

## PERSATUAN GEOLOGI MALAYSIA

## WARTA GEOLOGI

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# CATATAN GEOLOGI (GEOLOGICAL NOTES)

## THORIANITE FROM BUKIT KELUANG AREA, RAUB, PAHANG

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### Abstract

*The occurrence of thorianite (ThO<sub>2</sub>) in heavy mineral concentrates from Bukit Keluang area, Raub, Pahang is reported. The localities, mode of occurrence, physical characteristics, associated minerals, results of X-ray diffraction studies and origin of the thorianite are discussed.*

### Introduction

Thorianite is a mineral containing essentially ThO<sub>2</sub>. However U<sup>4+</sup> substitutes for the Th to at least U : Th = 1:1.1, and the mineral is then referred to as uranoan or uranothorianite. The formula may then be written as (Th, U)O<sub>2</sub>. Dana (1952, p. 621) described the mineral as being usually dark grey to black with a horny to submetallic lustre. The mineral crystallises in the isometric system and in the detrital form usually occurs as cubic or pseudoorthorhombic water-worn grains.

It was first identified in Sri Lanka within pegmatites and in detrital placer deposits. In the latter occurrence it is present chiefly as water-worn crystals associated with zircon, ilmenite, geikielite and thorite. The mineral was later discovered in Madagascar (Lacroix, 1925) where it occurs with phlogopite, diopside and spinel in alluvial deposits. The first reported occurrence of thorianite in United States was at Easton, Pennsylvania (Wells, *et al.*, 1933). There it was found in serpentine at the contact of limestone with pegmatite. Thorianite has also been reported to occur in the black sands of a gold placer on the Boschogoch River, Transbaikalia, Siberia.

This paper reports the discovery of thorianite in the Raub area, Pahang, which is also believed to be the first authenticated occurrence of this mineral in West Malaysia.

### Locality and mode of occurrence

The area in which the thorianite occurs is located about 15 km west of Gumong Benom in the Raub district of Pahang, West Malaysia (see Figure 1). The mineral is present in panned concentrates taken along rivers draining the slopes of Bt. Keluang. After heavy liquid separation (using bromoform) followed by magnetic separation the mineral is found to be concentrated in the non-magnetic fraction.

### General geology of the area

The general geology of the area in which the thorianite occurs is shown in Figure 1. The area forms part of the Benom Igneous Complex (Jaafar Ahmad, 1979).

It is predominantly underlain by alkali gabbro (with minor pyroxenites) consisting generally of prismatic crystals of diopside, green

hornblende, plagioclase, biotite, quartz and orthoclase. Apatite, magnetite and pyrite are common accessories. Biotite plates have commonly been altered to granular ilmenite and sphene along the cleavage traces and rugged edges. Along zones of intense shearing the clinopyroxene has been converted to fibrous tremolite and magnetite is usually abundant.

A diorite and quartz diorite band, about 5 km wide and trending northeast is present on the northeastern side of Bt. Keluang. The rocks show both fluxion and gneissic textures. Apart from K-feldspar, plagioclase and quartz they tend to contain abundant hornblende and biotite which together may comprise up to 65%. Apatite, zircon, magnetite, pyrite and orangite have been found as accessories.

Quartz syenite is prominent in the areas northeast of Bt. Keluang. It consists mainly of orthoclase, plagioclase and pyroxene (usually rimmed by green hornblende). Quartz is interstitial. Apatite, pyrite, magnetite, zircon are present as accessories.

Bodies of orthoamphibolites occur within the gabbroic rocks and usually consist of hornblende, plagioclase (oligoclase or andesine), biotite, quartz, sphene and magnetite.

A small body of hornblende biotite granite is present about  $1\frac{1}{2}$  km north of Bt. Keluang.

#### Physical characteristics

The thorianite occurs as minute grains varying in size from 0.6 mm downwards. The grains are typically black, opaque, water-worn and pitted; closely fitting the description given by Dana (1952). Some of the grains still retain their isometric characteristics (i.e. cubic outlines) although most are irregular in shape. A few grains appear prismatic. The pits are usually filled with a whitish-yellow material which presumably is an alteration product (gummite?). Figure 2 shows the physical appearance of some thorianite grains together with some thorite grains for comparison.

#### Associated minerals in the concentrates

Table 1 gives the results of quantitative mineral analyses carried out on concentrate samples carrying thorianite. The samples are invariably dominated by magnetite with zircon being present in subordinate amounts. Ilmenite, epidote, garnet and uranothorite/orangite are present as accessories. Allanite, rutile, apatite, tourmaline, sphene, topaz and a green amphibole (hornblende?) usually with associated diopside are present in trace to rare amounts. The unusual features of the concentrates is the invariable presence of uranothorite/orangite which is also present even in concentrate samples not containing thorianite.

