2 (150)	A (066°/78°SE)	10	
	B (324°/88°NE)	8		B (014°/73°E)	7		B (086°/82°S)	9	
	C (085°/90°)	6		C (269°/78°W)	5		C (132°/72°SW)	8	
	D (305°/86°NE)	4		D (060°/80°E)	4		D (002°/70°E)	6	
Cheras Quarry (390)	A (326°/80°NE)	5	Ulu Langat -Ampang Rd. km 3.4 (100)	A (138°/82°SE)	7	Karak Hy. km 32 (150)	A (276°/74°N)	10	
	B (240°/82°NW)	5		B (014°/78°E)	6		B (062°/78°SE)	8	
	C (124°/86°SW)	4		C (094°/74°S)	6		C (142°/74°SW)	9	
	D (088°/86°S)	3		D (062°/76°SE)	5		D (200°/76°W)	3	
	E (044°/78°SE)	3					E (040°/34°SE)	3	
PWD Quarry (115)	A (138°/86°SW)	10	Ukay Height Ulu Kelang (100)	A (120°/84°SW)	10	Karak Hy. km 32.7 (150)	A (038°/88°SE)	16	
	B (076°/90°)	10		B (320°/76°NE)	11		B (270°/84°SW)	11	
	C (168°/76°W)	5		C (016°/72°E)	5		C (140°/80°SW)	6	
	D (214°/74°NW)	4		D (090°/74°S)	5		D (022°/26°E)	6	
	E (232°/80°NW)	4		E (062°/74°SE)	6		E (112°/38°S)	4	
	F (038°/82°SE)	4		F (230°/70°NW)	4				
	G (018°/82°E)	4							
Dayapi Quarry (690)	A (014°/80°E)	6	Karak Hy. km 23 (414)	A (008°/86°E)	10	GENTING SEMPAH MICROGRANITE			
	B (056°/78°SE)	4		B (092°/80°S)	8	Location (n)	Joint Set (maxima)	Maxima (%)	
	C (320°/84°NE)	4		C (056°/78°SE)	7	Karak Hy. km 38.1 (100)	A (090°/66°S)	18	
	D (298°/86°N)	4		D (320°/86°NE)	4		B (064°/76°SE)	16	
	E (090°/80°S)	3					C (188°/78°W)	10	
				Karak Hy. km 39.8 (150)	A (064°/62°SE)		8		
					B (108°/75°SW)		8		
					C (144°/80°SW)	10			
Taman Bt Cheras (A) (150)	A (012°/80°E)	9	Karak Hy. km 24.4 (150)	A (022°/78°SE)	11	Karak Hy. km 40.3 (150)	D (250°/74°N)	5	
	B (324°/78°NE)	8		B (096°/80°S)	7		A (58°/74°SE)	12	
	C (090°/78°S)	9		C (146°/78°SW)	8		B (222°/70°NW)	8	
	D (234°/76°NW)	7		D (056°/72°SE)	5		C (096°/78°S)	9	
Taman Bt Cheras (B) (100)	A (322°/82°NE)	10	Karak Hy. km 27.2 (280)	E (242°/28°NW)	2	Karak Hy. km 28.5 (100)	D (320°/80°NE)	5	
	B (060°/74°SE)	11					E (160°/56°W)	2	
	C (092°/74°S)	8							
	D (014°/74°E)	6							
Taman Bt Cheras (C) (100)	A (322°/76°NE)	14							
	B (024°/78°E)	8							
	C (270°/74°N)	8							

the joint sets have a modal spacing of about 15 cm. The mean spacing ranges from 35 to 63 cm (75% between 35 and 45 cm). The minimum spacing is between 1 and 5 cm while the maximum spacing is between 2.25 to 3.54 m.

General joint spacing

Photographic prints were used to obtain the *general joint spacing* (x). General joint spacing refers to the distance between points where two adjacent joints intersect a scanline. The orientations of the joints are disregarded for this measurement (procedure outlined in Ng, in press). The distribution of the general joint spacings is shown in Figure 5. The differences in general joint spacing distributions between various exposures are not significant. A majority of the general joint spacings are less than 1 m (more than 90% are less than 1 m; more than 50% less than 30 cm), with a higher concentration at the lower spacings. All the mean spacings are between 20 cm to 43 cm, except for two localities adjacent to fault zones. Modal spacings generally lie between 10 to 30 cm.

Priest and Hudson (1976) suggested that for randomly positioned discontinuities, the frequency distribution of discontinuity spacings along a straight line through a rock mass is of negative exponential form with the probability density $f(x)$ defined by $f(x) = \lambda e^{-\lambda x}$; where $f(x)$ is the frequency of occurrence of spacing value x , λ is the average number of discontinuities per metre or discontinuity frequency.

In this study, a negative exponential function is fitted to the joint spacing data in the form of $f(x) = ae^{-bx}$. This negative exponential function is transformed to the form of $\ln f(x) = \ln(a) - bx$; which is a straight line. A best fit line is calculated using the least squares method, and it is superimposed onto the bar charts (Fig. 5). The parameters a and b , and the coefficient of correlation (r) for the best fit lines are shown together with the bar charts.

The results show that the frequency of joint spacing values can be fitted on to the negative exponential distribution, implying that the joints are randomly positioned in the granitic rock masses investigated. The calculated parameter $-b$ (slope of best fit line) is very close

to the measured joint frequencies, λ , ($-b = \lambda \pm 15\%$). The coefficient of correlation (r) of the best fit lines ranges from -0.87 to -0.99 , implying a strong negative correlation between the frequency of joint spacing and joint spacing values.

PERSISTENCE AND TERMINATION

The persistence of a joint with reference to a plane through the rock mass is defined as the fraction of the area within the plane that is actually discontinuous (Einstein *et al.*, 1983). Joint persistence is among the most important rock mass parameters which has a major effect on the rock mass strength. As it is impossible to map the joints inside a rock mass, joint persistence is often very difficult to quantify.

Joint persistence can be crudely quantified by measuring the length of joints at the exposures. Measurements of joint lengths are, however, subject to a considerable degree of uncertainty as many joints extend outside the rock exposures. The joints can also be disturbed by blasting as in the exposures studied. Ambiguity also arises because a large proportion of joints which appear to be persistent are actually made up of numerous, very closely spaced, *en echelon* segments.

The lengths of major and minor joints were measured from 8 near vertical exposures. Due to lack of the horizontal exposures, the length of joints along their strike is not known. In their investigations of joints in granitic rocks, Segall and Pollard (1983) observed that joint morphology appears to be similar in vertical and horizontal exposures. It is thus likely that the joints in the study area also have the same length vertically and horizontally.

Results of the joint length studies are displayed in the form of stacked bar charts for easy visualization (Fig. 6). The major (or systematic) joints appear to be more persistent (longer) than the minor joints. Most (>90%) of the major joints have lengths between 0.1 to 3 m, while the minor joints are mainly between 0.1 to 2 m. The percentage of joints decreases as the joint length increases. The measurements, however, may not represent the typical joint lengths as about half (54% in Perkuat Quarry)

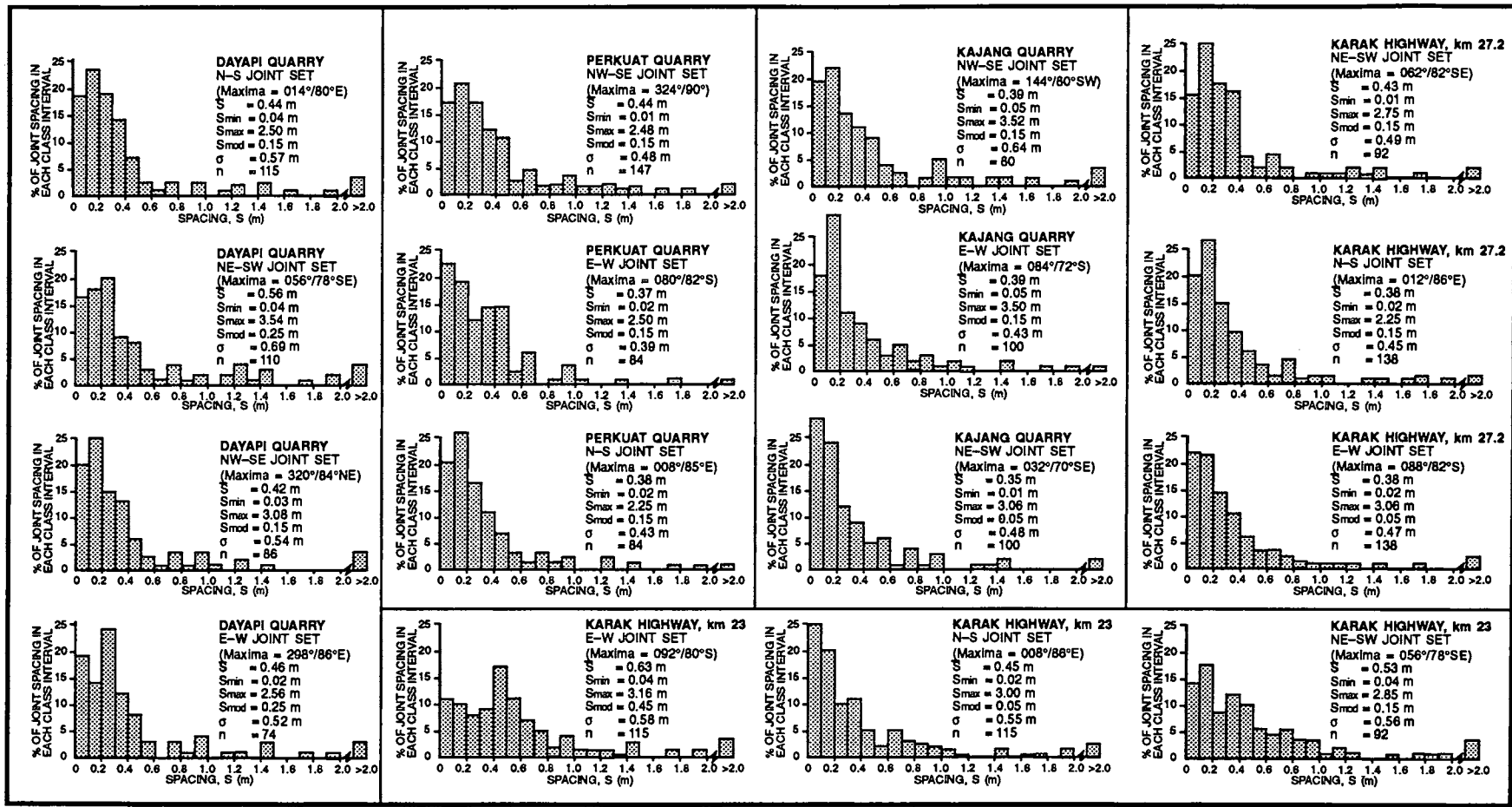


Figure 4. Set spacings of the major joints in Dayapi Quarry, Perkuat Quarry, Kajang Quarry, km 23 and km 27.2 Karak highway. The set spacing parameters are: \bar{S} =mean spacing; S_{min} =minimum spacing; S_{max} =maximum spacing; S_{mod} =modal spacing; σ =standard deviation and n =number of readings.

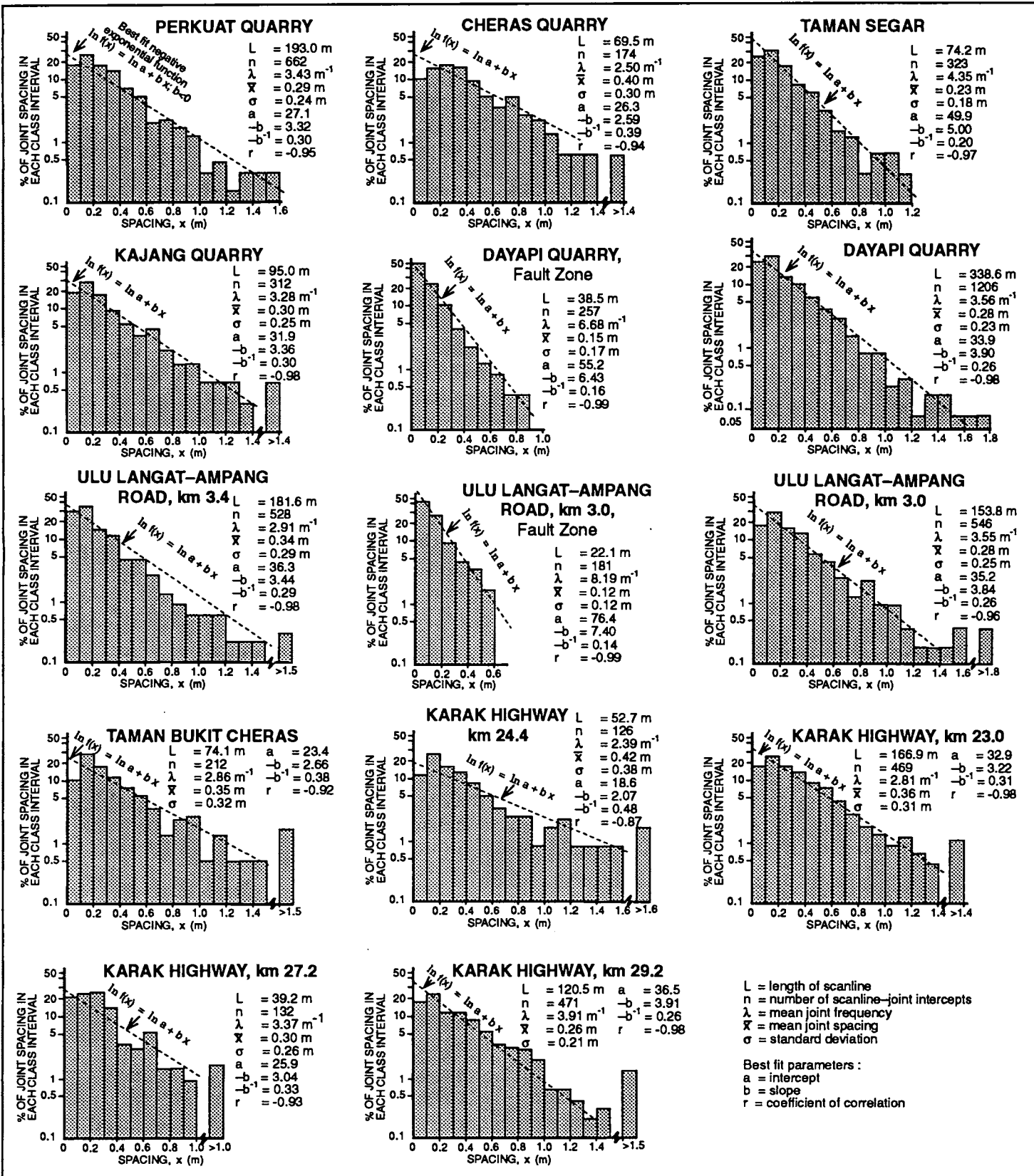


Figure 5. Bar-charts showing the distribution of general joint spacings. The best fit negative exponential distribution is superimposed onto the bar charts.

lengths as about half (54% in Perkuat Quarry) of the measured joints have at least one end which continues beyond the exposure.

The type of joint terminations in Perkuat Quarry has also been noted. Most of the joints terminate against another joint, or extend outside the exposure. Joints with both ends terminating in the rock mass are scarce (Fig. 7). About 77% of the joints have at least one end which terminating against another joint. This value is likely to be over-estimated, as the exposures have been disturbed by blasting. During blasting, cracks may propagate from the tips of joints which terminate in the rock, until they meet another joint. The fractures developed during blasting may, however, be differentiated from the joints by careful examination. The fracture due to blasting is generally fresh, devoid of mineral coating, and rougher compared to the joints.

ROUGHNESS OF JOINT SURFACES

The surface roughness is an important factor that influences the shear resistance of the joint surfaces, particularly if the joint is closed, unweathered and unfilled. According to ISRM (1978), the roughness of joint surfaces can be described in two scales: small scale (several centimetres); and intermediate scale (several metres). The small scale roughness is divided into three categories: slickensided; smooth; and rough. The intermediate scale roughness is also divided into three categories: planar; undulating; and stepped.

In the study area, the roughness of the joint surfaces ranges from smooth planar (minimum roughness) to rough undulating (maximum roughness). The most frequently observed degree of roughness in all the exposures appears to be similar, which is smooth and slightly undulating. The joint surfaces coated with minerals such as chlorite and calcite are smoother than those devoid of mineral coating. Rough undulating joint surfaces are uncommon, and rough stepped joint surfaces are not observed. However, stair-stepped failure planes formed by breaking of intact rock bridges between an echelon joint segments are common.

APERTURE

Aperture is the perpendicular distance separating the adjacent wall rock of an open joint, in which the intervening space is air or water filled (ISRM, 1978). The aperture has a major influence on the fluid conductivity of a rock mass. Most of the studied exposures have been disturbed by excavation and blasting and hence render the measurements of the apertures unreliable. The steep exposure surfaces may also have permitted adequate expansion for the opening of joints. The aperture of the joints is thus likely to have enlarged.

Fine joint apertures were estimated with a gauge, and the larger apertures were measured with a metal ruler. Strongly disturbed exposures were not investigated. The joint aperture mainly ranges from a fraction of a millimetre (about 0.1 mm) to 3 mm, with modal values of about 0.25 to 0.5 mm. Larger aperture values up to 3 cm occur subordinately. Sheet structures generally have wider apertures (0.5 mm to 1 cm) than the other joint sets.

FILLING

A large proportion of the joints and other fractures are filled with fluid during or after their formation. These fluids deposited quartz, tourmaline, chlorite, fluorite, muscovite and other minerals. It was observed that these minerals, particularly chlorite, carbonate, quartz and fluorite often do not fill the joints completely to form veins, but develop a thin layer on the joint surfaces. These mineral layers are referred to as mineral coating. The most common mineral coating is chlorite, followed by quartz and carbonate. Other minerals such as fluorite, epidote and pyrolusite are also observed, though they are less common. Joint and fault surfaces are also often stained by iron oxide. The types of mineral coatings and their abundances recorded at 13 exposures are shown in Figure 8.

The percentage of joints coated by chlorite ranges from 30% to 69% (mean 48%). The exposures with high percentages of chlorite-coated joints are associated with sheared granites (for example, Taman Bt. Cheras C; Cheras Quarry). Usually, almost the entire joint surface

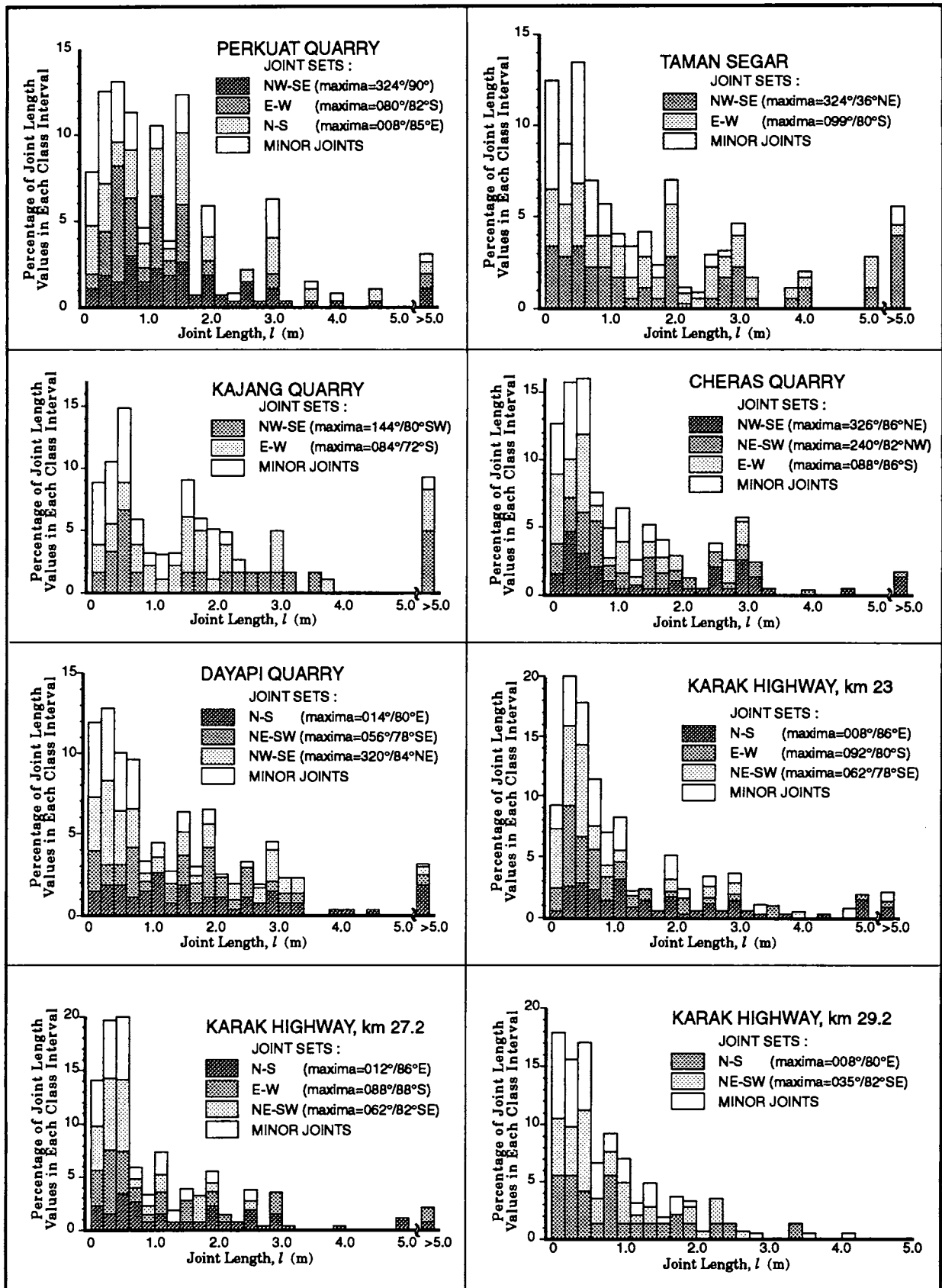


Figure 6. Stacked bar-charts showing the distribution of joint lengths.