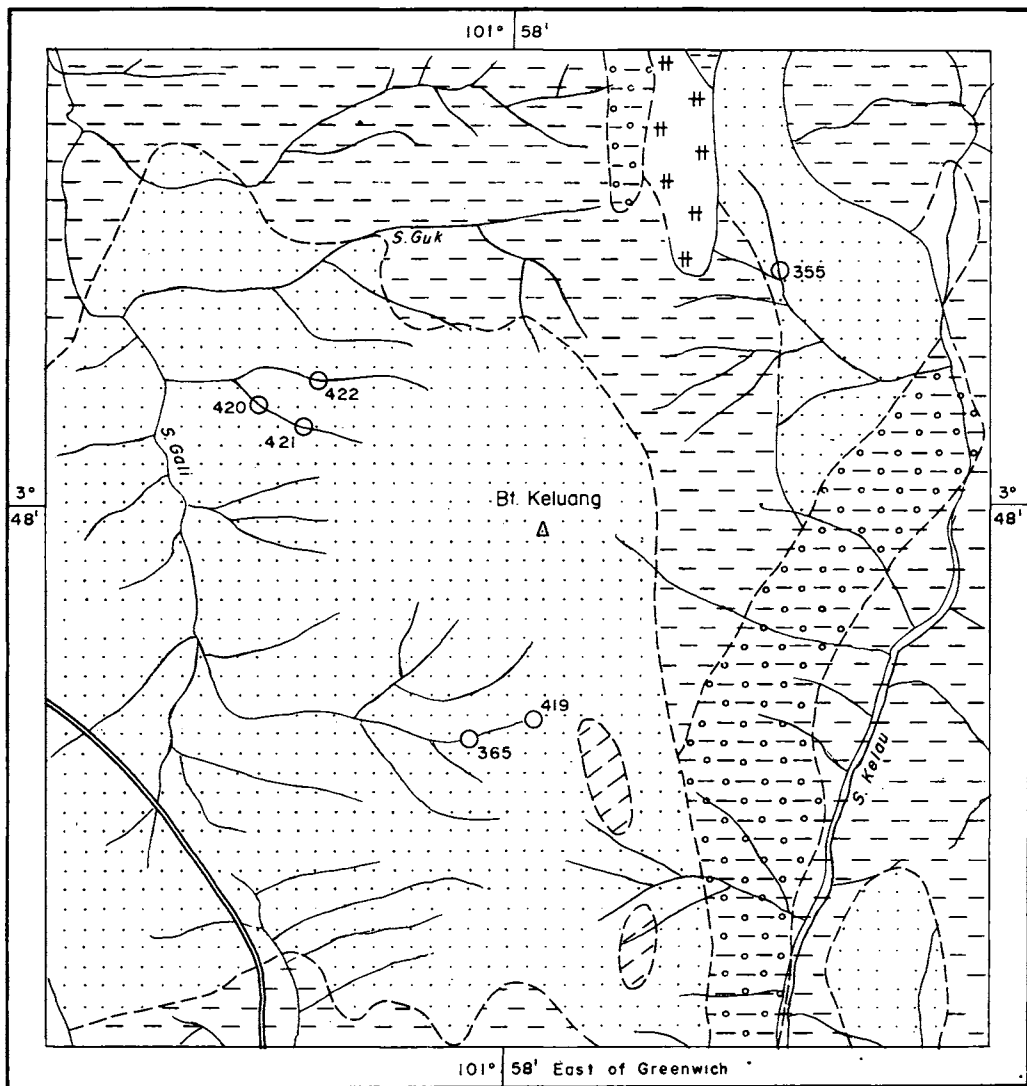
#### X-ray powder diffractometry

X-ray powder diffractometry was carried out on several individual grains (see Figure 2) as well as on a sample containing five thorianite grains. Table 2 gives the results obtained for the sample which contains five thorianite grains. The corresponding ASTM d-spacing and intensity values for thorianites are listed for comparison. The similarity in the two sets of values clearly identify the mineral investigated as thorianite. An accurate chemical analysis could not be carried out because only a small amount of the mineral grains were available.

#### Provenance of the thorianite

From the drainage pattern, the general geology of the area and the

Figure 1. Location map of concentrate samples containing thorianite, Bukit Keluang area, Raub, Pahang.



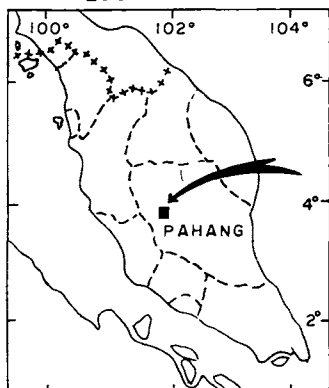
L. H. Teoh - MatNor / 7.7.1982

KBM: (Mp) D-C2-82

SCALE









LOCATION MAP



0 100 Km

LEGEND

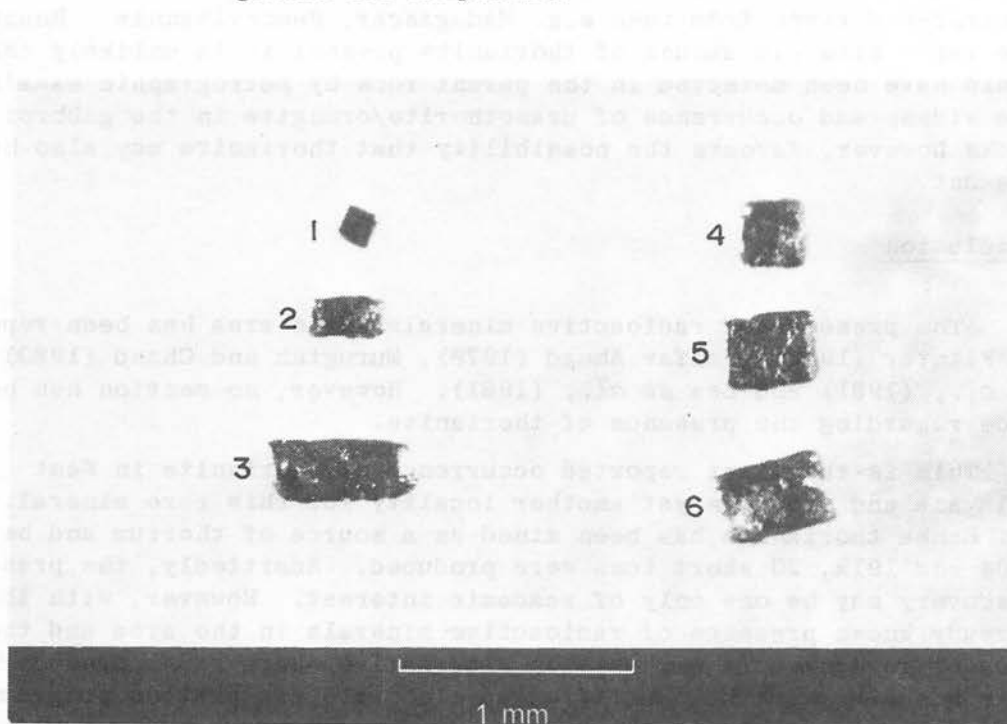
-  Sample location
-  Alkali gabbro with minor pyroxenes
-  Diorite and quartz diorite
-  Quartz syenite
-  Ortho amphibolite
-  Hornblende biotite granite

Concentrate No.	Ilmenite + Hydroilmenite	Zircon	Cassiterite	Magnetite	Epidote	Iron oxide	Amphibole + possibly diopside	Garnet	Allanite	Rutile	Apatite	Uranothorite/orangite	Tourmaline	Sphene	Topaz	Thorianite	Pyrite	Monazite	Xenotime
355	16	30½	-	40½	4½	½	½	5½	-	Tr	½	1½	-	Tr	-	Tr	-	Tr	Tr
365	1½	16	-	75½	3	2	Tr	½	-	Tr	Tr	1½	-	Tr	-	Tr	-	-	-
418	1½	8½	Tr	87½	1	Tr	Tr	½	-	Tr	-	1	-	Tr	-	Tr	-	-	-
420	2	28½	-	64	1½	1½	Tr	1	Tr	Tr	Tr	1½	Tr	-	Tr	Tr	-	-	-
421	1	13½	-	82	2	½	Tr	½	-	Tr	Tr	½	Tr	Tr	-	Tr	-	-	-
422	1	13½	-	82	2	1	Tr	Tr	-	Tr	Tr	Tr	-	½	-	Tr	-	-	-

Table 1. Quantitative mineral analyses of heavy mineral concentrates containing thorianite mineral content in percent



Figure 2. Showing physical appearance of some thorianite grains alongside thorite grains for comparison



1. Sample produces only thorianite X-ray powder pattern
2. Sample produces only thorianite X-ray powder pattern
3. Sample produces only thorite X-ray powder pattern
4. Sample produces only thorianite X-ray powder pattern
5. Sample produces both thorite and thorianite X-ray powder pattern
6. Sample produces both thorite and thorianite X-ray powder pattern

(Thorite generally more reddish in colour in contrast to thorianite which is black)

Table 2. Results of X-ray powder diffraction analysis carried out on thorianite sample from Bt. Keluang, Raub

Experimental data			ASTM data		Calculated lattice constant based on experimental data
Line no.	d-spacing	I/I <sub>1</sub>	d-spacing	I/I <sub>1</sub>	
1	3.230 Å	100	3.234 Å	100	5.600 Å
2	2.796	50	2.800	35	5.596
3	1.977	70	1.980	58	5.594
4	1.683	50	1.689	64	5.587
5	1.613	15	1.616	11	5.596
6	1.399	15	1.400	8	5.596
7	1.281	20	1.284	26	5.586
8	1.261	20	1.252	17	5.595
9	1.1415	30	1.1432	20	5.592
10	1.0779	30	1.0779	19	5.594

Lattice constant given in the ASTM data card = 5.600 Å

localities of occurrence of the thorianite it appears that the source of the thorianite is most likely within the gabbroic rocks. Thorianite has been known to occur in basic and ultrabasic rocks as well as concentrates derived from them e.g. Madagascar, Pennsylvania. Because of the small size and amount of thorianite present it is unlikely that it could have been detected in the parent rock by petrographic examination. The widespread occurrence of uranothorite/orangite in the gabbroic rocks however, favours the possibility that thorianite may also be present.