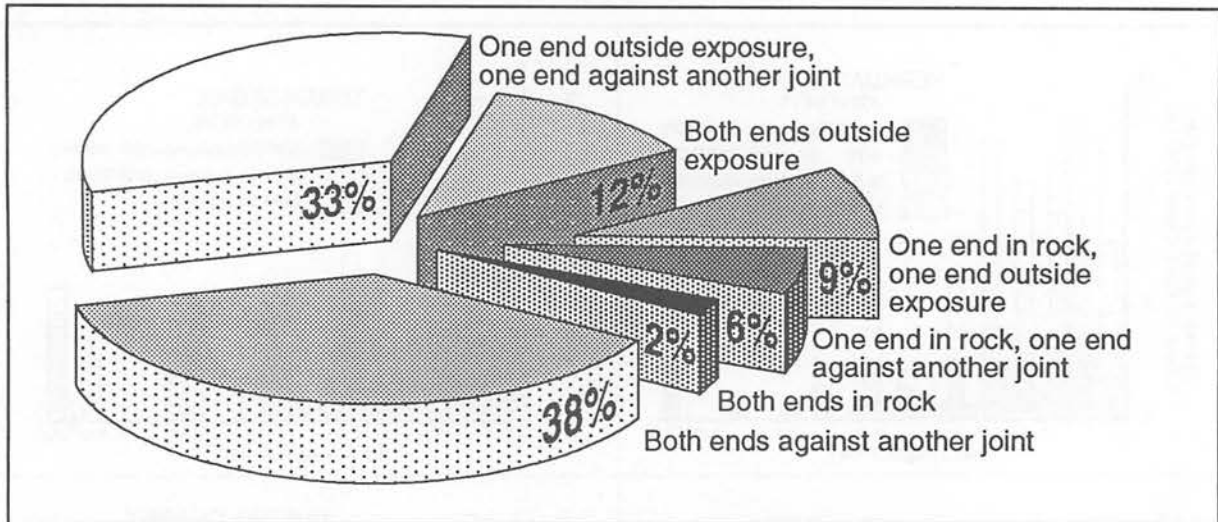


Figure 7. Diagram illustrating the frequency of occurrence of the six types of joint terminations observed in Perkuat Quarry.

is coated by chlorite, though the thicknesses of the chlorite is not consistent, varying from a fraction of a millimetre to 2 mm. Chlorite also forms irregular and sub-circular patches.

About 2% to 20% (mean 11%) of the joints are coated by quartz. Quartz usually forms very thin and irregular patches on the joint surfaces, covering up to 75% of the surface area. It also often coexists with chlorite. Carbonate coatings occur subordinately (0-8%) and form irregular patches, of up to a few millimetres thick. A considerable amount of the joints (18-63%, mean = 34%) are clean (devoid of any mineral coating).

The presence of mineral coatings on the joint surfaces influence the behaviour of the joints. The permeability of the rock mass will be reduced by the presence of filling and coating materials which decrease the effective aperture of the joints. Coated joints are also usually smoother than joints devoid of coating. All the mineral coatings, except for quartz, are weaker than the fresh wall rock, and thus reduce the shear resistance of the joints.

SEEPAGE

The seepage of water through granite bedrock masses mainly results from flow through joints and faults. The rate of seepage is influenced by rainfall. During the dry seasons,

a majority of the joints are dry, though some faults, sheet structures and persistent major joints show slight seepage. Continuous flow of water is uncommon during the dry seasons. Most of the joint surfaces are, however, damp during the wet seasons. Free water is observed in the more persistent open joints, sheet structures and faults. Discontinuities which give occasional slight seepage during the dry seasons, may during the wet seasons show continuous water seepage.

CONCLUSION

Joints are the most prominent structure in the granitic rocks in the eastern part of Kuala Lumpur and occur in all exposures investigated. They have the following characteristics:

1. A majority of the joints occurs as sets of discontinuities, each set having similar orientation; though some joints are randomly oriented. Most exposures have between 3 to 5 joint sets.
2. They form four major or systematic sets which have regional distribution and are more prominent and persistent than the other minor or non-systematic joints. These major joints are steeply dipping to vertical, and strike approximately NW-SE, N-S, E-W and NE-SW. The NW-SE set dominates in the southern part of the study area

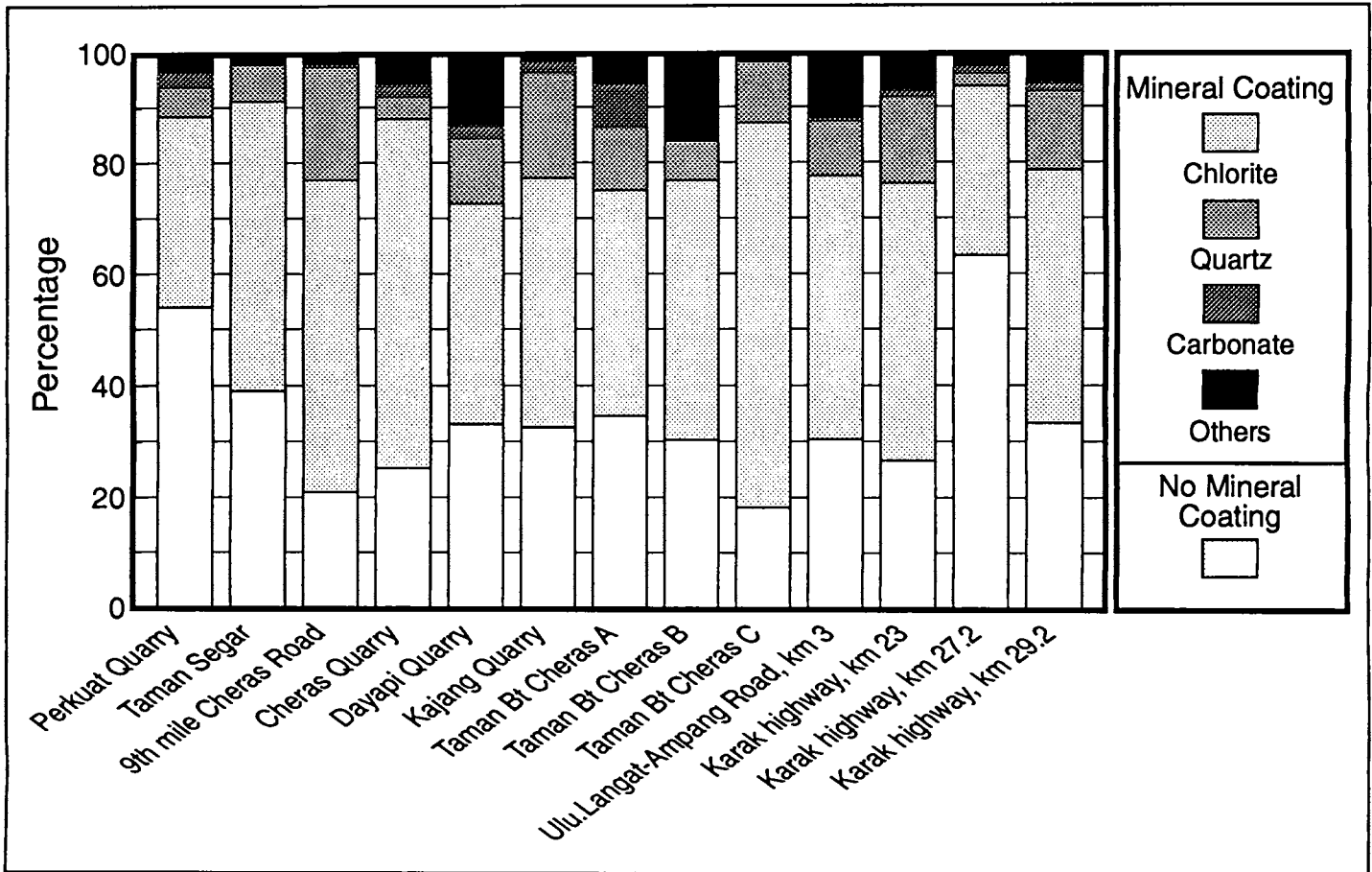


Figure 8. Stacked bar-chart showing the percentages of clean joints and mineral-coated joints.

(Ampang to Kajang), while the northern part (Karak highway) is dominated by the N-S set.

- The joints are not uniformly spaced. The set joint spacings (S) of the major joints range from 1 to 350 cm, but are mainly less than 50 cm. The mean values largely lie between 35 cm and 45 cm. Generally, there is no significant difference in the distribution of set joint spacing between the various major joints sets.
- More than 90% of the general joint spacings (x) obtained from photo-interpretation are less than 100 cm, and more than 50% are less than 30 cm. The mean values vary mainly between 20 cm and 43 cm. The joints are more closely spaced in and around fault zones. The general joint spacings display a negative exponential distribution, implying that the joints are randomly positioned in the granite.
- The length of joints are mostly less than 3 m, however, these values are limited by the size of the exposures.
- Most of the joints terminate against other joints, while joints with both ends that terminate in the rock mass is scarce.
- The joint surfaces are mainly smooth and slightly undulating.
- The joint surfaces are often coated with chlorite (30 to 69%, mean 48%) and 18 to 63% (mean 34%) are clean. Other common mineral coatings are quartz and carbonate.
- Most of the joints are dry in the dry seasons. In the wet seasons, they are damp, though free water is found in some persistent open joints and sheet structures.

ACKNOWLEDGEMENTS

This paper forms part of a M.Phil dissertation at the Institute for Advanced Studies (IPT), University of Malaya and I would like to thank Dr. K.R. Chakraborty and Dr. J.K. Raj for their supervision. This study is financed in part by research grants F169/88 and PJP280/90 from University of Malaya.

REFERENCES

- BIGNELL, J.D. AND SNELLING, N.J., 1977. *Geochronology of Malayan Granites*. Oversea Geol. Miner. Res., London, No. 47, 73 p.
- COBBING, E.J. AND MALLICK, D.I.J., 1987. South-East Asia granite project. Field report for Peninsular Malaysia. British Geol. Sur. Oversea Dir., Rep. No. MP/87/19R.
- DARBYSHIRE, D.P.F., 1988. *Geochronology of Malaysian granites*. NERC Isotope Geol. Centre Rep. No. 88/3.
- GOBBETT, D.J., 1964. Lower Palaeozoic rocks of Kuala Lumpur. *Fedn. Mus. J.*, 9:67-79.
- HOEK, E. AND BRAY, J.W., 1974. *Rock Slope Engineering*. Inst. Mining Metallurgy, London, 402 p.
- ISRM (INTERNATIONAL SOCIETY OF ROCK MECHANICS), 1978. Suggested methods for the quantitative description of discontinuities. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.*, 15:319-368.
- JAEGGER, J.C. AND COOK, N.G.W., 1979. *Fundamentals of Rock Mechanics*. 3rd Ed. Chapman and Hall, London, 593 p.
- LIEW, T.C., 1983. *Petrogenesis of the Peninsular Malaysian granitoid batholith*. Unpubl. D.Phil. thesis, Aust. Nat. Univ.
- NG, T.F. (IN PRESS). Joint spacings in granitic rocks of the eastern Kuala Lumpur area, Peninsular Malaysia.
- PEVZNER, M.E., 1974. Explosion effects on stability of excavated slopes. *Proc. 3rd. Congress of ISRM*, Vol. II, p 809-812.
- PHILLIPS, F.C., 1971. *The Use of Stereographic Projection in Structural Geology*. Edward Arnold, London, 90 p.
- PRIEST, S.D. AND HUDSON, J.A., 1976. Discontinuity spacings in rock. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.*, 13:135-148.
- SEGALL, P. AND POLLARD, D.D., 1983. Joint formation in granitic rock of the Sierra Nevada. *Geol. Soc. America Bull.*, 94:563-575.



Manuscript received 17 January 1994

CATATAN GEOLOGI

Geological Notes

Letter to the Editor

James A. Richardson
19 Acacia Road
Maida Vale
Western Australia 6057

2nd February, 1994.

The Editor,
Warta Geologi
Geological Society of Malaysia.

Dear Sir,

Warta Geologi Vol. 19 No. 2 pp. 35-41
Warta Geologi Vol. 19 No. 3 pp. 55-58; Abstract p. 137

Selinsing : I have read with much interest the paper by J.J. Pereira on renewed mining of eluvial and more recently of hardrock at the old Selinsing Gold Mine. Several deep *lobang Siam* had been dug around Selinsing during the 19th Century and perhaps earlier. Underground mining was in progress between 1889 and 1901. When underground mining ceased the mine closed down. My last memories of Selinsing were in 1938 when the old shaft had been dewatered down to the 100 foot level (No. 1 level) during renewed investigations of its gold potential. I sampled along the 100 foot level but failed to discover anything of promise.

It is good to know that renewed exploration carried out during the past few years has led to renewed profitable mining at Selinsing.

Congratulations to the operators and to J.J. Pereira in her further researches.

Raub Gold Mine: I made the first detailed underground geological survey of the Raub Mine between 1937-1939: mapping starting at Level 3 (300 foot) because Levels 1 and 2 were considered by the Mine Management to be too dangerous for even a Government geologist to be allowed in! Very interested to read Ian Metcalfe's report on the recently discovered Permian Conodonts providing additional data in detailing age of the sedimentary units around Raub and environs.

Bukit Koman (Raub): Very interested in the paper by Yeap Ee Beng and J.J. Pereira concerning the new developments over the defunct Raub Australian Gold Mine (RAGM). The new mining presumably overlies the underground stockwork gold mineralization lying between the main Raub mineralization (the Eastern Reef System) and the much less prolific Western Reef System. The stockwork mineralization comprises gold, scheelite and stibnite with pyrite and quartz in phyllites.

All success with the many activities of Persatuan Geologi Malaysia.

Sincerely,
Signed
Dr. James A. Richardson
Professional Member 1967

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PERTEMUAN PERSATUAN Meetings of the Society

Forum on "GROUNDWATER", 11th January 1994, University of Malaya, Kuala Lumpur – Report

The Forum on "Groundwater" was held at the Dept. of Geology, University of Malaya, on 11th January '94. This forum was the 4th in the series of such forums organised by the Working Group on Engineering Geology & Hydrogeology, following three previous forums as follows:

- i) Dam Geology (Sept '92)
- ii) Highway Geology (Jan '93)
- iii) Urban Geology & Geotechnical Engineering in Construction (July '93) – this 3rd Forum was organised jointly with the Geotechnical Engineering Division of the Institution of Engineers Malaysia (with published proceedings).

Seven papers were scheduled for presentation at the ½-day Forum (see List of Papers attached). Unfortunately, one speaker did not show up (guess who?), and only six papers were presented. Fortunately, all the seven papers have been published in the Proceedings, so participants could still refer to the paper that was not presented. The papers covered topics ranging from groundwater resource exploration and utilisation, to pollution and environmental impacts, with case studies covering Peninsular Malaysia, Sabah and Sarawak.

Speakers hailed from the Geological Survey Dept. (Ipoh & Kuching), DID, local universities and private consultants. In spite of the heavy rain, the Forum had a fair-size audience (~50), and ample time was allocated for the numerous lively discussions, questions & comments.

* **Limited** copies of the proceedings are available for sale at a nominal price of RM20.00 – please contact Anna for your personal copy.

Once again, we thank all authors, co-authors and the participants for yet another successful forum.

Tan Boon Kong,
Chairman,
Working Group on Engineering
Geology & Hydrogeology

12th January 1994

**Forum on "GROUNDWATER", 11th January
1994, University of Malaya, Kuala Lumpur
– List of Papers**

LECTURE 1

Hydrogeological framework and groundwater resources utilisation in Peninsular Malaysia

by Mr. Ang Num Kiat

LECTURE 2

Groundwater investigations at Teluk Dalam, Pulau Perhentian Besar, Besut, Terengganu – A case study on the application of resistivity survey

by Mr. Ng Chak Ngoon & Mr. Lim Chee Kheong

LECTURE 3

Assessment of hydrogeological setting of Pulau Burong for municipal landfill

by Dr. Nasiman Sapari, Dr. Shaharin Ibrahim & R. Zainariah A.

LECTURE 4

Groundwater – a neglected resource which need to be protected

by Ir. Azuhan bin Mohamed

LECTURE 5

Hydrogeological evaluation of the Sahabat area, Sabah

by Dr. Tan Teong Hing

LECTURE 6

Soil and water investigations for an aquaculture project in Johor by Mr.

by Tan Boon Kong & Dr. Lim W.H.

LECTURE 7

Potential impacts of land development activities on the shallow fresh groundwater sources in the coastal lowlands of Sarawak

by Mr. Yogeswaran Mailvaganam



Captions to Photos – Smile

1. Mr. Ang N.K. kicking off with an overview of the hydrogeology of Peninsular Malaysia.
2. Mr. Ng C.N. on a case study in Pulau Perhentian, Terengganu.
3. Dr. Nasiman, obviously very happy with his assessment of Pulau Burong for municipal landfill.
4. Ir. Azuhan, looking around and asking: "Where are the geologists?"
5. Mr. Tan, B.K., pointing and talking to the blank screen!
6. Sdr. Yogeswaran winding up with land development versus groundwater in Sarawak.
7. A view of the fair-size audience.
8. This must be the "kopi-O" that the Speaker from Sarawak was referring to when describing groundwater from peat!

Behaviour of gold and other heavy minerals in streams — Implications for exploration geochemistry

W.K. FLETCHER

Laporan (Report)

Professor W.K. Fletcher gave the above talk at the Geological Survey Office in Kota Kinabalu on 3 February, 1994.

The talk was attended by an audience of 28 from the Geological Survey, Sabah Operations Centre and from exploration companies currently active in Sabah. The talk was lively and lucid and attracted some good questions from the floor.

Abstrak (Abstract)

Geochemical anomalies for gold in drainage sediments are typically erratic, both locally on the bed of the stream and seasonally. In part, this is a consequence of the rarity of gold particles leading to the so called nugget effect. However, even when care is taken to collect samples of sufficient size to be representative gold concentrations may still show considerable variability as a result of the variable transport and deposition of sediment and gold in response to local hydraulic conditions.

Field studies in Harris Creek, a small gravel bed stream in British Columbia, Canada, have shown that gold is preferentially accumulated at high energy bar-head sites as the annual flood, caused by melting snow, passes. The gold anomaly at such sites may remain constant or even show increasing concentrations downstream away from the source of the gold. In contrast, there is no preferential enrichment of gold at low energy bar-tail sites. Gold anomalies at such sites therefore have lower concentration of gold with values that decrease going downstream. The degree of enrichment of gold concentrations between high and low energy sites decreases as the size of the gold particles decreases.

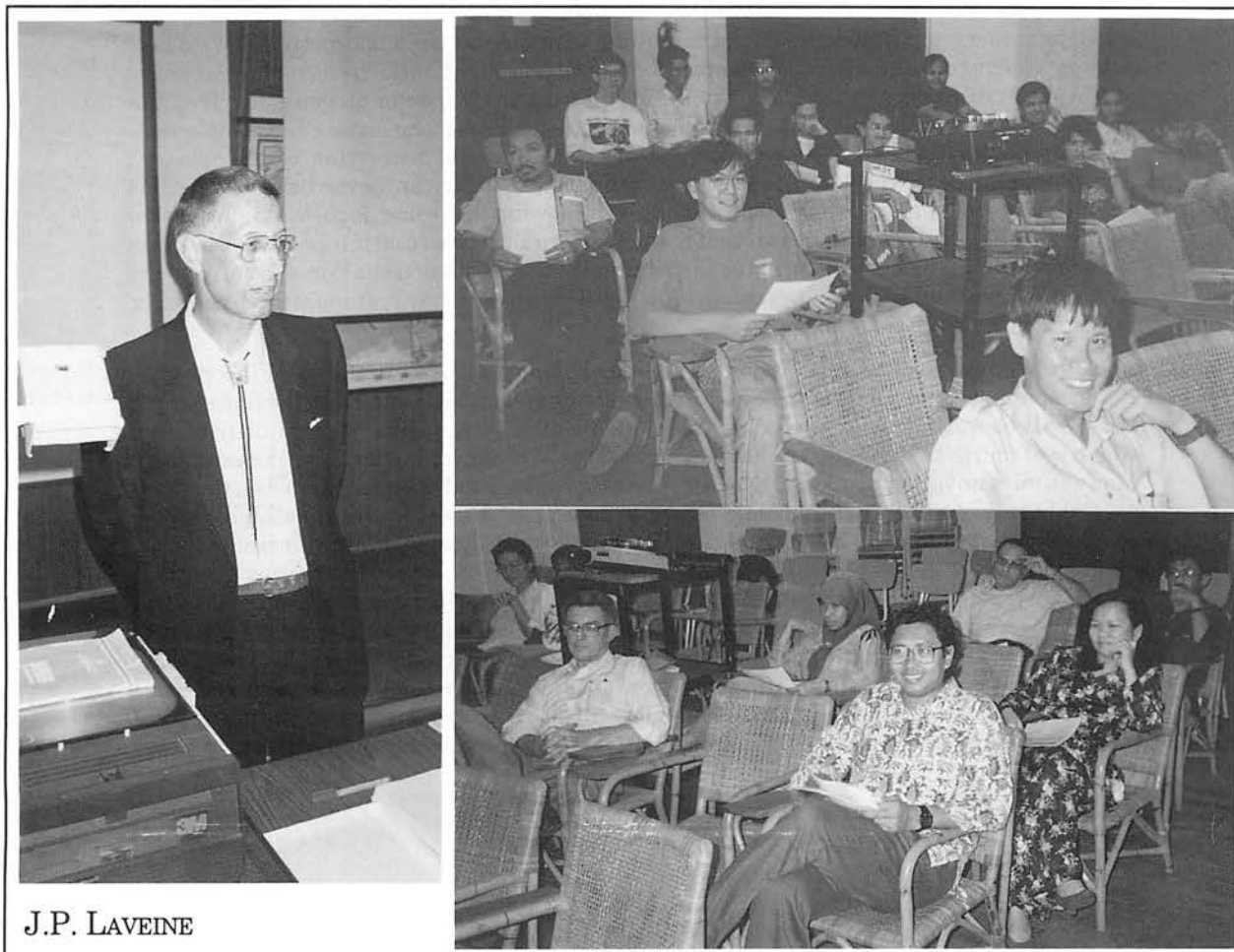
Similar observations have been made for distribution of gold in a small stream in northern Thailand and for other heavy minerals elsewhere, for example cassiterite in Malaysia. Furthermore it has been shown that the field observations of the distribution of gold and other heavy minerals on the stream bed are consistent with the theoretical predictions of bed load transport models. Such models predict that preferential accumulation of gold will be favoured by high bed roughness and decreasing stream gradient.

The field observations and theory have important implications for the design and interpretation of stream sediment surveys for gold.

1. Because gold concentrations are greatest and anomalous dispersion trains longest in the high energy environment, such sites are to be preferred for low density reconnaissance surveys. However, care must be taken to obtain samples from sufficient depth in the bed of the stream to obtain gold-rich sediments deposited during flood events. Also concentrations of gold at such site may decrease (rather than increase) toward the bedrock source of the gold. Care is therefore required for interpretation and follow-up.
2. Gold concentrations at low energy sites are relatively low and the anomalous dispersions trains short. However, because concentrations of gold are more likely to increase upstream towards the source, they may provide a more suitable medium for follow-up or detailed surveys.
3. Whatever medium is sampled it is important that:

- (a) the same hydraulic environment be sampled as consistently as possible.
 - (b) at all stages of sampling and analysis, samples are of sufficient size to be representative – ideally samples and subsamples should be of sufficient size to contain at least 20 particles of gold if sampling errors are to be better than $\pm 45\%$ at the 95% confidence level.
 - (c) For a given concentration of gold, the number of gold particles will increase as particle size decreases. More consistent results are therefore usually obtained with finer grain sizes (e.g. -200 mesh). Use of finer sizes also decreases the effects of hydraulic variability on gold concentrations.
4. In interpreting results it is important to remember that gold concentrations on the stream bed are a function of hydraulic conditions and **can increase**, downstream away from the primary source. Hydraulic (“mini-placer”) gold anomalies can be identified by their association with accumulation of other heavy minerals (e.g. magnetite) and by correlation of gold concentrations with stream width, velocity and bed roughness.