### Conclusion

The presence of radioactive minerals in the area has been reported by Flinter (1957), Jaafar Ahmad (1979), Murugiah and Chand (1980), Chu *et al.*, (1981) and Lee *et al.*, (1981). However, no mention has been made regarding the presence of thorianite.

This is the first reported occurrence of thorianite in West Malaysia and provides yet another locality for this rare mineral. In Sri Lanka thorianite has been mined as a source of thorium and between 1904 and 1912, 20 short tons were produced. Admittedly, the present discovery may be one only of academic interest. However, with the already known presence of radioactive minerals in the area and the present government's emphasis on alternative energy/fuel resources this discovery further justifies an elaborate exploration programme for radioactive minerals in the area.

### Acknowledgement

The authors wish to thank Mr. S. Murugiah who collected the samples which form the basis of this paper.

### References

- Chu, L.H., Mountanion H., Sidik A., Chand F., and Troup, A., 1981. Regional Geochemistry of South Kelantan. Geological Survey Malaysia, Geochemical Report 1.
- Flinter, B.H., 1957. The occurrence of radioactive minerals in Malaya. Proceedings of the 9th Pacific Science Congress, 5, 116-118.
- Jaafar b. Ahmad, 1979. The Petrology of the Benom Igneous Complex. Geological Survey Malaysia Special Paper 5.
- Lacroix, A., 1925. Legisement de la thorianite a Madagascar. Bull. soc. franc. Mineralogie, 48, 236-237 (not seen: extracted from Wells, *et al.*, 1933, below).
- Lee, A.K., Gonzales, R.A., Hussein, T.F., Chand F. and Troup, A., 1981. Regional Geochemistry of north Pahang. Geological Survey Malaysia, Geochemical Report 2.
- Murugiah, S., and Chand, F., 1980. Geochemical exploration in the Benom-Telor area, Raub, Pahang. Geological Survey Malaysia, Annual Report (in press).
- Wells, R.C., Fairchild, J.G., and Ross, C.S., 1939. Thorianite from Easton, PA. Am. Jour. Science, 26, 45-54.

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## OCCURRENCE OF SAW-HORSE PENETRATION-TWINNED POTASH FELDSPAR IN PENINSULAR MALAYSIA

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Kuala Lumpur

In early March 1982 the authors visited the Telaga Tujuh waterfall in Langkawi which exposes a rather extensive stretch of the Raya granite (Fig. 1) occurring near the contact with the Upper Cambrian Machinchang Formation.

The granite at the waterfall is a porphyritic biotite granite which has been tourmalinized at places and also locally sheared. The most conspicuous feature of this granite is the occurrence of potash feldspar (microcline) phenocrysts which stand out from the water-smoothened surfaces of the granite outcrop. The lengths of the potash feldspar crystals measure up to about 7 cm or more. The phenocrysts often show flow alignment and xenoliths present in the granite are often preferentially orientated parallel to the flow as well.

Among the large potash feldspar crystals were found two pairs which are peculiarly twinned. Each of them is about 7 cm in length and appears to display twinning in a manner resembling the saw-horse penetration type (Fig. 2) commonly shown by minerals such as staurolite. The pair shown in Fig. 2 is aligned with the longest axis parallel to the general flow direction but the other pair is aligned with the longest axis cutting across the flow direction.

Another rather strange occurrence of the feldspar here is that some of them are curved forming open V-shaped crystals. These may be twinned crystals (on 101?) or bent crystals. On account of the smooth bending of the crystals and evidence that the granite has been sheared it is more likely that these are bent crystals.

Potash feldspars showing twinning similar to the two pairs mentioned here have been noted in Perak by Dr. E.J. Cobbing (personal communication). The Telaga Tujuh occurrence is therefore another locality if the crystals shown indeed show penetration twinning and not any other structure. As this form of twinning is rather scarce, as evidenced by the lack of description of it in textbooks on mineralogy, it will merit further studies and more records of their occurrences.

### Acknowledgements

Encik Abdul Halim b. Abdul Samad is thanked for photography of Figure 2 in the field. Field visit is partly funded by University of Malaya F-vote 28/79.

### References

- Jones, C.R., 1981. Geology and mineral resources of Perlis, North Kedah and the Langkawi Islands. District Memoir 17, Geological Survey Malaysia, 257 p.