P.S. Lim



The Euramerian Carboniferous Floras — Main characteristics and their interest from a geological viewpoint

J.P. LAVEINE

Laporan (Report)

Prof. Jean-Pierre Laveine gave the above talk on the 31st January 1994 at the Geology Department, University of Malaya. Prof. Laveine is presently the Director of the Laboratory of Paleobotany with the Geological Department, University of Lille I., France. Prof. Laveine split his talk into 2 parts, the earlier part was a systematic presentation of the Euramerian Carboniferous plants with excellent diagrams and slides from museum collections. After a coffee break, Prof. Laveine demonstrated to the audience of about 50, the importance of controlled worldwide paleobotanical data in global Carboniferous paleogeographic reconstruction and some of the evolutionary problems.

Summary

Owing to more than one and a half century of the extensive coal industry directly linked with the industrial revolution, the Carboniferous floras of Western Europe were actively studied. Underground coal mining involved the digging of many pits (connected by numerous and long underground galleries) and the drilling of numerous deep boreholes. The intense activity brought out numerous data for paleobotanical investigations. The tectonic complexity of the Western European coal deposits, resulting from the Variscan orogeny, involved the necessary cooperation of all the Carboniferous scientists. These long lasting and complementary studies have led to a precise deciphering of the normal succession of the Western European coal deposits. Even though a paleontological study can never be considered as definitively (and numerous examples will be given showing that some important information is still missing), and despite the fact that many Western European coal mines are more or less closed or closing, the knowledge of the distribution of the Carboniferous floras from Western Europe has reached a level of precision which settle them as a basic, standard reference for comparison with all the other areas.

The main taxa of the major groups (Lepidophytes, Arthropytes, Filicophytes, Pieridospermaphytes, Cordaitophytes) or Carboniferous plants characterising the Euramerian floras will be quickly presented at a systematic point of view. Their vertical distribution, which is of course the basis for the establishment of biostratigraphic charts, will be examined. Many studies have demonstrated that the biostratigraphic subdivisions founded on the floral assemblages are valid for the whole Western Europe area. However recent paleogeographic comparisons extended to North America, East and South East Asia, have revealed some anomalies (as compared to the European standards!) which raise very interesting questions in all fields of paleobotany. Some suggestive examples will be presented, which will demonstrate that the recovering of controlled paleobotanical data from all parts of the world is of fundamental importance not only for global Carboniferous paleogeographic reconstructions (with the allied paleoclimatic consequences), but also for the understanding of some evolutionary problems as well. These examples will also help to demonstrate the necessity of a cooperation between all Geologists for a better understanding of the past history of our planet.

G.H. Teh

The trend of seismotectonic studies for engineering projects

WASIF AHMAD SIDDIQUI

Laporan (Report)

The above talk by Wasif Ahmad Siddqui was held in collaboration with the Drainage and Irrigation Department Malaysia (DID) at the Geology Department, University of Malaya on 19th February 1994. Mr. Wasif Ahmad Siddqui is the Technical Director and In-charge of the Engineering Geology Division, Associated Consulting Engineers, Lahore, Pakistan. There was a good turnout of about 30 for the talk which was followed by some lively discussions.

Abstrak (Abstract)

The engineering practices for evaluating earthquake risk its application in the design of dams have become more stringent owing to the demands of the society for greater safety. The evaluation of earthquake risk largely depends on the earthquake history and geologic and tectonic setting which defines and control the seismicity.

The task of risk evaluation in Malaysia becomes more difficult because of the paucity of detail record of historical seismicity and instrumental data for both macro and micro events.

Malaysian Peninsula is considered to be a stable peninsula and generally ASEISMIC by many. Though not exactly identical however, the same term was used for Deccan Trap of India but now active faults have been detected when in depth studies were made after Koyana earthquake. Under the circumstances, it is high time that scientists prove for disprove the stable peninsular theory for Peninsular Malaysia.

How to go about it?

The answer lies in the study of quaternary tectonics for recent movements. With example at other places, this question has been addressed.

G.H. Teh



WASIF AHMAD SIDDIQUI

Weardale granite and its mineralisation

M.H.P. BOTT

Laporan (Report)

Professor M.H.P. Bott gave the above talk at 5 pm on the 25 February 1994 at the Geology Department, University of Malaya. Prof. Bott was last here in March-April 1992 as External Examiner (Applied Geology), University of Malaya where he gave 2 talks (Warta Geologi Vol. 18 No. 2). Presently Prof. Bott is Professor Emeritus at the University of Durham and is on his way home after attending a Seismological Symposium in New Zealand.

What follows is a write-up of the talk by Prof. Bott himself for the benefit of members.

Abstrak (Abstract)

The lecture described the interpretation of gravity anomalies in northern England which concern the relationship of the buried Weardale granite. To the lead-zinc mineralization and to the later structural history of the region. This contrasts with the tin mineralization in Malaysia where a different type of relationship with the granites applies.

A local negative gravity anomaly of -35 Mbal amplitude occurs over the gently dipping Carboniferous rocks of the Alston Block (northern Pennines). The anomaly closely corresponds with the mineral zonation. The characteristics of the anomaly indicate the anomaly is caused by a granite penetrating the underlying Lower Palaeozoic basement, rather than a sedimentary basin. Limiting depth considerations placed a maximum depth of about 400 m to the top of the granite, justifying a borehole, which proved a Devonian granite unconformably underlying the Lower Carboniferous. Thus the granite did not give rise to the mineralization because it was earlier, but probably acted as a channel for the upward flow of the mineralizing fluids.

To the north and south of the granite there are gravity gradients of opposite polarity which must be attributed to substantial thickening of the Lower Carboniferous succession away from the granite, corresponding to Lower Carboniferous hinge lines which correlate with later fault lines seen at the surface. It appears that the region underlain by granite (the Alston Block) was much more stable than the adjacent regions, suffering much less subsidence during the Lower Carboniferous than the adjacent troughs. The gentle faulting and folding is also less intense above the granite. It is thus suggested that the Weardale granite has exerted an important and persistent structural influence on the later rocks of the regions as well as acting as an upward channel for the mineralizing fluids.

G.H. Teh



M.H.P. BOTT



BERITA-BERITA PERSATUAN

News of the Society

MAJLIS 1994/95 (Council 1994/95)

An election was held this year for the Vice-President (2 nominations), Vice President (3 nominations) and four 2-year Councillors (8 nominations).

In announcing the election results, the Election Officer, Dr. S. Paramanathan, reported that 145 ballots were received and there were 2 spoilt votes. The other posts are filled by candidates nominated by the Nominations Committee comprising Choo Mun Keong (Chairman), Azhar Haji Hussin and Chong Foo Shin. The new line-up is as follows

GSM Council 1994/95

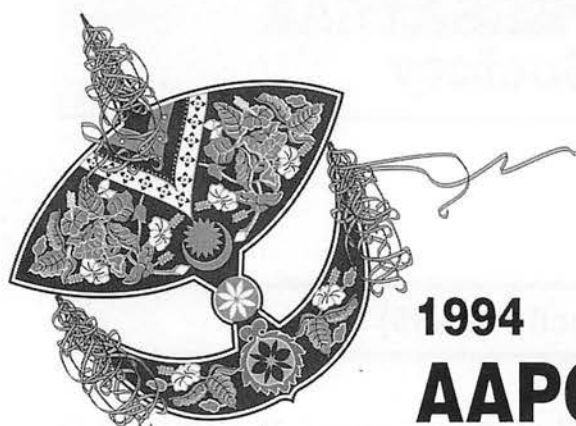
President	:	Fateh Chand
Vice President	:	Ibrahim Komoo
Secretary	:	Ahmad Tajuddin Ibrahim
Asst. Secretary	:	Nik Ramli Nik Hassan
Treasurer	:	Lee Chai Peng
Editor	:	Teh Guan Hoe
Immediate Past President	:	Ahmad Said
Hon. Auditor	:	Law Jack Foo

Councillors

1994-96	1994-95
Abd. Ghani Mohd Rafek	Ali Mohd. Sharif
Abdul Rahim Samsudin	Choo Mun Keong
Effendy Cheng Abdullah	Idris Mohamad
Tan Boon Kong	Jimmy Khoo Khay Khean

G.H. Teh

GSM



Kuala Lumpur
MALAYSIA

1994

AAPG International Conference & Exhibition

Southeast Asian Basins: Oil and Gas for the 21st Century

August 21-24, 1994

Putra World Trade Centre

Kuala Lumpur, Malaysia

Sponsor:

The American

Association of

Petroleum Geologists

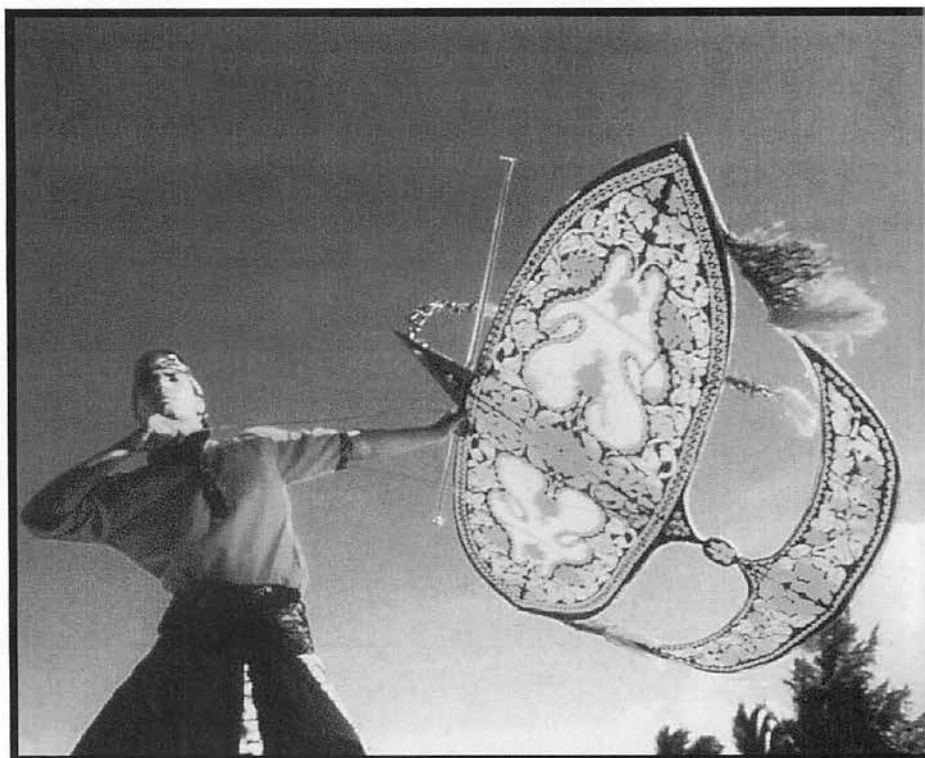
(AAPG)

An International Organization

Host Society:

Geological Society of

Malaysia





1994 AAPG International Conference & Exhibition

Welcome to Kuala Lumpur!

The 1994 International Conference and Exhibition of the AAPG will be hosted by the Geological Society of Malaysia at the Putra World Trade Centre in Kuala Lumpur August 21-24, 1994. This conference and exhibition is one of the many attractions of *Visit Malaysia Year '94*, a national effort to attract tourists to visit this beautiful and friendly country.

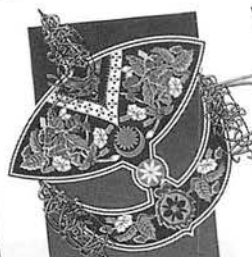
Kuala Lumpur, the federal capital of Malaysia and site of the conference, came about in the 1860s as a tin mining outpost at the confluence of the Klang and Gombak rivers. Its founders called this outpost "Muddy Estuary," which is the literal translation of Kuala Lumpur. When oil was first produced in the country in 1910, Kuala Lumpur was the colonial capital of the then-federated Malay States, and in 1946, Malaya. Today, Kuala Lumpur is the seat of the Malaysian government, with its administration headed by a prime minister. Over the past few years, Kuala Lumpur has developed further with high-rise buildings and modern highways and is today a bustling city.

The conference's theme, "Southeast Asian Basins: Oil and Gas for the 21st Century," was chosen to reflect the growing importance of this region to the petroleum industry that will carry into the next century. The application of the best geoscience technologies to find and develop hydrocarbon resources will be the catalyst for this growth. This conference and exhibition therefore provides an excellent opportunity to share our experiences for the advancement of the necessary technologies to ensure success in our objectives.

The Technical Programme Committee has designed an outstanding program covering most aspects of exploration and development geosciences. We believe you will find the oral and poster presentations very interesting, informative, and educational. Even more educational are two selected technical short courses on application of sequence stratigraphy in exploration for subtle traps and field development and reservoir management and one management forum on how to conduct oil business in Southeast Asia. Four field trips planned for you are equally interesting, informative, and educational. The field trip around Kuala Lumpur will take you to see placer mining for tin, and the field trips to Sarawak in Malaysia, Phuket in Thailand, and Northern Sumatra in Indonesia will expose you to new geology of this growing petroleum province, while at the same time permitting you to discover an exciting world of contrasting cultures.

The Organising Committee is confident that you will find the 1994 AAPG International Conference and Exhibition in Kuala Lumpur an extremely rewarding experience, and because your presence in hospitable Kuala Lumpur coincides with the peak of *Visit Malaysia Year '94*, you will take home a lot of fond memories. Please join us in discussions with both local and international experts in a wide range of technical topics in one of the fastest-growing petroleum provinces in the world.

Dr. Khalid Ngah
General Chairman



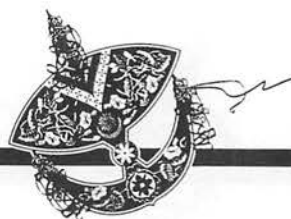
Kuala Lumpur
MALAYSIA

1994 AAPG International
Conference & Exhibition
August 21-24, 1994

Sponsored by:
American Association
of Petroleum Geologists
— An International Organization

Host Society:
Geological Society
of Malaysia

Kuala Lumpur Malaysia



Conference Highlights

All events will be held at the Putra World Trade Centre unless otherwise noted.

Wednesday, August 17

Field Trip #1 departs

Saturday, August 20

08:00-17:00 Short Course #1

Sunday, August 21

08:00-20:00 Registration
08:00-17:00 Field Trip #2
08:00-17:00 Short Course #1 continues
17:00-20:00 Exhibition opens
17:00-20:00 "Icebreaker" Welcome Reception

Monday, August 22

08:00-18:00 Registration
09:00-12:30 Opening Session
12:30-18:30 Exhibition
12:30-14:00 Exhibits Hall Buffet Luncheon
14:00-17:35 Oral and Poster Sessions
17:30-19:30 Student Reception (Hotel Istana)
20:00-24:00 Malaysian Cultural Evening

Tuesday, August 23

08:00-18:00 Registration
09:00-18:00 Exhibition
09:00-12:30 Oral and Poster Sessions
12:00-14:00 House of Delegates' Luncheon (Hotel Istana;
by invitation only)
12:30-14:00 Exhibits Hall Buffet Luncheon
14:00-17:35 Oral and Poster Sessions

Wednesday, August 24

08:00-14:00 Registration
09:00-16:00 Exhibition
09:00-12:30 Oral and Poster Sessions
12:30-14:00 Exhibits Hall Buffet Luncheon
14:00-17:35 Oral and Poster Sessions
18:15 Field Trip #3 departs

Thursday, August 25

Field Trip #4 departs
08:00-17:00 Short Course #2

Friday, August 26

08:00-17:00 Short Course #2 continues



Malaysian girls in traditional costumes.



Left to right: Johnny L. Hall (General Vice Chairman, Oral Judging Chairman); Ibrahim Komoo (Poster Chairman, Poster Judging Chairman); Khalid Ngah (General Chairman); Kenneth Knoll (Short Courses Chairman); Azhar Haji Hussin (Field Trips Chairman); Roger W.J. Birch (Technical Program Chairman)



1994 AAPG International Conference & Exhibition

Conference Activities

All events will be held at the Putra World Trade Centre unless otherwise noted.

"Icebreaker" Welcome Reception

Sunday, August 21
17:00-20:00

Join other conference attendees and their guests in the exhibits hall for the traditional AAPG "Icebreaker." Known by AAPG members throughout the world as the best way to open a conference or convention, it is a great way to socialize with exhibitors, meet new friends, find your business acquaintances, and get a sneak preview of the exhibits on display. Exhibitors will be on hand to greet and encourage you to stop by their stands later in the week. Refreshments will be located throughout the hall.

Admittance will be by badge only. Due to liability restrictions, no one under the age of 13 will be permitted in the exhibits hall.

Exhibits Hall Buffet Luncheons

Monday, August 22 through Wednesday, August 24
12:30-14:00

Enjoy a different international menu each day with colleagues from around the world as you discuss the morning's talks. Eat early, then investigate the exhibits without missing a paper. Or explore the exhibits hall first in order to decide which stands will require more time to visit. Whether you're accustomed to eating early or late in the day, there will always be something you'll enjoy. The cost is included in the professional's and student's registration fee. Spouse or guest tickets will be available on site.

Speakers' and Poster Presenters' Information

All oral speakers, poster presenters, and session chairmen are reminded to attend a breakfast on the morning of their talk or presentation. All breakfasts begin at 08:00.

International Oral and Poster Awards Judges Needed

Judges are needed both for oral and poster sessions during the conference. If you are interested in judging, please mark the appropriate box on your registration form. Further information will be forwarded to you by the judging chairmen, as well as an invitation to attend a special breakfast on Monday morning, August 22. Get involved! Volunteer to be a judge!

House of Delegates' Luncheon

Monday, August 22
12:30-14:00
Hotel Istana

The chairman of the House of Delegates invites all delegates of AAPG-affiliated societies who are attending the conference to join him and other AAPG officials for lunch. Agenda items from the House of Delegates' meeting at the 1994 AAPG Annual Convention in Denver will be reviewed, and international delegates will have the opportunity to discuss their societies' activities.

Student Reception

Monday, August 22
17:30-19:30
Hotel Istana

Join other students from all over the world at the AAPG Student Reception. If you are not presently a student member of AAPG, this is your chance to learn more about the benefits of student membership and the organization's student chapter program. And if you are already a student member, come to meet members of the Student Chapter Committee as well as AAPG officers and staff. Learn more about starting a chapter at your local university.

Malaysian Cultural Evening

Monday, August 22
20:00-24:00

Experience the excitement of Malaysia! PETRONAS, the national petroleum company of Malaysia, will be hosting this lavish gala, which will feature a formal dinner and native Malaysian dancers in colorful costumes. This extravaganza is free for the first 1,500 attendees who present their tickets for redemption (excluding student registrants).

GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

BULLETIN OF THE GEOLOGICAL SOCIETY OF MALAYSIA
 WARTA GEOLOGI - NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

ADVERTISING SPACE ORDER FORM

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For further information, please ring 03-7577036.

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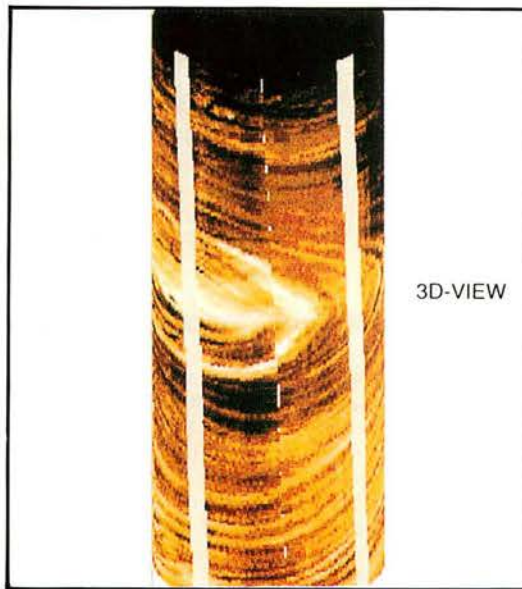
Fullbore Micro Imager*

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.

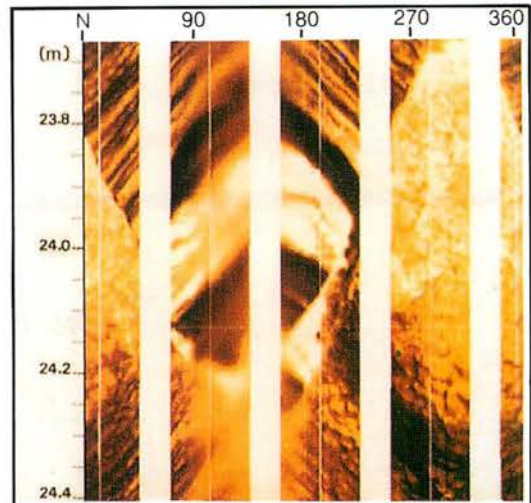
The FMI log, in conductive muds, provides electrical images almost insensitive to borehole conditions and offers quantitative information, in particular for analysis of fractures.

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.

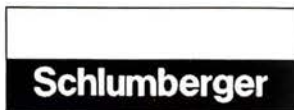
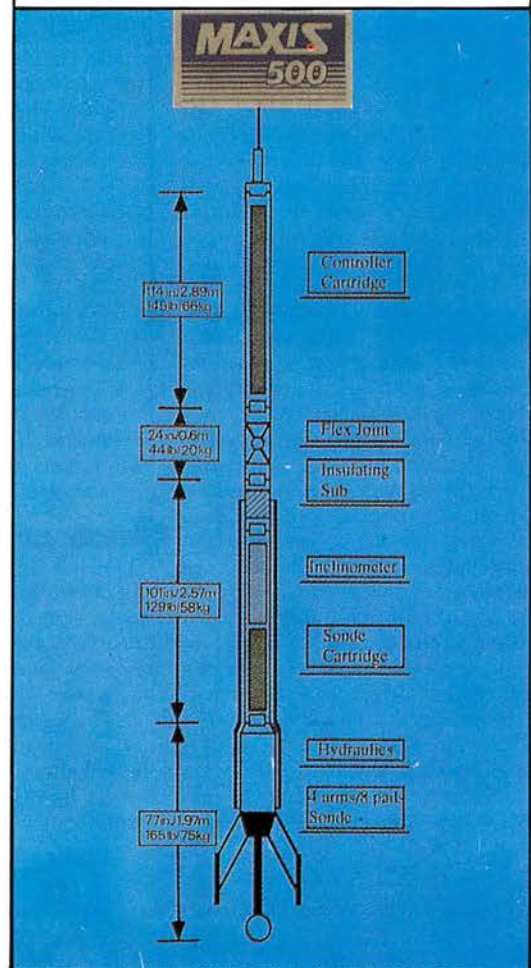
The tool's multiple logging modes allow wellsite customization of results to satisfy client needs without compromising efficiency.