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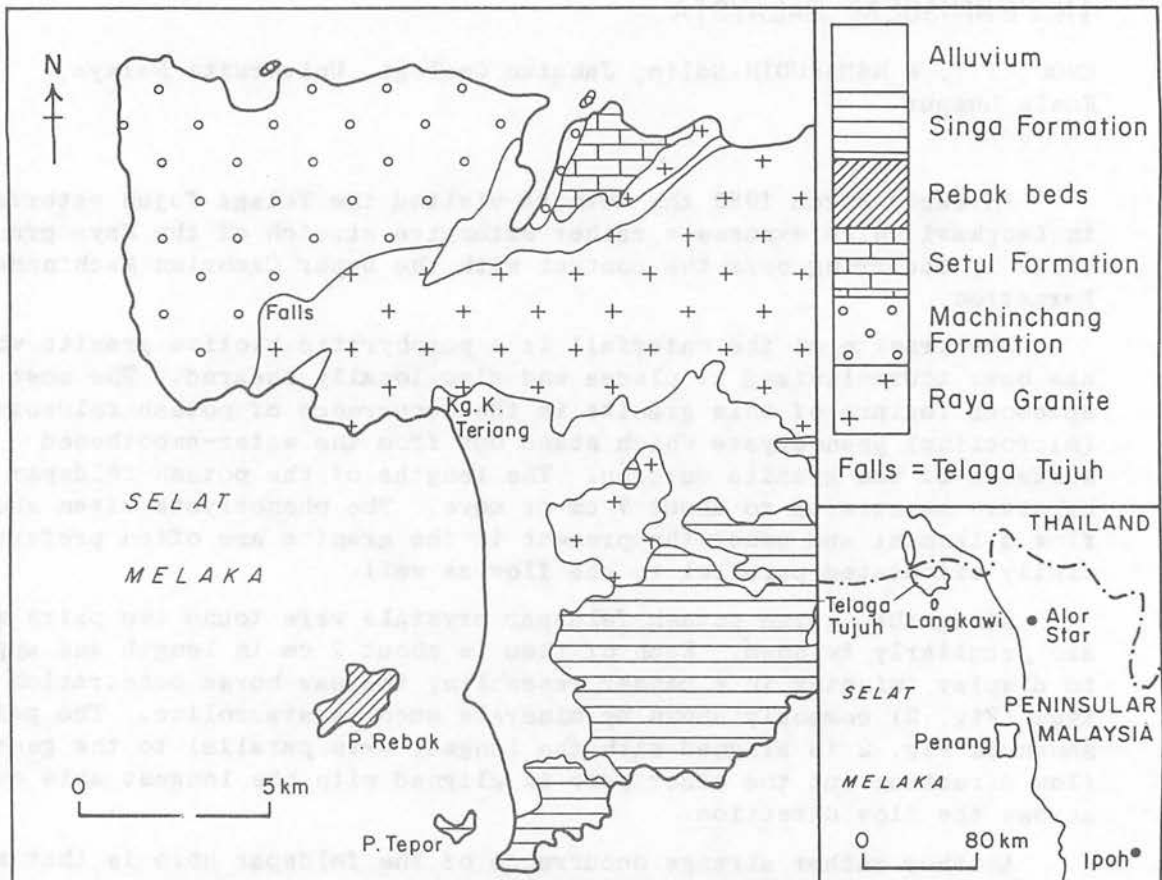


Fig. 1: Map showing locality and geology of Telaga Tujuh and adjacent areas. Geological boundaries are from Jones (1981).



Fig. 2. Photograph showing saw-horse penetration-twinned potash feldspar from Telaga Tujuh, Langkawi.

## PERHUBUNGAN LAIN (OTHER COMMUNICATIONS)

### RURAL WATER SUPPLY ON SPECIAL NEPALESE COIN

MOHAMAD Ali b. Hasan, Department of Geology, University of Malaya, Kuala Lumpur

The Government of Nepal, deeply concerned with rural water supply, has accorded the unusual honour of producing a special coin (Waterfront, 1981) with his Majesty King Birendra on one side and children at a public water tap (standpost) on the other (Figure 1). It seems that the assistance provided by UNICEF in the work of the local Development Department of Nepal for piped water to the villages and commemorating International Year (1981) of the Child has made quite an impact.

Over the next few decades every nation in the world will intend to concentrate even more of their efforts and resources to ensure that the majority of their populations (especially so in the developing countries) have access to clean drinking water and hygienic sanitation. Realising the importance of water as an indispensable commodity and the fact that it is a prerequisite for the very existence of life on earth, the United Nations (UN) is now coordinating the "International Drinking Water Supply and Sanitation Decade (1981-1990)" which aims at providing clean water and adequate sanitation for all by 1990.

Geographically, according to Kia (1981), the greatest need is in the countries of highest population, especially in Asia (see part A of Table 1). More than 2 out of 3 rural people needing clean water and adequate sanitation are in Asia; more than half are in India, Bangladesh, Indonesia and Pakistan (see part B of Table 1).

Closer to home, only about 60% of the people in Peninsular Malaysia are supplied with piped drinking water, and 90% of this fortunate group live in urban areas. Among the rural population, it is disheartening to note that less than 50% have access to potable water (Abraham, 1982). In recent years, prolonged droughts have grossly aggravated the deplorable state of affairs, triggering a host of detrimental effects such as the outbreak of water-borne diseases, decreased agricultural production, frustration and deteriorating quality of life in general.

During the current (fourth) Malaysia Plan (1981-1985) the government under the Rural Environmental Sanitation Programme is trying to realise its vital role in raising the health standards among rural communities and in controlling a wide range of water-borne diseases, through the provision of safe water supply and sanitary latrines. Under this programme, it is envisaged that 7,632 wells and 162 gravity water supply systems will be completed in Peninsular Malaysia, while in Sabah and Sarawak, 870 wells and 2169 gravity supply systems and 1079 rain water storage cisterns will be installed. The coverage of safe water-supply systems to the total rural population outside the area served by the Public Works Department (PWD) in Peninsular Malaysia increased from 3.2% in 1970 to 11.3% in 1980, in Sabah from none to 14.5% and in Sarawak from 4.4% in 1970 to 44% in 1980. The coverage of sanitary latrines to the rural population increased from 25% in 1970 to 44.7% in 1980 in Peninsular Malaysia, from none to 15% in Sabah and from 3.5% to 45% in Sarawak (Government of Malaysia, 1981, p. 372).

### References

Abraham, M, 1982. The need to Formulate and Implement a National Water Policy to overcome the water crisis in Rural Areas. Paper presented at the "Regional Workshop on Limnology and Water Resources Management in the Developing Countries of Asia and the Pacific", University of Malaya, Kuala Lumpur, 29th November - 5th December 1982.

Kia, B., 1981. Internal Financing of Water Supply and Sanitation in Developing Countries. UNDP Division of Information, Case History No. 5, International Drinking Water Supply and Sanitation Decade, 12/81.

Government of Malaysia, 1981. Fourth Malaysia Plan: 1981-1985, Government Printers, Kuala Lumpur.

Waterfront, UNICEF, 1981. Newsletter no. 24, p. 23 only.

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(Not to scale)

Figure 1: Children and water tap on special Nepal Coin

(Source: Waterfront (UNICEF) No. 28, p. 23)

Table 1: Rural population without potable water and sanitation in developing countries <sup>1/</sup> - (1980)

A. <u>Geographic Regions</u>	Rural Population in 1980 (millions)	Rural Population without Potable Water <sup>2/</sup>			Rural Population without Sanitation <sup>3/</sup>		
		Number (millions)	As per cent of rural population in area.	As per cent of rural population in developing world	Number (millions)	As per cent of rural population in area	As per cent of rural population in developing world
Africa (ECA members)	330	247	75%	22%	280	85%	20%
Latin America	141	118	77%	11%	118	77%	9%
Arab countries (ECWA members)	25	17	67%	1.2%	20	80%	2%
Asia and Pacific <sup>4/</sup>	<u>1,056</u>	<u>739</u>	<u>70%</u>	<u>65%</u>	<u>950</u>	<u>90%</u>	<u>69%</u>
TOTAL	1,552	1,121	72% (average)	100%	1,368	88% (average)	100%
<b>B. <u>Four Asian Countries</u></b>							
India	542	379	70%	34%	531	98%	39%
Indonesia	126	107	85%	10%	102	81%	8%
Bangladesh	80	23	19%	2%	79	99%	6%
Pakistan	<u>60</u>	<u>50</u>	<u>83%</u>	<u>5%</u>	<u>59</u>	<u>99%</u>	<u>4%</u>
TOTAL	808	559	69% (average)	51%	771	95% (average)	57%

<sup>1/</sup> Data provided by member governments

<sup>2/</sup> Without potable water is defined as not having reasonable access to uncontaminated water.

<sup>3/</sup> Without sanitation is defined as lacking latrines or a safe way of disposing excreta.

<sup>4/</sup> Excludes People's Republic of China.

SOURCE: Kia, B. (1981)

## GEOSCIENCE CURRICULUM DEVELOPMENT IN SOUTHEAST ASIA - A REPORT OF WORKSHOP

MOHAMAD Ali Hasan, Department of Geology, University of Malaya, Kuala Lumpur

As a follow up to the Regional Workshop held in Manila (1981) on the Role of Geoscience Educational Institutes in Natural Resources Development in Southeast Asia, a workshop on the above theme was successfully held at Rincome Hotel, Chiang Mai, Thailand on January 30-31, 1983. A total of 39 participants from 14 countries participated in the two-day workshop. Malaysia was presented by Tuan Syed Sheikh Al-Manshoor and Associate Professor Dr. Ismail Mohd. Noor (both from Universiti Kebangsaan Malaysia) and Mohamad Ali Hasan (Universiti Malaya). Also present was the Fullbright Visiting Professor to the University of Malaya, Professor Bruce W. Nelson.

The objectives of the workshop were as follows:

1. To provide a forum for the exchange of views and experiences in geoscience curriculum development between Southeast Asian universities and academic institutions, aimed at improving geoscience education in the region.
2. To promote links between universities and academic institutions in order to build a strong geoscience education that would serve as foundation for natural resources development.
3. To identify clearly the problem areas and design realistic ways of remedial measures.

The format throughout the workshop, was in the form of discussions and exchanges of views rather than formal lectures. The workshop included two keynote addresses given by namely (i) Professor W.H. Matthews III, Chairman of Commission on Geology Teaching, International Union of Geological Sciences (IUGS), which was entitled "Current Trends in Geoscience Education" and (ii) Professor Werner Gocht, Aachen Technical University, Aachen, Germany, who talked about "The Development of Curricula in the Fields of General Geology and Applied Geology in West Germany".