"Bullseye" structure



Fault without associated drag



*Kuala Lumpur
Malaysia*



The Exhibition

YOU WILL FIND no busier locale during the conference than the Putra World Trade Centre's Level 3, site of this year's associated scientific and trade fair. Nearly a hundred exhibitors will occupy wall-to-wall displays, showing off the technology that makes the exhibition *the one place* where you can explore the leading edge of our science through hands-on demonstrations and in-depth discussions with the knowledgeable staff assembled.

Products will range from mapping software to global positioning systems, well services to geologic area studies, and computer hardware to seismic data acquisition and interpretation. Government agencies, earth science organizations, and other non-profit publishers and information and data services are also being invited to exhibit. In addition, the exhibits hall will be the location of the conference's poster sessions throughout the three-day event.

The exhibits hall will be located a short escalator ride from the oral session halls, making it the perfect place to rendezvous with colleagues while enjoying a

cup of coffee, courtesy of Schlumberger. The exhibition will also serve as the backdrop for Sunday evening's Icebreaker reception, thereby introducing you to all it has to offer.

The Technical Program Committee has built in extended breaks each morning and afternoon, allowing you to explore the displays in depth. And lunch will be served daily in the hall to all registrants,

providing two hours over which to view the exhibition without missing a paper.

IMPORTANT: Due to liability restrictions, children under the age of 13 will not be allowed in the exhibits hall at any time. Please keep this in mind when making your arrangements to attend the conference.

Exhibitors

The growing list of exhibitors includes, as of December 1993:

Amoco Production Co.
ARK Geophysics Ltd.
Baker Hughes INTEQ
BEICIP-FRANLAB
CogniSeis Development
Digi-Rule Inc.
The Geocoin Group
Geophysical Micro Computer Applications Ltd.
Hydrocarbon Data Systems
IEDS Ltd.
IES Integrated Exploration Systems GmbH
Landmark Graphics Corp.
NOPEC as
Petroconsultants (Far East) Pte. Ltd.
Petronas
Petroleum Information Corp.
Platte River Assoc. Inc.

Schlumberger
Silicon Graphics Singapore Pte. Ltd.
Simon Petroleum Technology
Sperry-Sun Drilling Services
Stratamodel Inc.
Western Atlas
Wiltshire Geological Services Pty. Ltd.

If your company would like information on how to exhibit, as well as a floor plan showing what space is still available, please contact: Bruce Lemmon, AAPG Exhibits Manager, P.O. Box 979, Tulsa, OK 74101-0979 USA; telephone (918) 584-2555; fax (918) 584-2274.



1994 AAPG International
Conference & Exhibition

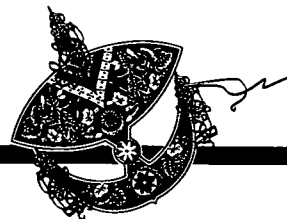
Technical Program at a Glance

	Morning	Afternoon
Monday, August 22	Opening Session	Exploration History of Southeast Asian Basins
		Reservoir Characteristics and Modelling, Part I
		Influence of 3-D Seismic in Exploration and Development
		Structural and Stratigraphic Analysis of Hydrocarbon Traps
Tuesday, August 23	Recognition of Hydrocarbon Using Geophysical Techniques	Workstations/Geoscience Database Applications, Etc.
	Southeast Asian Plate Tectonics/ Stress Models, Part I	Southeast Asian Plate Tectonics/ Stress Models, Part II
	Malaysian Tertiary Basins	Sequence Stratigraphy of Southeast Asian Basins
	Overpressure Zones in Southeast Asian Basins	Diagenetic and Sedimentological Trends in Carbonate and Clastic Sediments
	Basin Development and Modelling	Hydrocarbon Habitat and Reservoir Modelling
Wednesday, August 24	Borehole Geophysics and Gravity	Basin Development and Modelling, Part II
	Basin Development and Modelling, Part I	Reservoir, Seal, and Source Rock Distribution in Hydrocarbon, Part II
	Reservoir, Seal, and Source Rock Distribution in Hydrocarbon, Part I	Structural and Stratigraphic Analysis of HC Traps
	Reservoir Characteristics and Modelling, Part II	
	Southeast Asian Plate Tectonics/ Stress Models	

Oral Session

Poster Session

*Kuala Lumpur
Malaysia*



Technical Program

All oral session halls will be located on Level 2 of the Putra World Trade Centre.

Poster sessions will be located in the exhibits hall on Level 3.

Abstracts for the following papers will appear in the July issue of the *AAPG Bulletin* and in the conference program book.

Monday Morning, August 22

Opening Session

Tun Dr. Ismail A/B

- 09:00 Official Opening
- 09:05 General Chairman's Welcome
- 09:10 GSM President's Welcome
- 09:20 AAPG President's Address
- 09:30 AAPG Awards Presentation
- 09:45 Welcome and Address by Prime Minister of Malaysia or a Senior Cabinet Minister
- 10:00 Coffee Break
- 10:30 Keynote Addresses
- 12:30 Adjourn

Monday Afternoon, August 22

Exploration History of Southeast Asian Basins

Tun Dr. Ismail A/B

PRESIDING: E. Cheng and S. Iamchula

- 14:00 Introduction
- 14:05 **Tan Bee Seng**: History of Hydrocarbon Exploration by Shell in East Malaysia
- 14:30 **F.G. Rillera, E.F. Durkee**: Visayan Basin — The Birthplace of Philippine Petroleum Exploration Revisited
- 14:55 **W. Leslie, W.K. Ho, M. Abdul Ghani**: Results and Implications of New Regional Seismic Lines in the Malay Basin
- 15:20 **J.B. Blanche, J.D. Blanche**: An Overview of the Hydrocarbon Potential of the Spratly Archipelago, South China Sea, and Its Regional Implications for Oil and Gas Development
- 15:45 Break
- 16:30 **P.J. Cullen, S.C. Wright, C.J. Kearney, A.T. Pink**: Exploration in the Savannakhet Basin, Peoples Democratic Republic of Laos
- 16:55 **NG Tong San**: The Role of Seismic in Exploration of Carbonate Buildups in Offshore Sarawak, Malaysia
- 17:20 **N.T. Tin, N.D. Ty, L.T. Hung**: Nam Con Son Basin

Reservoir Characteristics and Modelling, Part I

Tun Hussein Onn A

PRESIDING: L.K. Hoong and C. Mouret

- 14:00 Introduction
- 14:05 **R.M. Sneider, J.T. Kulha**: Low Resistivity, Low Contrast Pays: Part I — Concepts and Methodology for Identification and Evaluation
- 14:30 **J.T. Kulha, R.M. Sneider**: Low Resistivity, Low Contrast Pays: Part II — Comparison of Examples from Southeast Asia and the Gulf of Mexico
- 14:55 **C.E. Schaafsma, S. Phuthithammakul**: Reservoir Characterisation Helping to Sustain Oil Production in Thailand's Sirikit Field

- 15:20 **F.V. Abbots**: Neural Networks: Prediction of Carbonate Lithology and Permeability from Wireline Logs in a Miocene Buildup, Offshore Sarawak
- 15:45 Break
- 16:30 **G.J. Massonnat, F. Umbliever, P. Odonne**: The Use of 3-D Seismic in the Understanding and Monitoring of Water-Flooding in a Naturally Fractured Gas Reservoir
- 16:55 **D. Van Der Baan, U. Singh**: Reservoir Geology of the F6 Field, Offshore Sarawak, Malaysia
- 17:20 **J.W. Roestenburg**: Using Borehole Images to Quantify Reservoir Quality and Stratigraphic Distribution

Influence of 3-D Seismic in Exploration and Development

Tun Hussein Onn B

PRESIDING: D. Gisolf

- 14:00 Introduction
- 14:05 **W. Nestvold**: The 3-D Seismic Revolution: Impact on Exploration and Development
- 14:30 **M.N. Mansor, K.W. Rudolph, F.B. Richards**: Seismic Attribute Analysis for Reservoir and Fluid Prediction, Malay Basin
- 14:55 **J.P. Maret, M. Grausem, C. Lemoy, U. San Lyan, R. Tallyn**: Reservoir Characterisation of a Miocene Isolated Platform
- 15:20 **W.L. Alexander, M.R. Nellia***: 3-D Seismic Facies Analysis of a Reefal Buildup, Offshore North Sumatra
- 15:45 Break
- 16:30 **M.E. Enachescu**: Amplitude Interpretation and Visualization of 3-D Reflection Data
- 16:55 **K. Dickerman, E. Caamano, G. Roopa***: Spatial Distribution of Reservoir Properties Using Seismic Attributes Correlated to Log Properties
- 17:20 **B. Magnier, F. Mercier**: Reservoir Characterisation by Using 3-D Seismic Attributes with Log Properties

Poster session from 14:00 to 17:30

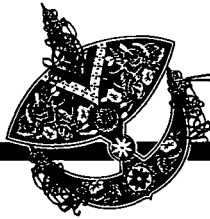
Authors in booths from 15:00 to 16:00

Exhibits Hall, Level 3

Structural and Stratigraphic Analysis of Hydrocarbon Traps

- Z. Yusoff**: Application of Seismic Interpretation in the Development of Jerneh Field, Malay Basin
- J.H. Shaw, S.C. Hook, E.P. Sitohang**: Exploration Opportunities in Inverted Rift-Basins Defined by Syntectonic Deposition and Axial Surface Mapping
- T.T. Chen, J.S. Watkins**: Structure and Stratigraphy of South Pengchiahsu Basin, Northern Offshore Taiwan
- M. Abdul Jalil, I. Komoo**: Petroleum Geology of Tembungo Area, Sabah Basin
- S. Wu, P. Weimer, G. Taylor***: Structural Restorations of Seismic Interpretations: An Important Approach to Sequence Stratigraphic Interpretation in Fold-Fault Terranes
- B.S. Smith, M.H. Carter**: Structural Evolution of the Sarawak, East Malaysia, Deep Water Area; Hydrocarbon Trap Assessment

* Denotes speaker other than senior author.



1994 AAPG International Conference & Exhibition

Tuesday Morning, August 23

Recognition of Hydrocarbon Using Geophysical Techniques

Tun Dr. Ismail A

PRESIDING: C. L. Yue and W. H. Boreland

- 9:00 Introduction
 9:05 Y.C. Lye, N.E. Birkett, M.R. Yaacob, M.R. Daneshvar: Direct Hydrocarbon Identification Using AVO Analysis in the Malay Basin
 9:30 S.W. Leaney, W.E. Borland: AVO and Anisotropy from Logs and Walkaways
 9:55 H. Jabour, M. Dakki: New Seismic Reflection Techniques Applied to Gas Recognition in the Rharb Basin, Morocco
 Break
 10:20 A.E. Wren: Seismic Amplitude: Its "True" Meaning and Benefit
 11:15 A.O. Idowu: Seismic Modelling for Gas Field Development in Offshore Niger Delta: A Case History
 11:40 S.T. Hu, T.L. Davis: Seismic Imaging of Complex Subsurface Structure, Western Flank of Denver Basin
 12:05 J. Voon Wei Khin, K. Wong Ung Sing: Application of 3-D Seismic Amplitude Studies in Porefill Prediction, Baram South Field, Offshore Sarawak, Malaysia

Southeast Asian Plate Tectonics/Stress Models, Part I

Tun Dr. Ismail B

PRESIDING: R.P. Koesoemadinata and C. Rangin

- 09:00 Introduction
 09:05 C. Rangin: Tectonics of Cenozoic Sedimentary Basins in Southeast Asia
 09:30 H.D. Tjia, K.K. Liew: Changes in Tectonic Stress Field in the Northern Sunda Shelf Basins
 09:55 R.W. Murphy: Tertiary Tectonic Events, Southwestern South China Sea
 Break
 10:20 S. Harder, R. McCabe, M. Flower: A Rotating Stress Field and the Evolution of Basins in the Gulf of Thailand
 11:15 A.J. Tankard, H.R. Balkwill, A. Mehra, A. Din: Tertiary Wrench Tectonics and Sedimentation in the Central Basin of Myanmar
 11:40 S. Hada: Accretion Tectonics in Thailand Along the Nanttaradit Suture Zone
 12:05 A. Samuel, N.A. Harbury, M.E. Jones: Basin Development and Inversion on an Oblique-Slip Convergent Margin: Nias Island, Western Indonesia

Malaysian Tertiary Basins

Tun Hussein Onn A

PRESIDING: D. Tan and K. A. Husin

- 9:00 Introduction
 9:05 M.T. Ismail, S.A. Abdullah, K.W. Rudolph: Structural and Sedimentary Evolution of the Malay Basin
 9:30 R.J. Morley, M.N. Bahari, B.H. Awalludin, M.Y. Azmi: Integrated Biostratigraphic Zonation for the Malay Basin
 9:55 H. Hazebroek, D. Tan, P. Swinburn: Tectonic Evolution of the Offshore Sarawak and Sabah Basins, Northwest Borneo
 Break

- 10:50 M.I. Ismail, A.M. Mohamad, M.S. Ganesan, S.A. Aziz: Geology of Sarawak Deepwater and Its Surroundings
 11:15 P. Swinburn: Structural Styles in the Balingian Province, Offshore Sarawak
 11:40 A. Hussin, T.A. Nuraiteng: Evolution of the Eocene-Miocene Carbonates of the North Sarawak Basin
 12:05 M.R. Che Kob, M. Mohamed: Miocene Chronostratigraphy of Sabah Basin from Nannofossil Assemblages

Overpressure Zones in Southeast Asian Basins

Tun Hussein Onn B

PRESIDING: F.W. Yang

- 9:00 Introduction
 9:05 W.I. Yusoff, R.E. Swarbrick: Thermal and Pressure Histories of the Malay Basin, Offshore Malaysia
 9:30 L. Warren, M.S. Kader*: Abnormal Pressure Study in the Malay-Penyu Basin
 9:55 A.M. Mantaring, F. Matsuda*, M. Okamoto: Analysis of Overpressure Zones at the Southern Margin of the Baram Delta Province and Their Implications to Hydrocarbon Expulsion, Migration, and Entrapment
 Break
 10:20 C. Kho Siak, T. Ten Have, D. Hemmings: Overpressures in the Baram Field, Offshore Sarawak, East Malaysia
 10:50 Y. Grosjean, M. Bois, L. de Pazzis: Evaluation and Detection of Overpressures in a Deltaic Basin: The Sisi Field Case History, Offshore Mahakam (Kutei Basin, Indonesia)
 11:40 M.A. Herkommer: Geopressure Modelling from Petrophysical Data: An Example from East Kalimantan
 12:05 J. Burrus, F. Schneider, S. Wolf: Modelling Overpressures in Sedimentary Basins; Consequences for Permeability and Rheology of Shales, and Petroleum Expulsion Efficiency

Poster session from 09:00 to 12:30

Authors in booths from 10:00 to 11:00

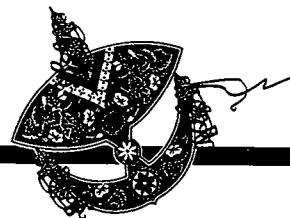
Exhibits Hall, Level 3

Basin Development and Modelling

- P.J. Eadington, M. Lisk, F. Krieger, P.J. Hamilton, M. Das, M. Person: Measurements of Salinity of Palaeoformation Waters in Sedimentary Basins for Better Evaluation of Oil Migration and Reserve Estimation
 K.K. Liew: Timing of Cenozoic Basin Formation in Northern Sunda Land, Southeast Asia
 S.S. Foland, K.J. Enzor: Reinterpretation of the Northern Terminus of the San Andreas Transform System — Implications for Basin Development and Hydrocarbon Exploration
 F. Tongkul: The Paleogene Basins of Sabah, East Malaysia
 A. Marsh, P.G. Buchanan: Development of a 3-D Validated Structural Model Using an Integrated Data Set — A Case Study from PNG
 D.W. Waples, R. Mahadir*: A Comparison of Quality of Present-Day Heatflow Obtained from BHTs, Horner Plots, RFTs, and DSTs of Malay Basin
 N. Halik, C. Wu: Basin Modelling of Jambi Sub-Basin, South Sumatra, Indonesia
 A.E. Cunningham, M.R. Prebish, M.O. Withjack: Late Compressional Features, East China Sea Shelf Basin
 D. Johari, M.F. Abdullah: Geology of the Merit-Pila Coal Basin, Sarawak, Malaysia
 J. Ting, T. Lee: Lower Miocene Sequence Stratigraphy of Taishi Basin, Offshore Western Taiwan

* Denotes speaker other than senior author.

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G. Zholtayev: Plate Tectonics: Geodynamics Models of Evolution of Oil- and Gas-Bearing Basins of Kazakhstan
 E. Larchenkov: Development Regimes of Rifted Basins and Criteria of Their Petroleum Potential
 K. Sobornov: Structural Development and Petroleum Potential of the Dagestan Foreland Thrust Belt, Terek-Caspian Basin, Russia
 A.J. Bertagne, N.G. Smith, D. Purnomo: International Megaregional Project — Principals and Results of a Regional Study in Eastern Indonesia

Tuesday Afternoon, August 23

Workstations/Geoscience Database Applications, Etc.

Tun Dr. Ismail A

PRESIDING: E. Allison and C. Foss

- 14:00 Introduction
 14:05 M.J. Wiltshire: The Personal Computer Revolution — Implications for Data Management
 14:30 P.H. Stark, R. Hodgson, J. Gawron: New-Generation Solutions for International Petroleum Data
 14:55 S. Singh, H.L. Vishwakarma: Managing Information Resource: A Key to Synergy in Petroleum Exploration and Production
 15:20 H.E. Low, S. Creaney, L.H. Fairchild, M.H. Peeley, P.S. Koch: The EPMI Malay Basin Petroleum Geology Database: Design Philosophy and Keys to Success
 15:45 Break
 16:30 J.M. Hickson, R.D. Erskine, N.C. Lian, M.G. Johnson*: Seismic Interpretation Today and Tomorrow
 16:55 N.R. Timbel: The Use of Statistical Software in the Application of Risk Analysis to the Petroleum Industry
 17:20 H. Xia, R. Hansen, N. Harthill, P. Traynin: Interactive Modelling of Potential Fields in Three Dimensions

Southeast Asian Plate Tectonics/Stress Models, Part II

Tun Dr. Ismail B

PRESIDING: R. P. Koesoemadinata and C. Rangin

- 14:00 Introduction
 14:05 T.O. Simandjuntak: Tectonic Development of the Indonesian Archipelago and Its Bearing on the Occurrence of Hydrocarbons
 14:30 J.D. Pigott, A.B. Cullen: Plate Boundary Reorganization as a Requisite Mechanism for Terrane Accretion: An Example from the Late Cenozoic of Northern New Guinea
 14:55 A.D. Scardina, E.A. Haan, K.A. Maher: The Palu Koro Shear Zone, a 1000-Km-Long Zone of Middle Miocene Tectonic Activity in Sulawesi and Eastern Borneo
 15:20 K. Hinz, M. Block, H.R. Kudrass, H. Meyer: Structural Elements of the Sulu Sea, Philippines
 15:45 Break
 16:30 G.P. Yumul Jr.: Ophiolite and Ophiolitic Complexes in the Philippines
 16:55 R. Hall, J.R. Ali: Tertiary Motion of the Philippine Sea Plate: Implications for Southeast Asia
 17:20 G.M. Wang, M.P. Coward, W. Yuan, J. Zhao, S. Liu, W. Wang: Tectonic Evolution of the East China Sea Basin — Implication for the Development of Western Pacific Marginal Seas

* Denotes speaker other than senior author.

Sequence Stratigraphy of Southeast Asian Basins

Tun Hussein Onn A

PRESIDING: K. Rudolph

- 14:00 Introduction
 14:05 J.C. Van Wagoner, R.E. Hill: Nonmarine Sequence Stratigraphy
 14:30 S.J. Malecek, C.M. Reeves, W.S. Atmadja, K.O. Widiantara: Sequence Stratigraphic Applications to Deep Water Exploration in the Makassar Strait, Offshore East Kalimantan, Indonesia
 14:55 S. Courtney: Sequence Stratigraphy Applied to the Hydrocarbon Productive Basins of Western Indonesia
 15:20 A.M. Mohammad: Seismic Sequence Stratigraphy of Tertiary Sediments, Offshore Sarawak Deepwater Area
 15:45 Break
 16:30 R. Lovell, M.R. Elias, R.E. Hill, M.H. Feeley: Miocene-Oligocene Sequence Stratigraphy of the Malay Basin
 16:55 R.A. Rahman, M.J. Said, J.R. Bedingfield, R. Lovell: Sequence Stratigraphy and Reservoir Architecture of the J18/20 and J15 Sequences in PM-9, Malay Basin
 17:20 W.W. Wornardt, P. Vail, J. Zhang, P. Li, L. Baie: Seismic Sequence Stratigraphy of the East China Sea

Diagenetic and Sedimentological Trends in Carbonate and Clastic Sediments

Tun Hussein Onn B

PRESIDING: C. P. Lee and N. Sattayarak

- 14:00 Introduction
 14:05 J.D. Pigott, C. Geiger*: Neogene Carbonate Exploration Play Concepts for Northern New Guinea: New Iteration from Fieldwork and Seismic Stratigraphy Along the Northern New Guinea Fault Zone
 14:30 M.Y. Ali: Reservoir Development in Miocene Carbonates, Central Luconia Province, Offshore Sarawak
 14:55 N.L. Turner, S. Siemann-Gartmann: Tertiary Carbonate Development on the Shenhu Massif, South China Sea
 15:20 M.Z. Farshori, A. Jantan: Sedimentation and Lithofacies Relations in the Holocene Pahang Delta Complex, East Coast of Peninsula Malaysia
 15:45 Break
 16:30 A.R. Abdul Hadi, T.R. Astin: Genesis of Siderite in the Upper Miocene, Offshore Sarawak: Constraints on Pore Fluid Chemistry and Diagenetic History
 16:55 L. Coshell, J. Brown, J.K. Warren: X-Ray Computed Tomography (CT) Applied in Routine Core Analysis: Examples from New Guinea and the Northwest Shelf, Australia
 17:20 R.E. Swarbrick: Episodic Overpressure as a Primary Control of Diagenetic Fluids

Poster session from 14:00 to 17:30

Authors in booths from 15:00 to 16:00

Exhibits Hall, Level 3

Hydrocarbon Habitat and Reservoir Modelling

- T. Miki: Maturation of Tertiary Sediments in the Asian Continental Margins: A Basis for Hydrocarbon Generation Studies
 M.R. Elias, K. Dharmarajan: Fluvial Reservoir Architecture in the Malay Basin: Opportunities and Challenges



1994 AAPG International Conference & Exhibition

K. Zainun, M.R.M. Said, T.K. Soon: Comparison of MWD and Wireline Applications and Decision Criteria, Malay Basin
J.B. Carnes, J.M. Novitsky-Evans*, D.J. Schunk: Structural Control on Lithofacies in the Zhu 1 Depression, Pearl River Mouth Basin, South China Sea
S. Nugroho, S. Hansen, S. Mandhiri: Reservoir Modelling in the Bunyu Tapa Gas Field — An Integrated Case Study
A. Anuar, R. Kinghorn: Sterane and Triterpane Biomarker Characteristics from Oils and Sediment Extracts of the Middle-Late Miocene Sequences, Northern Sabah Basin, Malaysia
R.J. Norris, G.J. Massonnat, D. Gommard: Horizontal Permeability Anisotropy Developed from the Upscaling of Anisotropic Facies Patterns
G.J. Massonnat, E. Manisse: Evaluation of Vertical Permeability Anisotropy in Fractured Reservoirs
R.J. Norris, A. Hewitt, G.J. Massonnat: Applying Simple Geostatistical Techniques to a Routing Production Geology Problem — A Case Study
L. Sering, R. Adnan: Reservoir Geological Modelling of the A3/A6.0 Viscous Crude Reservoirs of the Bokor Field, Offshore Sarawak, East Malaysia
M. Taha, H. Kitagawa: Depositional Systems of Cycle VI M in Helang and Layang Structures, Offshore Sarawak, East Malaysia
B. Bait, G.F. Canjar, N. Norbi*: Horizontal Well Application for Development of a Thin Oil Column Within Multiple Discontinuous Lower Coastal Plain Sand Units, Lower Miocene Cycle II, Offshore Sarawak, East Malaysia

Wednesday Morning, August 24

Borehole Geophysics and Gravity

Tun Dr. Ismail A

PRESIDING: H. Shin-Tai and W. H. Borland

09:00 Introduction
 09:05 **P. Berger, D. Ferment:** An Update on the Array Induction Imager Tool (AIT) in the Gulf of Thailand
 09:30 **A. Manzur, J. Meyer:** Using Seismic-While-Drilling (SWD) Data to Assist in Selecting Casing Depths: Case Histories
 09:55 **K.K. Hlaing, C. Lemoy, W. Borland:** Low-Frequency Stoneley Energy for Stratigraphical Facies Evaluation
 Break
 10:20 **C. Foss, M. Parker:** Gravity Delineation of the Setting and Deep Structure of Southeast Asian Sedimentary Basins
 11:15 **C.C. Hu:** The Integrated Interpretation of Airborne Gravity, Magnetic Data, and Other Geophysical Data of Block SK-12 Onshore Sarawak, Malaysia
 11:40 **D. Santoso, S. Sukmono, H. Setyadi:** The Characteristics of Neogen Sediments and Structures in Siberuang Area (Central Sumatra Indonesia) Based on Gravity Data
 12:05 **M. Untung, Sardjono, I. Budiman, J. Nasution, E. Miranda, E.G. Sirodj, L.F. Henage:** Hydrocarbon Prospect Mapping Using Balanced Cross Sections and Gravity Modelling, Onin and Kumawa Peninsulas, Irian Jaya, Indonesia

* Denotes speaker other than senior author.

Basin Development and Modelling, Part I

Tun Dr. Ismail B

PRESIDING: H.D. Tjia and S. T. Sandal

09:00 Introduction
 09:05 **N. Azim-Ibrahim, N. White:** Subsidence Modelling of the Sabah Basin, a Foreland Basin, Northwest Borneo, Malaysia
 09:30 **D.C. Ginger, J. Potheary, R.J. Hedley:** New Insights into the Inversion History of the West Natuna Basin
 09:55 **M.J. Hoesni, M.N. Che Mood:** History of Hydrocarbon Generation in Tembungo Area, Northwest Sabah Basin
 Break
 10:20 **J. Burrus, E. Brosse, G. Choppin de Janvry, Y. Grosjean:** Interactions Between Tectonism, Thermal History and Palaeohydrology in the Mahakam Delta (Indonesia). Model Results, Petroleum Consequences
 11:15 **A. Bachtiar:** Study of Thermal Maturity in the Thrust-Belt Area of the Kutai Basin
 11:40 **R.P. Koesoemadinata, M.I.T. Taib, S. Luki:** Subsidence Curves and Modelling of Some Indonesia Tertiary Basins
 12:05 **J. Milsom:** Basin Formation in the Nias Area of the Sumatra Forearc, Western Indonesia

Reservoir, Seal, and Source Rock Distribution in Hydrocarbon, Part I

Tun Hussein Onn A

PRESIDING: C. Kluth and M. Heyman

09:00 Introduction
 09:05 **J.J. Tiercelin, J.P. Richert, K.E. Lezzar:** Sediment Infill Within Rift Basins: Facies Distribution and Effects of Deformation: Examples from the Kenya and Tanganyika Rifts, East Africa
 09:30 **A. Ait Salem:** Reservoir, Seal, and Source-Rock Distribution in Essaouri Rift Basin
 09:55 **H. Doust:** The Far East Hydrocarbon Habitat — The Charge Perspective
 Break
 10:20 **Gong Zaisheng, Zhu Weilin, Zheng Baoming:** Reservoir, Seal Rock Distribution and Control Factors in Hydrocarbon-Bearing Rift Basins of China
 11:15 **Qiao Hansheng:** Sedimentary Style and Oil-Gas Field Distribution in Western Bohai Bay
 11:40 **J.M. Armentrout, M. Prebish, A.C. Cunningham, R.J. Echols, P. Braithwaite, J.F. Sarg, J.W. Norris, D.K. Letsch, B.B. Bracken, C.N. Denison:** Cenozoic Tectono-Stratigraphic Sequences of the Shelf Rift Basin, East China Sea
 12:05 **P.T. Dien:** Some Cenozoic Hydrocarbon Basins on the Continental Shelf of Vietnam

Reservoir Characteristics and Modelling, Part II

Tun Hussein Onn B

PRESIDING: L. K. Hoong and C. Mouret

09:00 Introduction
 09:05 **H.B. Heijna, A. van Vliet, K. Wong, S. Leong Mooi Sin, S. Tiang Ting Ing, W. Manan, W. Hassan:** Multidiscipline Studies of the Depletion Behavior of the F23 Gas Field, Offshore Sarawak, East Malaysia
 09:30 **M.S. Ahmed, B.D. Wiggins:** Geoscience Technology Application to Optimize Field Development: Seligi Field, Malay Basin
 09:55 **U. Singh, D. Van Der Baan:** FMS/FMI Borehole Imaging of Carbonate Gas Reservoirs, Central Luconia Province, Offshore Sarawak, Malaysia
 Break
 10:20

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- 10:50 R.J. Norris, F.G. Alabert, G.J. Massonnat: Geostatistical Reservoir Characterization of Complex Lateral and Vertical Sequences in a Mixed Carbonate Platform
- 11:15 T. Ten Have, R. Abbas, A.G. Dundang*: Oil Development in the Structurally Complex West Bayan Field, Offshore Sarawak, East Malaysia
- 11:40 U. Ahmed: Optimization of Reservoir Development and Production Using Fullbore FMI Data
- 12:05 R.R. Carter, S. Salahudin, T.C. Ho: Geological Input to Reservoir Simulation, Champion Field, Offshore Brunei

Poster session from 09:00 to 12:30

Authors in booths from 10:00 to 11:00

Exhibits Hall, Level 3

Southeast Asian Plate Tectonics/Stress Models

- Z. Zhou, R.J. Whittington: Tectonic Evolution of the Pearl River Mouth Basin, Northern South China Sea
- P.D. Rabinowitz, T.J.G. Francis, J.G. Baldauf, J.F. Allan: Scientific Drill Results Bordering Southeast Asia
- P. Fan: Tectonic Patterns and Cenozoic Basalts in the Western Margin of the South China Sea
- K.A. Maher: A Cenozoic Tectonic Model for Southeast Asia — The Microplate Approach
- D.S. Kusnana, H. Panggabean, S.A. Mangga: The Tertiary Geology of Bayah Area in Relation to the Evolution of West Java
- T. Lee: Cenozoic Plate Reconstruction and Implied Stress Patterns in Southeast Asia
- P. Huchon, X. Le Pichon, C. Rangin, P.T. Thi: New Marine Data from Vietnam Margin Limit the Amount of Extrusion of Indochina During the Opening of the South China Sea
- H. Ahrendt, B. Hansen, K. Wemmer: Tertiary Nappe and Thrust Tectonics in Western Thailand Deduced from U/Pb, Rb/Sr, and K/Ar Age Determinations

Wednesday Afternoon, August 24

Basin Development and Modelling, Part II

Tun Dr. Ismail B

PRESIDING: H. D. Tjia and S. T. Sandal

- 14:00 Introduction
- 14:05 T. Huyen: The Heat Flow Study in Tertiary Basin of Vietnam Offshore
- 14:30 N. Mountford: Hydrocarbon Prospectivity Assessment of the Southern Pattani Trough, Gulf of Thailand
- 14:55 H. Heggemann, D. Helmcke, K.W. Tietze: Contribution to the Sedimentary and Structural Evolution of the Mesozoic Khorat-Basin, Thailand
- 15:20 L.V. Minh, T. Abrajano*, E. Burden, L. Winsor, B. Ratanasthien: Palynology and Organic/Isotope Geochemistry of the Mai Moh Basin, Northern Thailand
- 15:45 Break
- 16:30 D.W. Waples, W. Leslie, R. Mahadir*: A Thermal Model for Evaluation of the Malay Basin
- 16:55 M.F. Abdul Halim: Thermal Regimes of Malaysian Sedimentary Basins
- 17:20 M. Kamal Roslan, J. Ahmad, A. Ibrahim: Sedimentology of Onshore Jurassic-Cretaceous Rocks and Its Probable Relevance to Offshore "Basement," Malay Peninsula

Reservoir, Seal, and Source Rock Distribution in Hydrocarbon, Part II

Tun Hussein Onn A

PRESIDING: C. Kluth and M. Heyman

- 14:00 Introduction
- 14:05 A. Chonchawalit, R.M. Bustin: Basin Analysis of Tertiary Strata in the Pattani Basin, Gulf of Thailand
- 14:30 Ith Praing, B. Rogers: Depositional Facies Variation in the Sediments of the Khmer Trough, Offshore Cambodia
- 14:55 S. Creaney, A.H. Hussein, D.J. Curry, K.M. Bohacs, R. Hassan: Source Facies and Oil Families of the Malay Basin, Malaysia
- 15:20 B.J. Katz: Stratigraphic and Lateral Variations of Source Rock Attributes of the Pematang Formation, Central Sumatra
- 15:45 Break
- 16:30 P. Swinburn, H. Burgisser, J. Yassin: Hydrocarbon Habitat of the Balingian Province
- 16:55 D.J. Curry: Variations in the Geochemistry of Closely Interbedded Oil-Prone Coals and Shales
- 17:20 C.F. Schiefelbein, H.L. Ten Haven: Geochemical Typing of Crude Oils from the Gulf of Thailand and the Natuna Sea

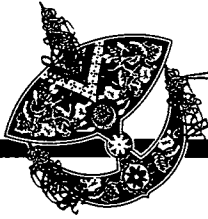
Structural and Stratigraphic Analysis of HC Traps

Tun Hussein Onn B

PRESIDING: R. Phoa and B. Jasim

- 14:00 Introduction
- 14:05 F. Jiamo, P. Cunmin, S. Guoying, C. Sizhong: Alteration of Fault Development on the Accumulated Oil Geochemical Features
- 14:30 T.L. Burnett: New Directions in Geoscience Technology for Petroleum Exploration
- 14:55 S. Mitra: Geometry and Evolution of Structural Traps Formed by Inversion Structures
- 15:20 H. Xiao: Rollover Development and Resulting Geometry with Applications to Rapid Stratigraphic Correlation Across Major Growth Faults
- 15:45 Break
- 16:30 J.M. Hurst, P.A. LaPointe, U. Kyaw Nyein, U. Maung Nyunt, U. San Lyann: Carbonate Petroleum Systems in Myanmar
- 16:55 J.E. Laing, B.P. Atmodipurwo, A. Rauf: Structural Evolution of the Pematang Reservoirs, Kelabu-Jingga Gas Fields, Sumatra
- 17:20 E.A. Lorenzetti, P.A. Brennan, S.C. Hook: Structural Styles in Rift Basins: Methodology and Examples from Southeast Asia

* Denotes speaker other than senior author.



1994 AAPG International Conference & Exhibition

Short Courses

THE 1994 AAPG conference offers two short courses (one pre-conference and one post-conference) dealing with highly topical and diversified subjects which stand in today's limelight of technical development and its application in the industry. These courses are considered to be of interest and benefit to a wide range of experienced petroleum pro-

fessionals from research scientists and technological specialists to petroleum and contract managers.

Courses will be held in the Putra World Trade Centre. Prices are quoted and guaranteed in U.S. Dollars.

IMPORTANT: If any of these short courses are likely to meet your needs or those of your professional staff, you are strongly encouraged to register early.

All courses are limited in size, and undersubscribed courses will be cancelled. It would be a shame if one of these courses was cancelled because of late registrations. The longer you wait to register, the harder it is to change last-minute plans, such as airline and hotel reservations. We caution you about purchasing non-refundable airline tickets in order to attend a course.

Short Course 1. Development and Reservoir Management

Date/Location: Saturday, August 20 through Sunday, August 21, 08:00-17:00, Putra World Trade Centre

Instructor: Robert M. Sneider (R.M. Sneider Exploration, Houston, Texas, USA)

Fee: US\$450

Limit: 50 persons

Content: 1.4 CEU

This two-day course summarizes the advances made in concepts and methodology for reservoir development, description, and management that can lead to improved hydrocarbon recovery. It will provide participants with knowledge on controls of reservoir pore space distribution and an understanding of the geological, geophysical, and engineering procedures used to appraise, develop, and manage reservoirs for the purpose of optimizing recovery. Emphasis is on solving problems found in developing fields like those found in Southeast Asia.

Course content includes designing a development plan to answer key reservoir performance questions and to optimize recovery; facies controls on reservoir properties and scales of reservoir heterogeneities; recognition and mapping of correlative reservoir subzones; mapping techniques to portray the three-dimensional distribution and continuity of porosity, permeability, and capillary properties; influence of shale barriers on reservoir performance; importance of the aquifer; value of 3-D seismic in reservoir and aquifer delineation and description; and economic value of synergistic, multidisciplinary teams.

Participants will compile a development plan, construct maps and cross sections for estimating hydrocarbon-in-place, and distinguish and map pay types and flow barriers.

This course is designed for geologists, geophysicists, petroleum engineers, and supervisors who are involved with field development and management. Participants should have three to 10 years' experience.

Short Course 2. Application of Sequence Stratigraphy to Hydrocarbon Systems

Date/Location: Thursday, August 25 through Friday, August 26, 08:00-17:00, Putra World Trade Centre

Instructor: John C. Van Wagoner (Exxon Production Research Co., Houston, Texas, USA)

Fee: US\$450

Limit: 50 persons

Content: 1.4 CEU

This course will introduce the fundamentals of sequence stratigraphy and illustrate the methodology of how sequence stratigraphy is applied, primarily in a producing setting. Participants will understand sequence stratigraphy terminology; parasequences and parasequence sets, including how to identify these stratal types in logs and cores and how to use these units to effectively zone reservoirs and locate bypassed oil; sequence boundaries, including an in-depth discussion of the criteria used to identify these boundaries and what these boundaries look like in well logs, cores, and outcrop; systems tracts, including the facies components of each systems tract, the parasequence stacking patterns within systems tracts, and the controls that systems tracts exert on reservoir and seal; how to recognize sequences in well logs and cores; and how sequence concepts are used to correlate reservoirs and how they are applied to producing fields to improve production performance and increase field reserves.

Topics include the philosophy of sequence stratigraphy; beds and bedsets and their importance for well-log correlation; parasequence concepts illustrated with examples from well logs and cores cut on the outcrop; the differences between parasequences and formation stratigraphy and the practical significance of these differences; parasequence set concepts and their application to reservoir correlation; an introduction to sequences and systems tracts along different types of basin margins; sequence and sequence boundary examples in outcrops and cores; incised valleys in outcrop and subsurface, including well-log correlation exercises; and application of sequences and sequence boundaries to producing fields.

Emphasis will be on the practical application of sequence stratigraphy, supported with excellent examples from outcrops in the western United States, cores cut on the outcrops, well-log cross section exercises, and examples from producing fields.

This course is designed for exploration and production geologists, reservoir engineers, geological supervisors, and seismic interpreters. Participants need a basic understanding of facies geology and well-log correlation.

*Kuala Lumpur
Malaysia*



Pre-Conference Forum

Generating Successful Oil/Gas Business in Southeast Asia

(organized by the Institute for International Research)

Date/Location: Thursday, August 18 through Friday, August 19, 09:00-17:15, Hotel Istana
Chairman: Dr. Kenneth M. Knoll (Director/CEO Permata, Petronas Management Training Sdn. Bhd., Malaysia)
Fee: US\$895 AAPG conference participants
Limit: 250 persons
Who should attend: Managing directors, exploration & production managers, technical and business advisers, operations managers, business and oil analysts, contract managers, and decision-makers in the service/supply sectors

International Advisory Panel

- YB Dató Mohamad Idris Mansor, SVP, PETRONAS and MD/CEO, PETRONAS Carigali Sdn. Bhd., Malaysia
- Viset Chooplban, President, PTT Exploration & Production Public Co. Ltd., Thailand
- Datuk C. J. Knight, Chairman, The Shell Companies, Malaysia
- Umar Qureshi, Vice President and General Manager, South & East Asia, Schlumberger Technical Services Inc., Indonesia
- David Melzer, Managing Director, Premier Oil Pacific Ltd., Singapore
- Dalip Pathak, Chief of Regional Mission, International Finance Corporation, Thailand
- G.A.S. Nayoan, Senior Vice President, Director Exploration and Production, Pertamina, Indonesia

This pre-conference forum is a unique venture for the AAPG's international conference. With a number of Southeast Asian states experiencing more than 8 percent annual GDP growth, the opportunities for business in the global oil/gas industry are such as to warrant closer analysis as the demand for energy fuel supplies increases.

Country focus: Malaysia, Indonesia, Singapore, Thailand, Philippines, Brunei, and the Mekong region (focus on Vietnam)

Forum structure: Each day will commence with a keynote address by a prominent Asian industrialist who will offer a broad overview of the issues involved in that day's papers and workshops.

Day One Address: The Prospectus for Profitability in Southeast Asia's Oil/Gas Sector: The Economics of Exploration

Day Two Address: The Requirements for Business Success in Southeast Asia: The New Asia, New Markets, New Business Opportunities

The forum will have four main sessions, each designated as "Geo-Business Issues" for the Southeast Asian region. Each session will have two or three main presentations, after which Forum delegates will have the chance for a more detailed examination and questioning of the issues presented in strategy workshops. These workshops will allow extra expert panelists to expand on the issues.

Day One: August 18

Focus is on two key issues:

1. Forecasts of oil/gas reserves and opportunities
2. Production-sharing contracts: a regional and national focus

Speakers will focus on the key areas affecting prospectivity. The morning session will highlight three central topics: gas opportunities in the region, small field developments, and deep-water exploration. Where are the areas of greatest potential? What are the national incentives for exploration and development? Which countries will be taking up deep-water exploration? And where are the small field developments in Southeast Asia?

The afternoon session will examine production-sharing contracts. How do PSCs affect the development of new energy sources? What are the present and foreseeable government incentives for PSCs in the region? Which states offer the best terms and conditions for E&P investment?

A panel discussion will allow delegates a full and open opportunity to question all the key speakers of the day.

Day Two: August 19

Three main topic areas are:

1. Southeast Asia's finance and banking structure (three main papers)
 - Investing in Southeast Asia's oil/gas industry: understanding the financial framework for foreign investors
 - Strategic structuring of joint ventures for oil/gas projects in the region
 - Project finance for oil/gas ventures

The morning session will give delegates the opportunity to hear the latest on the region's economic situation, options, and strategies for oil/gas investment and certifying oil/gas reserves.

The three topic areas will give delegates a full overview of oil/gas financing in the region with finance, banking, and legal experts within the Asian petroleum sector presenting and answering key issues you need to know about. What are the economics and risks by sector? What are the benefits and risks in Southeast Asian joint ventures?

The final afternoon session will examine:

2. Opportunities and effectiveness in service/supply contracts for Southeast Asia
3. Project management and corporate management issues

Here the focus turns to the supply sector and human resource issues that affect business in Southeast Asia. Issues such as maximizing service alliances, contractor-driven project management, national cultural and social factors, contracting methods and conditions, and quality assurance will be examined at these two sessions and in the strategy workshops. The workshops will allow for a more detailed country-by-country examination.



1994 AAPG International Conference & Exhibition

Field Trips

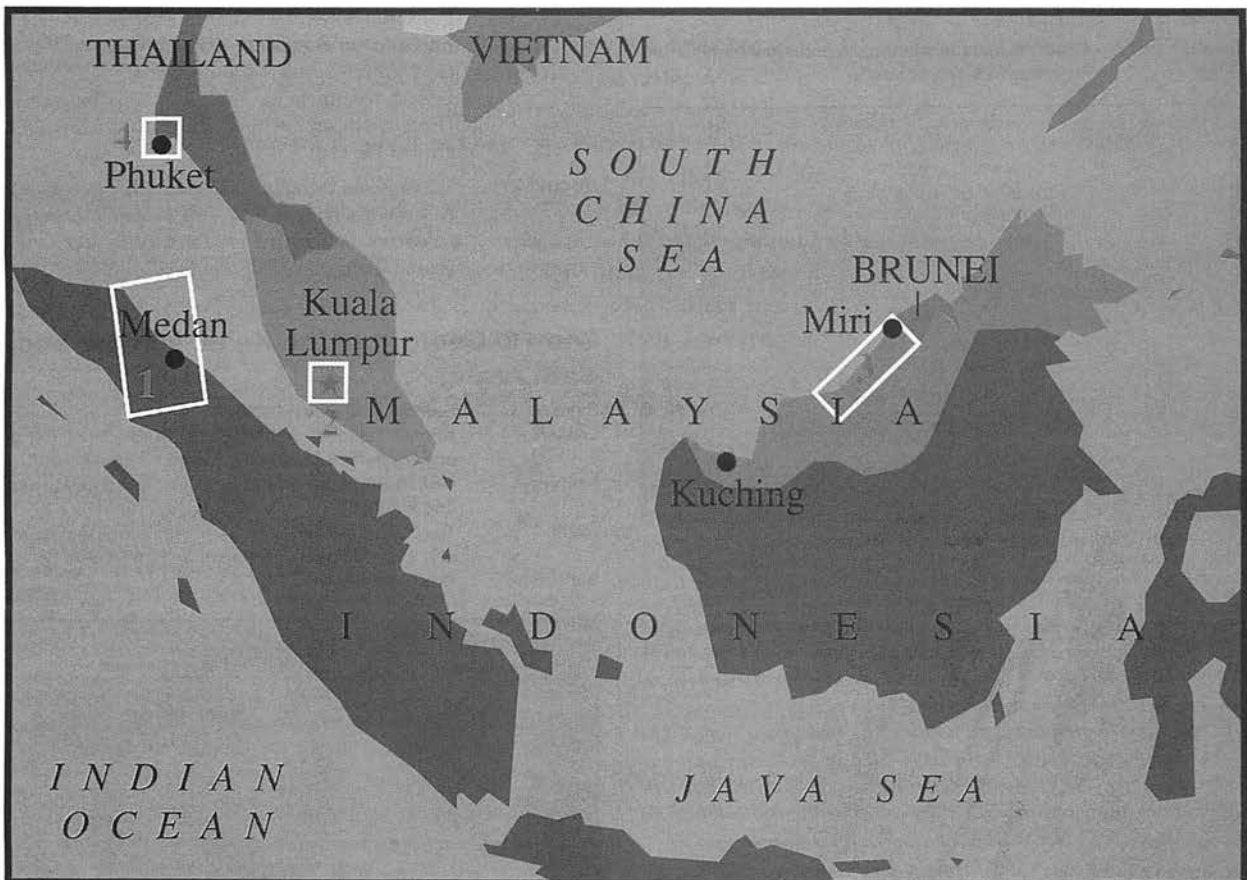
THE 1994 INTERNATIONAL conference also presents a diversified program of four regional field trips dealing with highly topical subjects. Links with selected short courses provide additional bene-

fit to professionals who attend mutually related events.