After the keynote addresses were delivered, country reports from various Network National Points of Contact were then heard. These country reports on Geoscience Curriculum Development included those from Australia, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, Japan and Vietnam. Malaysia's Report entitled "Development of Geoscience Curriculum in Malaysia" was presented by Assoc. Professor Dr. Ismail Mohd. Noor. Group discussions then ensued for almost one and a half days.

The Term of References for Group Discussions were as follows:

- 1) Structure of Geoscience Curriculum at school and university levels.
- 2) Trends in Geoscience Curriculum Development: relevance to the needs of industry and government, ways and means of development.
- 3) Promotion of links between universities and academic institutions in Southeast Asian countries.

At the end of the workshop, Professor William H. Matthews III, conveyed the following tentative recommendations, (fuller reports will be published later by the organiser):-

1. As for the Structure of Geoscience Curriculum at
  - a) University level, the following recommendations were suggested:-
    - i) Faculty members should plan or establish curriculum in close cooperation with government and industry.
    - ii) Close cooperation and coordination should exist between departments teaching Geoscience at all time.
    - iii) The basic Geoscience degree (i.e. Bachelor's degree) should be based broadly on 'core' courses in Geoscience and cognate subjects such as chemistry, mathematics, etc.
    - iv) Postgraduate degrees (Masters and Ph. D) should be regarded as specialised degrees to be taken only when prerequisites have been fulfilled.
    - v) There should be an accreditation board for geoscientists (regulatory board similar to that of engineers/doctors)
    - vi) It is essential for university staff members to improve their teaching techniques and processes by periodic exposure through workshops or seminars, etc.
    - vii) The curriculum should emphasize the need for field works.
  - b) School level
    - i) There should be a continuous development and periodic reviews of curriculum at school level.
    - ii) Relationship between teachers and universities should be forged (e.g. formation of educational centres for Geoscience education such as that to be found in the Philippines).
    - iii) It should be noted that there are too few geology teachers teaching at colleges, and it is recommended that geologists should be employed in teachers' colleges.
    - iv) Professionals should help teachers to prepare at proper level(s).
  
2. As for the trends in Geoscience Curriculum Development, it is felt that it is essential for faculty members to identify the trends, such as needs and where the needs are. One can identify the needs within the government and industry through the National Development Plans, Manpower Plan, Questionnaire, etc. The needs of the government sectors, government enterprises and private or industries should also be recognised.
 

3 trends can be recognised: (1) increase of diversification from the types of employers, (2) increase diversification in specialisation (such as marine geology, etc.) and (3) increase needs for the foreign companies.

The overall trend is the emphasis for a broad-based curriculum and staff members, wherever possible, should make use of data from companies.
  
3. As for promotion of links, the workshop recognised the importance of links between tertiary institutions, and recommended that:
  - i) Whatever existing channels (formal/informal) there are for the promotion of links should be maintained and encouraged, perhaps through personal contacts or societies.
  - ii) Regional association of geoscientists should complement and supplement efforts of other organisations. This is perhaps in line with the recommendations of the Manila Workshop and GEOSEA IV (as to the formation of a secretariat).