Trips appropriate for spouses are indicated. Prices are guaranteed in U.S. Dollars. Trips returning on Sunday, August 21 will return in time

for the conference's opening reception.

Field trip participants are advised to consult their physicians regarding malaria prevention and should check with their local embassies before traveling to any of these destinations.



IMPORTANT!

If any of these field trips is likely to meet your needs or those of your professional staff, you are well advised to make early reservations. Trips will be cancelled if undersubscribed; it would be a shame to miss a great opportunity if the trip of your choosing would be sold out or cancelled due to low preregistration. Also, most field trips require participants to make their own flight arrangements. Therefore, we caution you about purchasing non-refundable airfares.

Once preregistration closes or a field trip sells out, participants will receive a letter of instructions via fax (be sure to include your fax number on your registration form) for their particular trip, notifying them of all details, including where to meet, hotel phone numbers, special equipment, etc.

Don't be left out! Register early! The preregistration deadline is July 15, 1994.

Kuala Lumpur Malaysia



Trip #1. Geology of the Petroliferous North Sumatra Basin

Date: Wednesday, August 17 through Sunday, August 21
Leaders: B. Situmorang, B. Yulihanto, S. Sofyan (LEMIGAS, Indonesia), C.A. Caughey (Asamera Oil Ltd., Indonesia), and R. Rory (Mobil Oil Indonesia, Indonesia)
Fee: US\$700 (includes 4 nights' lodging based on single occupancy, 4 breakfasts, 4 lunches, 4 dinners, refreshments, coach transportation, flight on August 20, 2 cultural shows, guidebook, hat, and T-shirt)
Limit: 40 participants maximum; 25 participants minimum
Suitability: Professionals and spouses



Field Trip #1: Scenery of the volcano-tectonic collapse of the Toba Lake, North Sumatra, Indonesia, situated within the NW-SE trending dextral Sumatra Fault Zone. Photo courtesy of LEMIGAS.

This trip will provide an insight into the geological setting of the North Sumatra basin and includes visits to the basement rocks, the petroliferous Tertiary clastic and carbonate sequences and the young volcanics.

NOTE: Participants are required to make their own flight arrangements to Medan and from Medan to Kuala Lumpur after the trip. They are to check in at a designated hotel in Medan on August 17, followed by an introductory briefing on the geology of the North Sumatra Basin after dinner.

- August 17** Check in at designated hotel in Medan. Dinner, introductory briefing, and overnight stay in Medan.
- August 18** Early flight to Lhok Sukon after breakfast. Transfer to Rantau Panjang. Discussion on the Perlak Field, followed by geological stops at Keutapang deltaic sequences, Baong turbidites, Peutu Limestones, and the Bampo formation. Lunch, dinner, and overnight stay at Rantau Panjang. Discussion on the Peutu and Baong facies at night.

- August 19** Travel to Lhok Seumawe and visit the giant Arun Field. Discussion on the geology of the Arun Field and facilities followed by examination of continuous core of the Arun Field. Recap on the Peutu Reef, gas prospects, CO₂, etc. Lunch, dinner, Acehenese cultural show, and overnight stay in Mobil Camp.
- August 20** Early flight to Medan after breakfast. Travel to Prapat via Brastagi. En route will be geological stops in Toba tuffs, Prapat Microdiorite, the Paleozoic Bohorok Formation, and Sibaganding limestone of the Kualu Formation. A visit to a traditional Batak village in Tomok, Samosir Island within Lake Toba will also be made. Dinner, Batak cultural show, and overnight stay in Parapat.
- August 21** Travel from Parapat to Medan after breakfast. Afternoon flight *on your own* to Kuala Lumpur to arrive in KL in time for Icebreaker (suggested flight Malaysia Airlines 721 MH).

Trip #2. Geology of the Kuala Lumpur and Batu Arang

Date: Sunday, August 21, 08:00-17:00
Leaders: Ahmad Tajuddin, Azhar Hussin, Khoo Teng Tiong, and Mustafa Kamal Shuib (University of Malaya)
Fee: US\$50 (includes transportation, guidebook, hat, and lunch)
Limit: Two groups, each with 38 participants maximum and 25 participants minimum
Suitability: Professionals only



Field Trip #2: Interbeds of thin-graded beds of sandstone and siltstone with oil shales in the lacustrine sequence of the Tertiary Batu Arang basin, Malaysia. Photo by Azhar Hussin.



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This trip includes visits to several exposures of Paleozoic rocks, Triassic granites, and the Batu Arang Tertiary basin. The Tertiary basin fills are fluvial and lacustrine sediments in which coal beds and oil shales are found.

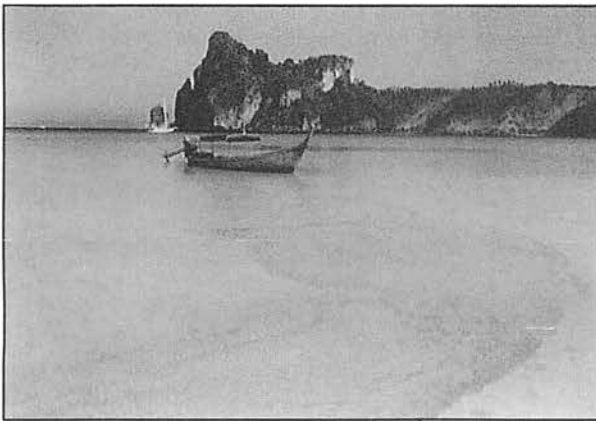
Participants will travel to the western foothills of the Main Range, where lower Paleozoic schists and marbles and the Triassic Main Range Granite are exposed. A visit to Batu Caves will also provide a panoramic view of the Klang Valley, where Kuala Lumpur is located.

The Batu Arang Tertiary basin is located about 30km north of Kuala Lumpur. The basin fills include cross-bedded channel sands, coals, and carbonaceous shales, lacustrine oil shales, siltstones, and intraformational conglomerates, and a thick sequence of Quarternary Boulder Bed. This is the best-exposed Tertiary sequence in Peninsular Malaysia.

This trip departs from and returns to the Putra World Trade Centre.

Trip #3. Geology and Geologic Resources of Phuket Island and Peninsular Thailand

Date:	Wednesday, August 24, 18:15, through Sunday, August 28
Leaders:	Prinya Putthapiban, Thara Lekuthai and Raksaskulwong (Department of Mineral Resources, Thailand)
Fee:	US\$550 single occupancy; US\$450 double occupancy (includes 4 nights' lodging, transfer from conference venue to airport in Kuala Lumpur, coach transport, 3 meals per each of 4 days, and airport transfer in Phuket)
Limit:	40 participants maximum; 18 participants minimum
Suitability:	Professionals and spouses



Field Trip #3: Upper Paleozoic rocks of a lower sandstone and shale sequence overlain by thick-bedded limestone, Krabi Province, Thailand. Photo by Azhar Hussin.

This trip will provide participants with an overview of the geology and geologic resources of Phuket Island and the adjacent part of Peninsular Thailand. Of special interest is the pebbly mudstones of the late Paleozoic Phuket Group, which many workers have used as a basis for the reconstruction of Gondwana paleogeography. In the Krabi Province, visits will be made to Mesozoic sequence, which has petroleum source rocks potential and the Tertiary lignite deposits. These deposits serve as important indicators to the hydrocarbon potential of the southern part of Peninsular Thailand and the offshore area.

NOTE: Participants are required to make their own flight arrangements from Kuala Lumpur to Phuket — Thai Airways flight 424 TG, arriving 18:25 Thai time — and their own return journey from Phuket.

- August 24** Transfer from convention venue to airport for flight Thai Airways flight 424 TG (departure time 18:15) from Kuala Lumpur to Phuket. Dinner and overnight stay in Patong Beach, Phuket.
- August 25** Visit to geological sites in Phuket: Paleozoic clastic and carbonate sequences, granites, and associated mineralizations. Breakfast, lunch, dinner, and overnight stay in Phuket.
- August 26** Travel overland to Krabi after breakfast. Study the Mesozoic sequence and the Tertiary lignite deposits in the Krabi Province. Lunch, dinner, and overnight stay in Krabi.
- August 27** Depart for the Phang Nga Bay. Board on boats to study the geology in the Bay area. Return to Phuket in the evening. Lunch in Panyi Island. Dinner and overnight stay in Phuket.
- August 28** Breakfast in Phuket. *Departure arranged on an individual basis.*

Kuala Lumpur Malaysia



Field Trip #4: Deformed Paleogene turbidite sequence of the basement rocks of the North Sarawak basin in the Tatau area, Malaysia. Photo by Azhar Hussin.

Trip #4. Tertiary Basin of North Sarawak

Date: Thursday, August 25 through Monday, August 29
Leaders: Boniface Bait (Sarawak Shell Berhad, Malaysia) and Richard Mani Banda (Geological Survey of Malaysia, Malaysia)
Fee: US\$650 (includes 4 nights' lodging based on single occupancy, coach transportation, guidebook, 4 breakfasts, 3 lunches, 1 dinner, 1 cultural show, and refreshments)
Limit: 28 participants maximum; 18 participants minimum
Suitability: Professionals only

This trip will provide an insight into the architecture of the North Sarawak basin and its sedimentary sequences. Both the clastic and carbonate sequences are the facies equivalent of hydrocarbon-bearing rocks in the onshore and offshore areas of Sarawak.

NOTE: Participants are required to make their own transportation arrangements from Kuala Lumpur to Bintulu on August 25 and their journey home from Miri on August 29.

- August 25** Participants travel to Bintulu on their own for overnight stay at a hotel in Bintulu, to be specified later.
- August 26** After breakfast, an excursion south of the Bintulu area, where the basement rocks and the older part of the Tertiary basin fills are superbly exposed. Lunch in Bintulu. Continue the study of the Tertiary sequences in the north Bintulu area. Overnight stay in Bintulu.
- August 27** Depart for Miri after breakfast. En route, stops will be made at a few exposures of clastic facies and the Subis Limestone. Excursion and picnic lunch at the Niah National Park. Onward journey to Miri, with a few stops along the way. Overnight stay in Miri.
- August 28** After breakfast, a full-day excursion around the Miri Field and the Lambir area. Lunch in the Lambir National Park. Dinner, cultural show, and overnight stay in Miri.
- August 29** Breakfast in hotel and departure, arranged on an individual basis.

NOTE: You can make your own arrangements for additional visits to the Mulu Caves or other interesting areas. For tour package information, contact Holiday Tours, fax 03-2443006.



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Optional Sightseeing Tours

AN EXCITING ARRAY of sightseeing tours will be offered Sunday, August 21 through Wednesday, August 24. Prices are quoted and guaranteed in U.S. Dollars. Representatives will be available at the tour desk to answer ques-

tions and sell tickets for any available tours.

All tours include transportation; pickup from conference hotels and the Putra World Trade Centre will begin 30-45 minutes prior to tour departure times listed and will return to

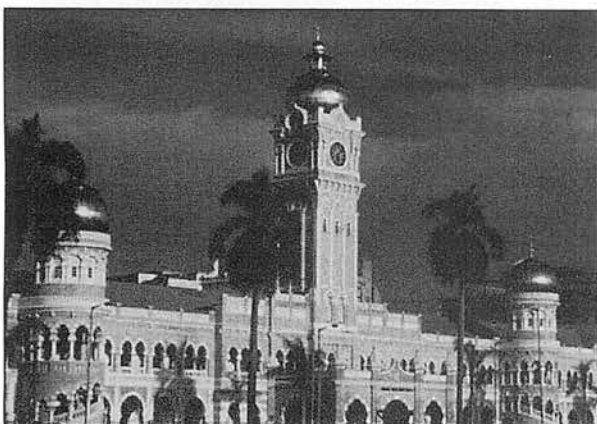
the conference hotels. Tours depart daily; you may use your tour ticket for any day during the conference.

NOTE: The "KL by Night" tour is Tuesday only — see following description for more details.

Kuala Lumpur City Tour

Date: Departs daily at 09:30 and 14:30 (tour lasts three hours)
Fee: US\$10

View a fine range of Malaysian handicrafts at Karyaneka Handicraft Centre before proceeding toward the Royal Palace. Drive through Chinatown and view Jame Mosque, one of the oldest mosques in Kuala Lumpur. Afterward, visit the National Monument before stopping at the National Museum for insight into Malaysia as a whole. View KL's quaint Moorish architecture, including the railways station and Sultan Abdul Samad building, before returning to your hotel.



Built in 1894, the Sultan Abdul Samad building now houses the offices and courts of the Malaysian Judiciary. Its 41m-high clock tower is frequently featured as one of Kuala Lumpur's more famous landmarks.

Batu Caves and Countryside Tour

Date: Departs daily at 09:30 and 14:30 (tour lasts three hours)
Fee: US\$10

Tour the surrounding countryside while driving along "Ambassadors' Row" and viewing Rumah Malaysia. Visit a rubber plantation for a short explanation of how rubber is converted from latex to a rubber sheet ready for exportation. Visit a batik factory and observe how a length of plain white cotton is transformed into exotically patterned fabric, using

skills passed down through generations. Then visit the Royal Selangor Pewter Factory and see how pure tin and antimony are fashioned into beautiful items. Climb up the steps of Batu Caves to pay respect to a Hindu deity set in a deep grotto framed with stalactites and stalagmites. Visit a scorpion farm where several tropical species are bred and see a wide range of tropical butterflies and insects.

Pulau Ketam Rural Adventure

Date: Departs daily at 08:30 (tour lasts nine hours)
Fee: US\$32 (includes lunch)

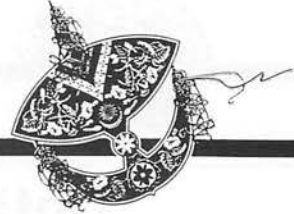
Depart Kuala Lumpur for a one-hour ride to Port Klang, Malaysia's busiest port. Take a short "Tongkang" ride to the ferry for a 70-minute ferry ride through the busy harbor and the mangrove swamps of nearby islands. On arrival in Pulau Ketam, take a leisurely stroll to see how an entire fishing community lives in a village where even the roads are built on stilts. Lunch will be provided at a local restaurant. After lunch, catch the ferry for the return trip to Port Klang. View the fabulous palace of the Selangor Sultan, then proceed to Kuala Selangor, where you can immerse yourself in the serenity and tranquility of the countryside where miles of swaying coconut palms are punctuated by typical Malay villages and cast crop plantations of coffee and cocoa. On arrival, visit Fort Altingsburg in Bukit Melawati. This battleground for many a confrontation between the Malays and the Dutch has today become home to the long-tailed macaques and the silverleaf monkeys. After a short stop at the rest house here, we will proceed to Kuala Lumpur via a scenic road dotted by little villages, oil palms, and rubber plantations.

Frasers Hill

Date: Departs daily at 08:45 (tour lasts eight hours)
Fee: US\$30 (includes lunch)

Drive northward up the north-south highway to the base town of Kuala Kubu Baru. From here we begin the uphill journey, reaching "The Gap" at about 10:45. Amidst the virgin tropical jungles and cool mountain air, we take a refreshment stop at the rest house and recover from the long winding drive. The road from here is one way, being open for ascending traffic at odd hours and for descending traffic at even hours. On arrival

Kuala Lumpur Malaysia



at the top, we will drive around the golf course and take a short stop for photographs before proceeding to a local restaurant for lunch. After lunch, we will head for the Jeriau Waterfalls, a journey which consists of a 20-minute drive followed by a short walk through dense tropical jungle. Take a cool refreshing swim at the waterfalls or just sit back and admire the awe-inspiring creations of mother nature.

Malacca Tour

Date: Departs daily at 09:30 (tour lasts eight hours)
Fee: US\$30 (includes lunch)

Arrive in historically exciting Malacca in a little over two hours. On arrival, visit St. Peter's Church. Then drive past the largest 17th-century Chinese cemetery outside of China, located at Bukit China or Chinese Hill. Stop at the foothills to view the Sultan's Well before driving through the Portuguese Settlement. Proceed to view the famous gateway, "Porta De Santiago," and the ruins of St. Paul's Church, lined by 17th-century Dutch tombstones. Next on the list is "Red Square," the salmon-pink Dutch administrative buildings which today house the Malacca Museum and other government offices. Visit Christchurch before proceeding for lunch at a local restaurant. After lunch, visit the "Abode of the Green Merciful Clouds" or the Cheng Hoon Teng Temple. Take a stroll along Malacca's antique street, which ends by the banks of the Malacca River. Our drive back includes short stops for photographs of Malay villages and plantations.

Genting Highlands

Date: Departs daily at 09:30 (tour lasts eight hours)
Fee: US\$25 (does not include lunch)

A relaxing 90-minute drive through dense tropical vegetation brings us to the summit, which includes a short stop at the fascinating Chin Swee Caves Temple (the idea is to pray for a little luck before laying your chips on the table). Upon reaching the Highlands, visit the casino and join in the excitement. Also within the same complex are an amusement centre and a 16-lane bowling alley.

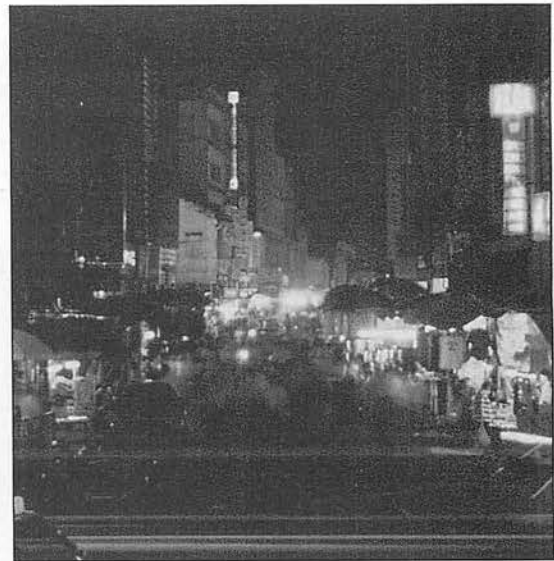
For a bird's-eye view of the mountains, take a ride on the cable car. Outside the casino complex, the atmosphere is altogether different. Designed for family fun, a beautifully landscaped lake takes center stage. Enjoy a leisurely boat ride around the lake or take the kids on a minitrain ride. Or have fun on the antique and bumper cars. Depart for the return to Kuala Lumpur at 15:30.

NOTE: A long-sleeved batik shirt or a long-sleeved shirt with a tie is required for entrance into the casino. Children under 18 are not allowed into the casino.

KL by Night

Date: Tuesday, August 23, departs 18:45
Fee: US\$28 (includes dinner)

Drive through the city at night to see lights ablaze. Visit the Seri Mahamariamman Temple, where the incessant chantings of Hindu priests and the mystical aura will give you an everlasting impression of this fascinating religion. Walk through Chinatown and see rows of food stalls, each with its own specialty, and taste the local delicacies at a full-course Chinese dinner at a popular restaurant.



Petaling Street in Chinatown is famous for its exotic food, fresh fruits, medicine shops, funeral parlors, and printed fabrics. Locals and visitors alike look for anything from imitation watches to ethnic jewelry, wall hangings, and teapots, brought over from India and Burma by Nepalese traders. Photo courtesy of Holiday Tours.



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Post-Conference Tours

SPECIAL AAPG post-conference tours have been arranged by TRAVEL DESIGNS, AAPG's official travel agency. These fully escorted trips will be for AAPG members only and are based on a minimum number of participants. Brief itineraries follow for these trips; contact TRAVEL DESIGNS for more detailed information and payment procedures.

Custom-designed pre- or post-conference trips can be easily arranged by the specialists at TRAVEL DESIGNS. Imagine a trip to the exotic island of Bali, a shopping excursion to Hong Kong, or an unforgettable train journey on the Eastern & Oriental Express.

For information and reservations, contact TRAVEL DESIGNS at 1-800-331-2626 or (918) 481-8900.

Send payments and written inquiries to: TRAVEL DESIGNS, 6931 South 66th East Ave., Tulsa, OK 74133.



TRAVEL DESIGNS

Post-Conference Tour #1. An Adventure in Borneo

Date: Thursday, August 25 through Wednesday, August 31
Fee: US\$725 per person, based on double occupancy (includes all meals [FAP], except during your stay at the Hyatt Saujana; does not include airfare — flight segments described below need to be included in your international itinerary)

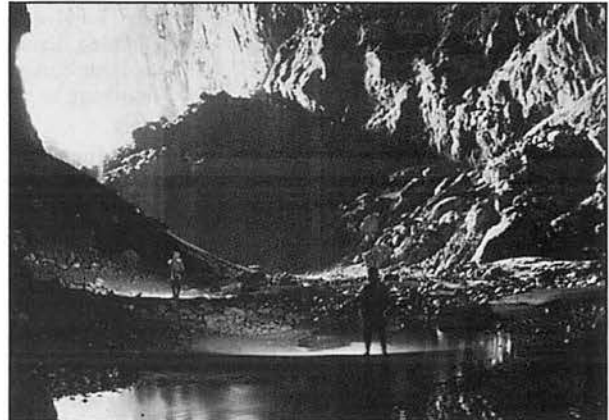
The very name Borneo is enough to conjure up exotic images in the mind of even the most pragmatic traveler. Sarawak is the Malaysian state which occupies the northwest portion of the island of Borneo, and it is here, in Sarawak, where our adventure begins. The geological sights on this trip are spectacular!

August 25 You will be picked up at your hotel and transferred to the Kuala Lumpur airport for the flight to Kuching. Upon arrival, transfer to the Damai Beach Resort, situated on the South China Sea, with the rain forest-clad Mount Santubong as the backdrop. In the afternoon, visit the Sarawak Cultural Village, which showcases the myriad cultures and ethnic expressions of Malaysia's largest state. In the evening, enjoy dinner at the hotel poolside.

August 26 Depart for Bako National Park, one of the best places in Sarawak to see wildlife in a natural setting. You can hike on jungle trails and swim in the sea by secluded beaches. Tonight, have a traditional welcome as a jungle feast is served in the Iban longhouse in the Sarawak Cultural Village.

August 27 Depart for the Sememgok Orang Utan Center, where a walk through the rain forest brings us face-to-face with the "wild men of Borneo." This center was established with the purpose of re-introducing the captive orang utan to the wild. Return to Kuching for lunch with a local art collector. After lunch, have a city tour of Kuching, including the famous Sarawak

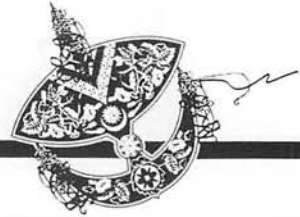
Museum. You'll have time for shopping in Kuching, one of Asia's most charming cities, with its riverwalk and wonderful handicraft shops, before our return to Damai. Dinner will be served at the hotel.



Deer Cave

August 28 Depart by flight from Kuching to Mulu via Miri and transfer to the Royal Mulu Resort and the Mulu National Park, home of the world's eighth wonder and oldest tropical rain forest. Hike to Lang's Cave, with its beautiful stalactites, stalagmites, and cave curtains. Behold the Deer Cave, the world's largest cave passage, which could hold London's St. Paul's Cathedral five times over. At the end of the Deer Cave is the Garden of Eden, open to the sky but completely encircled by the limestone massif. See the uncanny profile of Abraham Lincoln as you exit the cave. Weather permitting, wait for the bat exodus from the entrance

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Wind Cave

of the cave and return by torch light to the resort, where dinner is served.

- August 29** Visit the Clearwater Cave, holding Southeast Asia's longest cave system and the superb, aptly named Wind Cave. Today involves a degree of walking and stair climbing. Lunch will be served en route. Visit the Batu Bungan longhouse settlement before returning to the resort for dinner.
- August 30** Depart for the airport for the flight from Mulu to Kuala Lumpur via Miri. Upon arrival, transfer to the Hyatt Saujana for an overnight stay.
- August 31** Transfer to the airport for your international flight home.

Post-Conference Tour #2. Penang, "The Pearl of the Orient"

- Date:** Thursday, August 25 through Sunday, August 28
Fee: US\$425 per person, based on double occupancy (includes breakfast and dinner daily [MAP]; does not include airfare — flight segments described below need to be included in your international itinerary)
- August 25** Transfer from your hotel to the airport for the flight to the island of Penang. Upon arrival, transfer to the elegant Mutiara Beach Resort, a five-star hotel located in the resort area of Malaysia, Penang. The rest of the day is at your leisure to relax by the beach or to try bargaining at bazaars for a wide array of local crafts. Dinner is served at The Catch Seafood Restaurant, a unique and exciting restaurant at the resort.
- August 26** After breakfast, we'll have a city tour, where you'll have the chance to see such places of interest as the Esplanade, where Fort

Cornwallis stands, the Khoo Clan Ancestral house, the Penang State Museum, a Thai Buddhist Temple (Wat Chayamangkalaram), and the Botanical Garden. Penang is a quaint city, full of colonial British charm and history as well as natural beauty.

- August 27** Today is a day of leisure to enjoy as you wish, and your trip director will be on hand to assist you in planning your day. Relax at the resort, play golf on one of Penang's two golf courses, or shop for that irresistible souvenir. Tonight, we'll transfer to the colonial hotel of Penang Island, the Eastern & Oriental, for a delightful western dinner at the Victorian 1885 Grill.
- August 28** After breakfast, you'll have time at your leisure before the flight to Kuala Lumpur and your international flight home.

Post-Conference Tour #3. Exotic Thailand

- Date:** Thursday, August 25 through Thursday, September 1
Fee: US\$835 per person, based on double occupancy (includes breakfast daily, some meals, and the flight from Bangkok to Phuket; does not include Kuala Lumpur/Bangkok and Phuket/Kuala Lumpur flights, which need to be included in your international itinerary)
- August 25** Fly from Kuala Lumpur to Bangkok and transfer to the elegant Shangri La Hotel. Tonight, dinner will be held at Furama, a delightful local restaurant.
- August 26** After breakfast, depart for the Chao Phaya River and its tributaries to see the famous floating market, which bustles with activity. After lunch, proceed on a city tour of Bangkok, visiting the Grand Palace and other places of interest. Later, have dinner at the hotel.
- August 27** Have the morning at your leisure before our flight to the beautiful and internationally renowned island of Phuket. You'll stay at the exquisite Meridien Hotel and later dine at the Tunga Restaurant.
- August 28** Following breakfast, we'll have a full-day Pee Pee Island tour by King Cruiser, including a buffet lunch and dinner at Baitong.
- August 29** Enjoy a full day at your leisure.
- August 30** Enjoy a full day at your leisure.
- August 31** Transfer to the airport for the flight to Kuala Lumpur and an overnight stay at the Hyatt Saujana.
- September 1** Transfer to the airport for your international flight home.



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Hotel Information

IMPORTANT! Hotel reservation deadline: July 1!

AAPG HAS SECURED special conference rates at several hotels in Kuala Lumpur. To obtain these special rates, you must make your reservations through AAPG. Hotels are rated five- and four-star.

Each hotel requires one night's room deposit for each room booked. You may guarantee your room with a credit card or by check when paying for your

registration and other fees. If you are using a credit card, mark the appropriate box on your registration/reservation form and be sure to provide your credit card information. Your deposit will be sent to the hotel with your reservation. If you are paying by check, you must include your hotel deposit in the amount you send to AAPG. Your room deposit will be credited to your hotel bill upon checkout.

Hotels will be filled on a first-come, first-served basis. If the hotel of your choice is not available, AAPG will place you in a hotel with a rate closest to the one you requested.

Hotel prices are guaranteed in Malaysian Ringgit — room deposits are to be paid in U.S. Dollars (*approximate rate of exchange: US\$1.00=RM2.5*).

#1: Hotel Istana (Headquarters Hotel) ★★★★★



This elegant, world-class hotel is located in the heart of the banking, shopping, and commercial district. Rooms are air-conditioned and come with a minibar, TV/in-house movies, radio, IDD telephone, coffee/tea making facilities, personal safe, hairdryer, and bathrobes. Non-smoking rooms are available. The Hotel Istana also features extraordinary restaurants featuring international cuisine, as well as a pool, health center, gym,

sauna, tennis, squash, business center, 24-hour brasserie/room service, safe deposit boxes, parking, shops, and a barber/beauty salon. Please allow 30–45 minutes by taxi to the Putra World Trade Centre, depending upon the time of day.

#2: Concorde Hotel ★★★★★



Located a short distance from the Hotel Istana, the Concorde Hotel features rooms with a minibar, refrigerator, TV/in-house movies, radio, IDD telephone, and coffee/tea making facilities. The hotel has a pool, gym, business center, 24-hour café/room service, safe deposit boxes, parking, shops, and a barber/beauty salon. It is near shopping and entertainment facilities. Please allow 20–40 minutes by taxi to the Putra World Trade Centre, depending upon the time of day.

#3: Pan Pacific Hotel ★★★★★



This modern hotel is connected to the Putra World Trade Centre and is opposite one of the largest shopping malls in Southeast Asia. Rooms include a minibar, TV/in-house movies, radio, IDD telephone, hairdryer, and bathrobes. Non-smoking rooms are available. The hotel features a pool, health center, gym, sauna, tennis, squash, business center, 24-hour coffee house/room service, safe deposit boxes, shops, and a beauty salon.

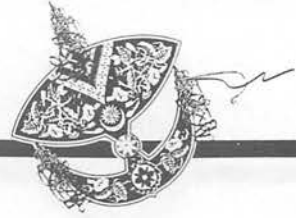
#4: The Legend Hotel ★★★★★



The Legend Hotel is located across the street from the Putra World Trade Centre and right above The Mall, which offers the best in shopping, entertainment, and dining. Rooms are air conditioned and include a minibar, refrigerator, TV/in-house

movies, stereo, piped music, IDD telephone, coffee/tea making facilities, and hairdryers. Other features include interconnecting rooms, 24-hour room service, pool, sauna, gym, squash, business center, airport representative service, babysitting, laundry and valet service, florist, prayer room/prayer mat, parking, shoeshine service, travel agent service, and a 24-hour on-call doctor. You can choose from several restaurants, including Chinese, Japanese, health food, a coffee shop, and a tea lounge.

Kuala Lumpur Malaysia



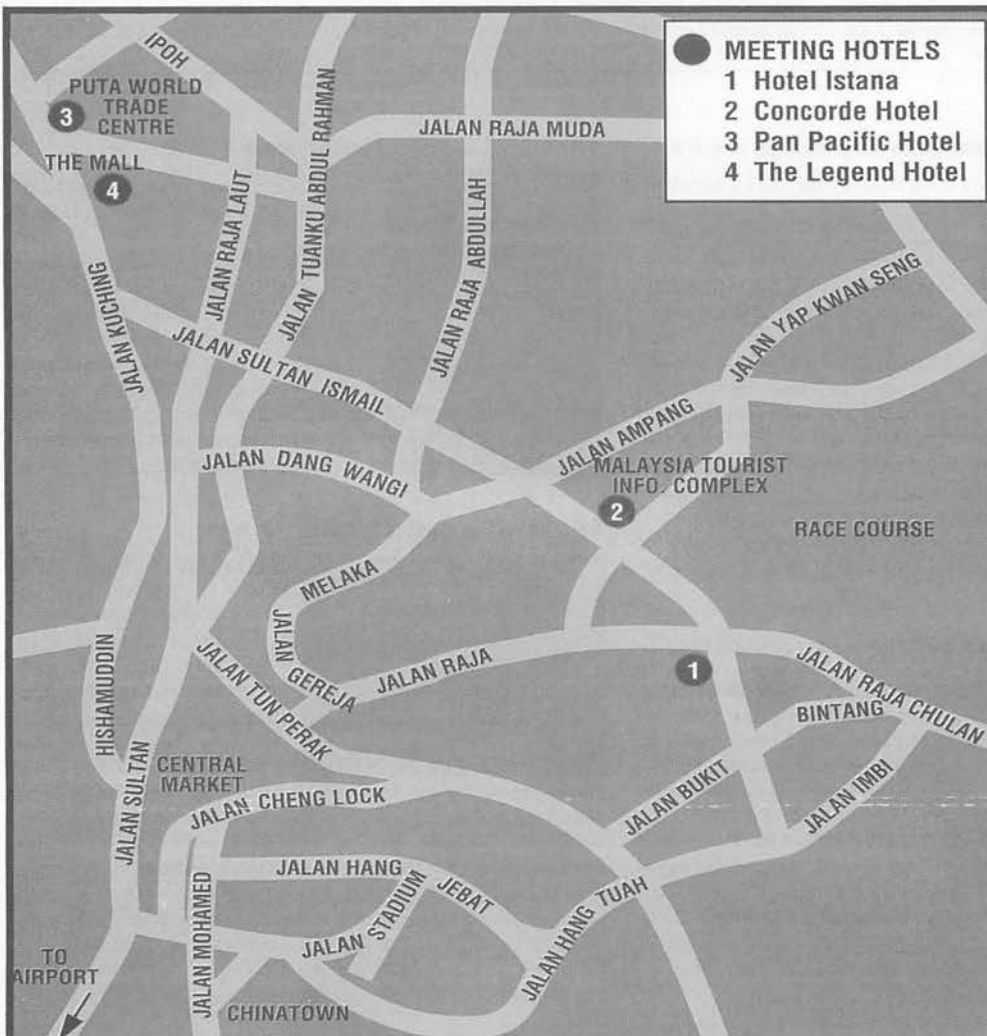
AAPG Hotel Rates

Hotel reservation deadline: July 1!

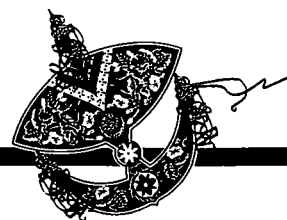
Hotel	Map #	Single-RM	Double/Twin-RM	1 Night's Deposit (US\$1.00=RM2.50)
Hotel Istana (AAPG Headquarters)	1	RM299	RM322	US\$150*
Concorde Hotel	2	Deluxe	RM225	US\$105*
		Deluxe/Premier	RM242	US\$115*
Pan Pacific Hotel	3	RM322	RM368	US\$175*
The Legend Hotel	4	RM230	RM230	US\$110*

Above rates are subject to a 10 percent service charge plus a 5 percent government tax.

* Deposit includes service charge and government tax.



*Kuala Lumpur
Malaysia*



Registration Information

PREREGISTRATION DEADLINE: July 15, 1994



Fastest Way to Register:

By Fax — 1-918-584-2274

Credit card use ONLY. Fax the registration form found in the back of this announcement directly to the AAPG convention department. Our fax line is open 24 hours. DO NOT SEND ANOTHER COPY BY MAIL.



Other Ways to Register:

By Phone — 1-918-584-2555

AAPG members using credit cards ONLY. Have your member number and complete information handy. DO NOT SEND ANOTHER COPY BY MAIL.



By Mail —

Mail the registration form found in the back of this announcement to either of the following addresses:

AAPG International Conference
P.O. Box 979

Tulsa, OK 74101-0979 USA

OR

AAPG International Conference

1444 S. Boulder

Tulsa, OK 74119-3604 USA

All fees, including conference registration, field trips, short courses, and optional tours, are quoted and guaranteed in U.S. Dollars. The exchange rate at the time of this printing (December 1993) was US\$1.00=RM2.5.

Payment must be made in full! Registrants will not be placed on a field trip, in a short course or tour, nor will hotel reservation be made, without full payment by personal check or credit card.

Please register one professional per form. If your spouse or a guest is attending, be sure to fill in his or her full name for the computerized badge. *Professional attendees may not register as spouses or guests.*

Refund Procedures

All changes and cancellations for registrations or events must be received in writing at AAPG by July 15. All total cancellations will be assessed a US\$25 cancellation fee. Refunds will be made until July 15. After that date, no refunds will be issued.

Hotel cancellations can be made without penalty until July 1. If you cancel after July 1, you will lose your one night's room deposit.

Registration Fees

	Advance	On Site
Member AAPG/GSM*	US\$390	US\$440
Non-Member*	US\$440	US\$490
Student**	US\$20	US\$20
Spouse/Guest***	US\$80	US\$80
One-Day Fee****	N/A	US\$160

* Includes Icebreaker, three buffet luncheons, and a formal dinner/cultural show

** Includes Icebreaker and three buffet luncheons

*** Includes Icebreaker and a formal dinner/cultural show

**** Can only register on the day you attend; includes buffet luncheon

Registration Hours

Level 2

Putra World Trade Centre

Saturday, August 20 08:00-17:00

Sunday, August 21 08:00-20:00

Monday, August 22 08:00-18:00

Tuesday, August 23 08:00-18:00

Wednesday, August 24 08:00-14:30

Important Deadlines to Remember

July 1	Hotel reservation deadline
July 15	Preregistration deadline

Attend the Conference While Making Your Application to Join AAPG!

Individuals who have a membership application in process at AAPG may register at the member rate. Non-member professional registrants who submit an application before September 30, 1994, will have their membership dues prepaid from the difference in registration fees.

For membership information, contact: AAPG Membership Department, P.O. Box 979, Tulsa, OK 74101-0979, (918) 584-2555, fax (918) 584-0469.



Registration Form—1994 AAPG International Conference

DEADLINE: JULY 15, 1994
Fax: 1-918-584-2274

MAIL TO: AAPG Convention Department
P.O. Box 979, Tulsa, OK 74101-0979 USA

AAPG Member Number _____

Member of: GSM SEPM SEG
 Male Female

Name (Family Name, Given Names) _____

Nickname for Badge (If Desired) _____

Is This: Company Address? Home Address?

Company (Name for Badge) _____

Mailing Address _____

City _____

State/Country _____

ZIP/Postal Code _____

Telex Number _____

Day Phone Number (include area/country code) _____

Fax Number (IMPORTANT!) _____

Please check position: 01/Owner/Partner/Officer 02/Manager 03/Chief/Senior Geologist
 04/Geophysicist 05/Geologist 06/Paleontologist/Biostratigrapher 07/Professor
 08/Independent/Consultant 09/Student 10/Other 12/Retired 13/Press

Category Number Fee per Person Total Cost

100 US\$390 _____

AAPG/GSM Member Registration

100 US\$440 _____

Non-Member Registration

200 US\$80 _____

Spouse/Guest Registration

Full Name for Badge _____

(CANNOT be Professional Attendee!)

100 US\$20 _____

Student Registration

105 FREE N/A

Malaysian Dinner and Cultural Evening

No. of Category Fee per Total
Tickets Number Person Cost

_____ 201 US\$10 _____

Optional Sightseeing Tours

Kuala Lumpur City Tour, Daily

_____ 202 US\$10 _____

Batu Caves, Daily

_____ 203 US\$32 _____

Pulau Ketam Rural Adventure, Daily

_____ 204 US\$30 _____

Frasers Hill, Daily

_____ 205 US\$30 _____

Malacca Tour, Daily

_____ 206 US\$25 _____

Genting Highlands, Daily

_____ 207 US\$28 _____

KL by Night, Tuesday

No. of Category
Tickets Number

Fee per
Person

Total
Cost

Short Courses/Forum

_____ 600

US\$450

Course #1, August 20-21

_____ 601

US\$450

Course #2, August 25-26

_____ 602

US\$895

Forum, August 18-19

Field Trips

_____ 603

US\$700

Trip #1, August 17-21

_____ 604

US\$50

Trip #2, August 21

_____ 605

US\$550

Trip #3, August 24-28

_____ 606

US\$650

Trip #4, August 25-29

Indicate
2nd Choice
Trip #: _____

No. of
Rooms

Deposit
Amount

Total

Hotel Deposit (if paying by other than credit card)

TOTAL AMOUNT DUE US\$ _____

PAYMENT INFORMATION (Make check payable to: AAPG 1994 International Conference)

Personal Check Enclosed
 MasterCard VISA American Express

Card Account Number _____

Card Expiration Date _____

Printed Name of Card Holder _____

Authorized Signature _____

IMPORTANT: HOTEL RESERVATION DEADLINE JULY 1!
NO REFUNDS WILL BE ISSUED AFTER JULY 1!
HOTEL DEPOSITS NONREFUNDABLE AFTER JULY 1!
PLEASE BE SURE TO INCLUDE YOUR FAX NUMBER!

Hotel Reservation NOTE: Suites available only upon request. Prices will be quoted upon request.

Do you want us to guarantee your hotel reservation with the above credit card information Yes No

Indicate hotel preference by map number: 1. _____ 2. _____ 3. _____

Please check one:

Single (1 bed, 1 person)

Rate Requested _____ Arrival Date _____

Double (1 bed, 2 people)

No. in Party _____ Departure Date _____

Twin (2 beds, 2 people)

Shared Occupancy with _____



Special needs: _____

Would you consider being a judge?

Yes No

Oral Session Poster Session

KEAHLIAN (Membership)

The following applications for membership were approved:

Full Members

- | | |
|---|--|
| 1. Keith Richards, Brig-Y-Don
43 Ty Mawr Road, Deganwy, Gwynedd,
United Kingdom LL31 9UD. | 7. Yogeswaran Mailuaganam
512 Taman Hui Sing, Kuching, Sarawak. |
| 2. Wolfgang S. Fletcher
3 Stewart Place, Panddington, New South
Wales, Australia 2021. | 8. Shaharin Ibrahim
Jabatan Fizik, Universiti Pertanian
Malaysia, Serdang, 43400 Selangor. |
| 3. Robert John Esmor Jones
Korsveien 14, 1320 Stabekk, Norway. | 9. Nurzaidi Abdullah
No. 12 Jalan Geale, 18000 Kuala Krai. |
| 4. John AK. Temaga
Lot 487, S/L 1040, Lutong Baru, 98100
Miri. | 10. D. Jeffrey Over
Dept. of Geological Sciences, SUNY -
Geneseo, Geneseo, New York 14454. |
| 5. Mansor Ahmad
34-1 Jalan 5/5, Taman Melati, 53000 Kuala
Lumpur. | 11. Haron Abdul Ghani
Sek. Men. Alor Biak, 06150 Ayer Hitam,
Alor Setar. |
| 6. Malcolm P.R. Light
7 Beechwood Way, Aston Clinton
Aylesbury, Buckinghamshire HP22 5 JW,
United Kingdom. | 12. Dominic Yap Kam Fai
7 Jalan Koop Cuepeps 2E, Taman Cuepeps,
Jalan Cheras, Bt. 9, 43200 Selangor. |
| | 13. Wong Chun Ken
P.O. Box 13828, 88844 Kota Kinabalu. |

Student Members

1. Senusi Mohamèd Harsha
Jabatan Geologi, Universiti Kebangsaan
Malaysia, Bangi.
2. Abdurrazagh Ezzeddin
Jabatan Geologi, Universiti Kebangsaan
Malaysia, Bangi.

PETUKARAN ALAMAT (Change of Address)

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

- | | |
|--|--|
| 1. Kamarudin Zakaria
Geological Survey Malaysia, P.O. Box
11110, 50736 Kuala Lumpur. | 4. Azuhan Mohamed
School of Civil Engineering, University of
Birmingham, Edgborton, Birmingham B15
2TT England. |
| 2. Kong Ing Chung
No. 23-24, Lor 8635-36 (3rd Floor), Section
64, Jalan Simpang Tiga, 93300 Kuching. | 5. C.K. Burton
Jl. Kebarusan Dalam 52, RT 07 RW 04,
Pasar Minggu, Jakarta 12520 Indonesia. |
| 3. Abd. Hanan B. Ahmad Nadzeri
7 Jalan 10C/6, Taman Setapak Indah,
53100 Kuala Lumpur. | |

GSM

PERTAMBAHAN BAHARU PERPUSTAKAAN (New Library Additions)

The Society has received the following publications:

- | | |
|---|---|
| 1. AAPG Explorer, Dec 1993 and Jan & Feb 1994. | 12. Palaeontological Abstracts, vol. 8, no. 3, 1993. |
| 2. Central Geological Survey, special pub. no. 7, 1993. | 13. Bulletin de la Societe belge de la Geologie vol. 101, nos. 1 & 2, 1992. |
| 3. Commonwealth Science Council, May-June and July-Aug 1993. | 14. Earthquakes & volcanoes, vol. 23, no. 6, 1992. |
| 4. Chronique de la Recherche Miniere, no. 512, 1993. | 15. Annual Report, Chinese Academy of geological Sciences, 1991. |
| 5. AAPG Bulletin, vol. 77, 11 & 12, 1993. | 16. Journal of Hobei: College of Geology, vol. 15, no. 6, 1992 & vol. 16, no. 1, 1993. |
| 6. American Museum Novitates, no. 3076, 1993. | 17. Association of geoscientists for International Development, membership directory, 1994. |
| 7. Geological map of Indonesia: West, Central and East Kalimantan. | 18. Geological Service of Belgium memoir, no. 36, 1993 |
| 8. Geological Research & Development Centre, no. 15, 1992, no. 16, 1993. | 19. Bull. Centres Rech. Explor.-Prod. elf aquitaine, vol. 17, no. 2, 1993. |
| 9. Geosurvey Newsletter: 1991: 246, 249; 1992: 251, 252, 254, 255, 256, 257, 258, 259, 261, 262; 1993: 263, 264, 265, 266, 267, 268, 269. | 20. American Museum Novitates, no. 3069, 1993. |
| 10. Acta Palaeontologica Sinica, vol. 32, no. 3-5, 1993. | 21. Bulletin of the National Science Museum, vol. 19, no. 4, 1993. |
| 11. Acta Micropalaeontologica Sinica, vol. 10, no. 1 & 2, 1993. | 21. U.S.G.S. Prof. Papers: 1993: 1536. |

GSM

BERITA-BERITA LAIN Other News

12th Australian Geological Convention

26-30 September, 1994
The University of Western Australia

OUTLINE OF PROGRAMME

MONDAY 26 SEPTEMBER

SYMPOSIUM: "PROTEROZOIC OF AUSTRALIA"

Crustal evolution
Assembly of Proto-Gondwana
Mineral and hydrocarbon deposits
Stratigraphy and sedimentology
Tectonics and metamorphism

AUSTRALIAN SEDIMENTOLOGY, PALAEOLOGY AND STRATIGRAPHY

Lakes, evaporites and associated facies
Environments, biodiversity and mineral
deposits of Devonian Reefs
Australian continental margin
sedimentology

TUESDAY 27 SEPTEMBER

SYMPOSIUM: "THE WISDOM OF SOLOMON - THE CONJUNCTION OF FACTORS THAT RESULT IN LARGE OREBODIES"

HYDROLOGY AND ENVIRONMENTAL GEOLOGY

Geoscience and environment
Palaeomagnetism, and global and
environmental change
Environmental geology and
rehabilitation in arid and tropical
terrains
Hydrology and economic development
in Australia and SE Asia

GEOCHRONOLOGY, STRATIGRAPHY AND PALAEOLOGY OF AUSTRALIA

Archaean to Recent stromatolites
Origins and extinctions
Tertiary biogeography
Geochronology and isotopic analysis
Geochronological constraints on
structural and tectonic events

WEDNESDAY 28 SEPTEMBER

AUSTRALIA'S GEOLOGICAL RELATIONS WITH ITS NEIGHBOURS

Accretion and breakup of Gondwana
Geology of areas adjacent to Australia
The Archaean of the Kaapvaal and
Pilbara cratons

MINERAL & FOSSIL FUEL RESOURCES OF WA

Western Australian mining in a world
context
Northwest Shelf resources and future
prospects
Mineral resources and future prospects
of WA

NEW DEVELOPMENTS IN DIGITAL TECHNIQUES: SIMULATION, INVERSION AND DESCRIPTION

3D computer modelling in mining
environments
Geophysical modelling of geology
Data capture, storage and manipulation

THURSDAY 29 SEPTEMBER

*CONTROLS ON ROCKS AND FLUIDS IN
SEDIMENTARY BASINS*

Pressure, temperature and fluid flow in
basins

Eustacy, cycles and sequences

Pre-Cambrian sequence stratigraphy

Palaeoclimates and basin evolution

SYMPOSIUM: "THE NICK ROCK SYMPOSIUM"

Alkaline rocks and associated
mineralisation

*POLICY ASPECTS OF AUSTRALIAN
GEOSCIENCE*

Geoscience education

Government and political aspects of
exploration

*METAMORPHIC AND IGNEOUS GEOLOGY
IN AUSTRALIA*

Metamorphic fluids and mineral deposits

Fluid-rock interactions during
metamorphism

Archaean-Palaeozoic and circum-Pacific
andesites

FRIDAY 30 SEPTEMBER

*FRACTALS, CHAOS AND GEOLOGICAL
PREDICTION*

Fractal geometry of geology

Fractal techniques in exploration,
mining and resource extraction

Cyclicity in global geology

Geological prediction

*AUSTRALIAN STRUCTURAL AND CRUSTAL
STUDIES*

Structure and evolution of Australian
basins and terranes

Crustal-scale structure

Earthquakes and earthquake risk

Influence of the mantle on intraplate
crust

*MINERAL AND HYDROCARBON
EXPLORATION IN AUSTRALIA*

Regolith and exploration for concealed
orebodies

Integrated geological-geophysical-
remote sensing studies

Mineral economics and resource
evaluation

Circulars and information:

The Secretary, 12th AGC, PO Box 119,
Cannington WA 6107, Australia

Telephone: 61-09-351 7968

Facsimile: 61-09-351 3153

KALENDAR (CALENDAR)

1994

→→→ April 1994←←←

April 3-8

PALEONTOLOGY AND BIOSTRATIGRAPHY (6th Congress), Trelew, Chubut, Patagonia, Argentina. (Dr. N.R. Cúneo, Museo Paleontológico Egidio Feruglio, Av. 9 de Julio 955, Trelew, Chubut, Argentina. Phone: (0965) 35464; telefax: (0985) 32658)

April 10-13

TOXIC SUBSTANCES AND THE HYDROLOGIC SCIENCES (Meeting), Austin, Texas. (American Institute of Hydrology, 3416 University Avenue, SE, Minneapolis, MN 55414-3326, USA. Phone: (612) 379-1030; telefax: (612) 379-0169)

April 12-15

GEOLOGY IN EUROPE AND BEYOND II, United Kingdom (P.R. Simpson at BGS Keyworth, Nottingham, United Kingdom. Phone: +44 602 363532, Fax: +44 602 363200.

April 17-20

EXTRACTIVE-INDUSTRY GEOLOGY, mtg., Sheffield, England. (Institution of Mining and Metallurgy, 44 Portland Place, London, W1N 4BR. Phone: +44 71 580 3802. Fax: +44 71 436 5388)

April 21-26

EFFECTS OF TRIPLE JUNCTION INTERACTIONS AT CONVERGENT PLATE MARGINS (GSA Penrose Conference), Eureka, California, USA. (Ms. Lois J. Elms, Penrose Conference Coordinator for GSA, 4881 Evening Sun Lane, Colorado Springs, CO 80917, USA. Phone: (719) 597-9201; telefax: (719) 591-4852)

April 24-25

LAND RECLAMATION AND MINE DRAINAGE/ABATEMENT OF ACIDIC DRAINAGE, ann. mtg., Pittsburgh. (Debbie Lowanse, U.S. Bureau of Mines, Box 18070, Pittsburgh, 15236. Phone: 412/892-6708. Fax: 412/892-4067)

April 24-27

NEAR-SURFACE EXPRESSIONS OF HYDROCARBON MIGRATION: AN AAPG HEDBERG RESEARCH CONFERENCE, Vancouver, British Columbia. (American Association of Petroleum Geologists, Box 979, Continuing Education Department Tulsa, Okla. Phone: 918/584-2555. Fax: 918/584-0469)

April 24-28

EDITING, ETHICS, ELECTRONICS AND ECONOMICS (5th General Assembly and Conference), Budapest, Hungary. (EASE Secretariat, 49 Rosendale Way, London NW1 OXB, UK. Phone: 44(0)71-388 9668; telefax: 383 3092)

April 24-May 14

XV CONGRESS OF THE COUNCIL OF MINING AND METALLURGICAL INSTITUTIONS, South Africa. (Bill Emmett Congress Manager 15th CMMI Congress, P.O. Box 809 Johannesburg 2000 South Africa. Phone: (27)(11) 838-8211 (office), (27)(11) 788-2518 (home). Fax: (27)(11) 834-1884)

April 25-30

OBSERVATION OF THE CONTINENTAL CRUST THROUGH DRILLING (7th International Symposium), Santa Fe, New Mexico, USA. (Earl Hoskins, DOSECC, College of Geosciences and Maritime Studies, Texas A&M University, College Station, TX 77843-3148, USA. Phone: (409) 845-3651; telefax: (409) 845-0056; E-mail: HOSKINS @ PLUTO.TAMU.EDU)

→→→ May 1994←←←

May 3-5

INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN MATERIALS AND MINERAL RESOURCES (RAMM '94), Penang, Malaysia (The Secretariat of the International Conference on Recent Advances in Materials and Mineral Resources (RAMM '94), School of Materials and Mineral Resources Engineering, Universiti Sains Malaysia, Perak Branch Campus, 31750 Tronoh, Perak, Malaysia. Attn: Dr. Zainal Arifin Ahmad)

May 9-12

GEOLOGIC REMOTE SENSING, mtg., San Antonio, Texas. (Environmental Research Institute of Michigan, Box 134001, Ann Arbor, 48113-4001. Phone: 313/994-1200 ext. 3234. Fax: 313/994-5123)

May 10-14

MININGLATINAMERICA (Meeting), Santiago de Chile. (IMM, 44 Portland Place, London W1N 4BR, UK. Phone: 44 71 580 3802; telefax: 44 71 436 5388)

May 15-18

GEOLOGICAL ASSOCIATION OF CANADA / MINERALOGICAL ASSOCIATION OF CANADA (Joint Annual Meeting). Waterloo, Ontario, Canada. (Alan V. Margin, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario N2L 3GL, Canada. Phone: (519) 885-1211, ext. 3231; telefax: (519) 746-7484)

May 16-18

GEOLOGICAL ASSOCIATION OF CANADA / MINERALOGICAL ASSOCIATION OF CANADA, ann. mtg., Waterloo, Ontario. (Alan V. Morgan, Dept. of Earth Sciences, University of Waterloo, Waterloo, Ontario, N2L 3G1. Phone: 519/885-1211, ext. 3231. Fax: 519/746-7484)

May 29-June 1

GLACIAL CYCLES AT HIGH LATITUDES - THEIR EFFECTS ON THE PHYSICAL ENVIRONMENT (International Symposium). Fjaerland, Norway. (Dr. Anders Elvetei. Project Administrator, Department of Geology, P.O. Box 1047 Blindern, 0316 Oslo, Norway. Phone: 47-22-85 66 56; telefax: 47-22-85 42 15)

May 23-28

INTERNATIONAL ASSOCIATION OF COMPUTER METHODS AND ADVANCES IN GEOMECHANICS, mtg., Morgantown, W. Va. (Society of Petroleum Engineers, Box 833836, Richardson, Texas 75083-3836. Phone: 214/952-9435)

May 28-June 1

SILICICLASTIC-CARBONATE FACIES, mtg., Veracruz, Mexico, by Society for Sedimentary Geology. (Julie Ball, SEPM, Box 4756, Tulsa, Okla, 74159-0756. Phone: 918/743-9765. Fax: 918/743-2498)

→→→ June 1994←←←**June 5-11**

GEOCHRONOLOGY, COSMOCHRONOLOGY AND ISOTOPE GEOLOGY (ICOG-8) (Meeting), Berkeley, California, USA. (Garniss H. Curtis, Institute of Human Origins - Geochronology Center, 2453 Ridge Road, Berkeley, CA 94709, USA. Phone: (415) 845-4003; telefax: (415) 845-9453)

June 6-7

WEDDELL SEA TECTONICS AND GONDWANA BREAKUP (Meeting), Cambridge, UK. (Dr. Edward King, Weddell Sea Meeting, British Antarctic Survey. High Cross, Madingley Road, Cambridge, CB3 0ET, UK. Phone: (0223) 62616; telex: 817725 BASCAMG)

June 6-10 (Correction)

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (56th Annual Meeting and Technical Exhibition), Vienna, Austria. (Evert van der Gaag, Business Manager EAEG, P.O. Box 298, 3700 AG Zeist, The Netherlands. Phone: +31 (0)3404 56997; telefax: +31 (0)3404 62640)

June 12-15

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS and SEPM (Society for Sedimentary Geology) (Annual Meeting), Denver, Colorado, USA. (SEPM, P.O. Box 4756, Tulsa, OK 74159-0756, USA)

June 14-18

SECOND EUROPEAN METALS CONFERENCE FROM AGRICOLA TO THE PRESENT (EMC '94), Dresden and Freiberg. (The Institution of Mining and Metallurgy, Conference Office, 44 Portland Place, London W1N 4BR, England. Phone: 44 71 580 3802. Telex: 26 14 10 Fax: 44 71 436 5388.)

June 15-20

FRACTURED UNLITHIFIED AQUITARDS: ORIGINS AND TRANSPORT PROCESSES (GSA Penhose Conference). Racine, Wisconsin, USA. (Dr. John A. Cherry, Waterloo Centre for Groundwater Research, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada. Dr. David M. Mickelson, Department of Geology and Geophysics, University of Wisconsin, Madison,

Wisconsin 53706, USA. Telefax: Cherry (519) 746-5644; Mickelson (608) 262-0693)

June 16-19

DINOSAURS OF WYOMING, field mtg., Casper. (Walter R. Merschat, Box 356, Casper, 82602. Phone: 307/266-4409. Fax: 307/266-1113)

June 20-24

GEOSCIENCE INFORMATION (International Meeting), Prague, Czech Republic. (Jiri G. Hruska, Geofond of Czech Republic, Kosteini 26, 170 21 Praha 7-Letna. Phone: (0042) 2 379346; telefax: (0042) 2 370647)

→→→ July 1994←←←

July

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS (21st General Assembly), Boulder, Colorado, USA.

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 SW1X 8PS. Phone: 071 235 3681. Fax: 071 823 1698) [December '92]

July 4-8

HISTORY OF GEOLOGY IN THE PACIFIC REGION, int'l mtg., Sydney, Australia by International Commission on the History of the Geological Sciences. (INHIGEO, c/o Earth Resources Foundation, Dept. of Geology and Geophysics, University of Sydney, New South Wales, Australia 2006. Phone: (02) 552 6136. Fax: (02) 552 6058)

July 5-9

FORAMINIFERA (International Meeting), Berkeley, California, USA. (FORAMS '94, Museum of Paleontology, University of California, Berkeley, CA 94720, USA. Phone: (510) 642-1821; telefax: (510) 642-1822)

July 10-14

EARTHQUAKE ENGINEERING (5th National Conference), Chicago, Illinois, USA. (EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1902, USA. Phone: (510) 451-0905; telefax: (510) 451-5411)

July 10-14

CLASTIC DEPOSITS OF THE TRANSGRESSIVE SYSTEM TRACT, mtg., Long Beach, Wash., by Society for Sedimentary Geology. (SEPM, c/o Ed Clifton, Conoco, Box 2197, Houston, 77252. Phone: 713/293-2839)

July 10-15

ENVIRONMENTAL GEOTECHNICS (International Meeting), Edmonton, Alberta, Canada. (D.C. Sego, First International Congress on Environmental Geotechnics, Dept. of Civil Engineering, University of Alberta, Edmonton, Alberta T6G 2G7, Canada. Phone: (403) 492-7228; telefax: (403) 492-8198)

July 25-29

BASEMENT TECTONICS (11th International Meeting), Potsdam, Germany. (Prof. Dr. Onno Oncken, GeoForschung-Zentrum, Telegrafenberg, D-0-1561 Potsdam, Germany. Phone: 331-310306; telefax: 331-310601)

→→→ August 1994←←←

Aug 12-18

9TH IAGOD SYMPOSIUM OF THE INTERNATIONAL ASSOCIATION ON THE GENESIS OF ORE DEPOSITS (IAGOD 1994), Beijing, China. (Dr. Wang Zejiu, 9th IAGOD Symposium, Chinese Academy of Geological Sciences, 26 Baiwanzhuang Road, Beijing 100037, China)

August 14-19

PHYSICS AND CHEMISTRY OF THE UPPER MANTLE (International Symposium), São Paulo, Brazil. (Professor Wilson Teixeira, Instituto de Geociencias. Universidade de São Paulo, P.O. Box 20899, 01498-970 São Paulo, Brazil. Phone: 55-11-8138777 ext. 3987; telefax: 55-11-2104958; E-mail: BRENHA @-IAG.USP.BR)

August 20-26

SEDIMENTOLOGICAL CONGRESS (14th International), Recife, Brazil. (Margareth M. Alheiros, 14th ISC, Caixa Postal 7801, Cidade Universitaria, 50739-970 Recife (PE), Brazil)

August 21-24

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Conference and Exhibition), Kuala Lumpur, Malaysia. (AAPG Convention Department, P.O. Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555)

August 28-31

PERMIAN STRATIGRAPHY, ENVIRONMENTS AND RESOURCES (1st International Symposium), Guiyang, Guizhou, China. (Dr. Wang Xiang-dong, Secretariat of Organizing Committee for ISP-1994, Laboratory of Palaeobiology & Stratigraphy, Nanjing Institute of Geology & Palaeontology, Chi-Ming-Ssu, Nanjing, 21008 China. Phone: 86-25-714443; telefax: 86-25-712207)

August 29-September 1

PROTEROZOIC CRUSTAL & METALLOGENIC EVOLUTION (International Conference), Windhoek, Namibia. (Dr. G.I.C. Schneider, Geological Society of Namibia, P.O. Box 699, Windhoek, Namibia. Phone: 264-61-37240; telefax: 264-61-228324)

→→→ **September 1994** ←←←

September 4-9 (Correction)

INTERNATIONAL MINERALOGICAL ASSOCIATION (16th General Meeting), Pisa, Italy. (Professor Stefano Merlino, Dipartimento di Scienze della Terra, Via S. Maria 53, 56100 Pisa, Italy. Telefax: 395040976; E-MAIL: IMA94@VM.CNUCE-CNR.IT)

September 5-9

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY (7th Congress), Lisbon, Portugal. (Organizing Committee, 7th IAEG Congress, c/o LNEC, Av. do Brasil, 101, 1799 Lisboa Codex, Portugal. Phone: 351-1-8473822; telefax: 351-1-8497660; telex: 16760 LNEC P)

September 5-9

ARCTIC MARGINS (International Meeting) Magadan, Russia. (Kirill V. Simakov, North East Scientific Centre, 16 Portovaga St., Magadan, Russia, 685000. Phone: (907) 474-7219, in the USA; (7-41) 3 233-0953 in Russia)

September 12-16

INTERNATIONAL VOLCANOLOGICAL CONGRESS (International Congress). Ankara, Turkey. Sponsored by the International Association of Volcanology and Chemistry of the Earth's Interior. (Dr. Ayla Tankut, Organizing Secretary, Int. Volcanological Congress, Dept. Geological Engineering, Middle East Technical University, 06531 Ankara,

Turkey. Phone: 90-4-210-1000, ext. 2682 or 2679; telefax: 90-4-210-1263.

September 19-24

EUROPEAN PALAEOBOTANICAL-PALYNOLOGICAL CONGRESS (4th), Heerlen, The Netherlands. (Dr. G.F.W. Herngreen, General-Secretary, c/o Geological Survey, P.O. Box 157, 2000 AD, Haarlem)

September 26-29

LITTORAL 94 (2nd International Symposium), Lisbon Portugal. (Associacao EUROCOAST-PORTUGAL, a/c do Instituto de Hidráulica e Recursos Hidricos, Faculdade de Engenharia, Universidade do Porto, Rua dos Bragas, 4099 Porto Codex Portugal. Telefax: 351-2-310870, 351-2-318787, 351-2-319280)

→→→ **October 1994** ←←←

October 4-7

BASIN FORMATION AND INVERSION IN EUROPE-ENDOGENOUS AND EXOGENOUS ASPECTS (Annual Meeting of German Geological Society), Heidelberg, Germany. (Professor Th. Bechstädt and Professor R.O. Greiling, Geologisch-Palaeontologisches Institut, Ruprecht-Karls-Universität, Im Neuenheimer Feld 234, D-6900 Heidelberg, Germany. Phone: (06221) 562831; telefax: (06221) 565503; telex: 461515 unihd)

October 15-26

JURASSIC STRATIGRAPHY (4th International Congress), Mendoza-Neuquen, Argentina. (Dr. A.C. Riccardi, C.C. 886, 1900 La Plata, Argentina. Phone: 54-21-39125; telefax: 54-21-530189)

October 23-27

SOCIETY OF EXPLORATION GEOPHYSICISTS (64th Annual Meeting). Los Angeles, California, USA. (Convention Assistant, Society of Exploration Geophysicists, P.O. Box 3098, Tulsa, OK 74101, USA)

October 24-27

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Seattle, Washington, USA. (Jean Kinney, GSA Headquarters, P.O. Box 9140, 3300 Penrose Place, Boulder, CO 80301, USA. Phone: (303) 447-2020)

1995

February 20-25

SOUTH ASIA GEOLOGICAL CONGRESS, COLOMBO, SRI LANKA. (N.P. Wijayananda, GEOSASS II Secretariat, NARA, Crow Island, Mattakkuliya, Colombo 15, Sri Lanka. Phone: 941 555008. Fax: 941 522932)

March 5-8

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

March 6-9

SOCIETY FOR MINING, METALLURGY, AND ENGINEERING, ann. mtg., Denver. (SME, Box 625002, Littleton, Colo. 80162-5002. Phone: 303/973-9550. Fax: 303/979-3461)

April 10-13

GEOLOGY AND ORE DEPOSITS OF THE AMERICAN CORDILLERA, mtg., Reno/sparks, Nev. (Bob Hatch, Geological Society of Nevada, Box 12021, Reno, 89510. Phone: 702/323-4569. Fax: 702/323-3599)

May 15-19

EXPLORING THE TROPICS, int'l mtg., Townsville, Queensland, Australia. (Russell Myers, 171GES, National Key Centre in Economic Geology, James Cook University, Townsville, 04814. Phone: 077-814486. Fax: 61-77-815522)

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)

June 11-16

AMERICAN NUCLEAR SOCIETY, ann. mtg., Atlantic City, N.J. (ANS, 555 N. Kensington Ave., La Grange Park, III. 60525. Phone: 312/352-6611)

June 12-16

ORDOVICIAN SYSTEM, int'l. mtg., Las Vegas, Nev. (Margaret Rees, Dept. of Geosciences, University of Nevada, Las Vegas, 89154-4010. Phone: 702/739-3262. Fax: 702/597-4064)

June 18-22

RAPID EXCAVATION AND TUNNELING, mtg., San Francisco. (Society for Mining, Metallurgy, and Engineering, Box 625002, Littleton, Colo. 80162-5002. Phone: 303/973-9550. Fax: 303/979-3461)

July 2-14

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS, mtg., Boulder, Colo. (IUGG General Assembly, c/o American Geophysical Union, 2000 Florida Ave. N.W., Washington, D.C. 20009)

August 28-September 2

ORIGIN OF GRANITES, Hutton Symposium, College Park, Md. (Michael Brown, Dept. of Geology, University of Maryland, College Park, 20742. Phone: 301/405-4082. Fax: 301/314-9661)

October 10-14

PALEOCEANOGRAPHY, int'l mtg., Halifax, Nova Scotia. (Larry Mayer, Ocean Mapping Group, Dept. of Surveying and Engineering, Box 4400, Fredericton, New Brunswick, Canada E3B 5A3)

November 6-9

GEOLOGICAL SOCIETY OF AMERICA, ann. mtg., New Orleans. (Vanessa George, 3300 Penrose Place, Boulder, Colo, 80301. Phone: 303/447-2020. Fax: 303/447-1133)

1996

October 28-31

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