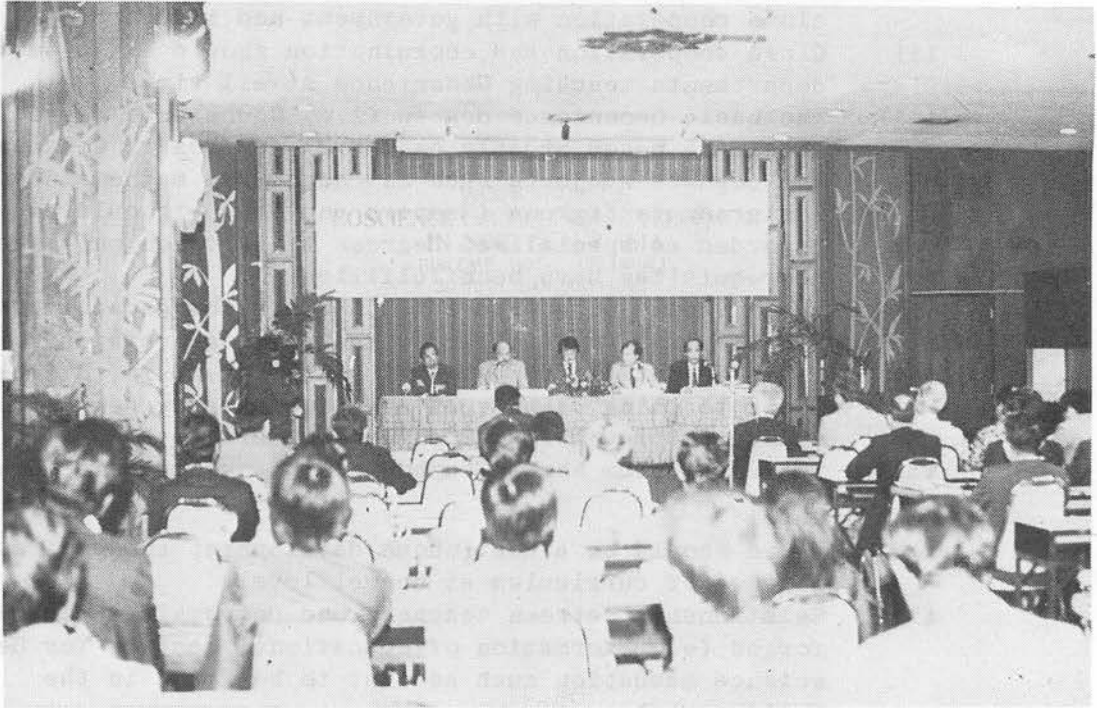


Fig. 1: Workshop at the Opening Ceremony. (From left: Deputy Governor of Chiang Mai, Reactor of CMU, Chairman of the Organising Committee, Representative of UNESCO, and Executive Secretary of NETWORK). (CMU pix).

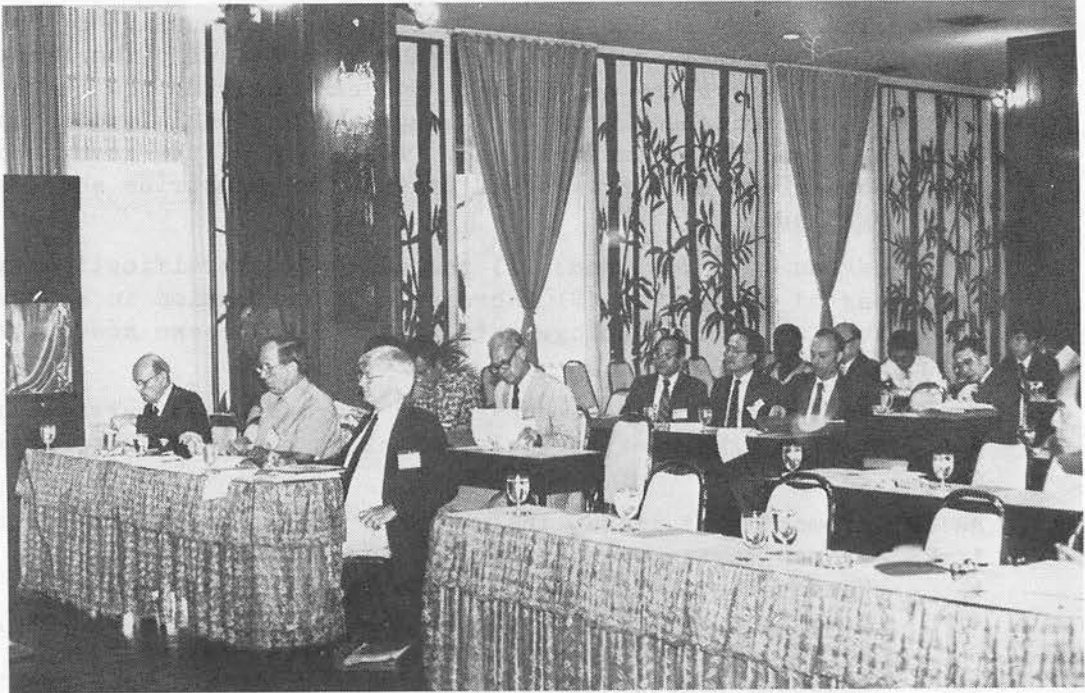


Fig. 2: Closer view of participants. (Professor Dr. William H. Mathews III - on the extreme left. (CMU pix).

iii) Links are to serve the industries, rather than individuals.

The Geological Society of Malaysia (GSM) was one of the cooperating organisations to the above workshop. The Proceedings and Reports of the GSM Geoscience Education Workshop was distributed to all participants. The author sincerely appreciates the joint sponsorship given him by GSM and the Universiti Malaya.

\*\*\*\*\*

## PROCEEDINGS AND REPORTS OF GSM GEOSCIENCE EDUCATION WORKSHOP 1982 - A COMMENT

by Professor Lewis ELTON, University of Surrey, England\*

### 1. Introduction

The very fact that such a workshop, concerned essentially with curriculum design, took place is impressive. Further, the papers are well presented and I feel that I have derived considerable understanding both of the achievements of university geology courses in Malaysia and of the problems facing them.

### 2. Specialization

One problem clearly is the overcrowding of the curriculum. There seems to be agreement that the curriculum must be basic and general, but the inevitable consequence of this is that graduates are not fully prepared for the various specialized jobs they go into. Industry always makes this complaint, and the suggestion of extending the undergraduate course to six years is surely unrealistic. It is however possible to meet the problem to some extent in a number of ways within present practices:

- a) by an honours project in a specialized field
- b) by final year options
- c) by making the curricula different in the different universities
- d) by students spending vacations in industry.

I would suggest that the following additional ways might be considered:

- e) sandwich courses, by which students spend a whole year (usually the year before the final degree year) in industrial employment
- f) specialized postgraduate courses
- g) release from employment for Attendance at short refresher courses.

### 3. Contact with industry

Means of strengthening the present contacts with industry could come from the following:

- a) the sandwich courses, mentioned above
- b) visiting appointments, including professorships, for leading people from industry.

---

\* Professor of Science Research, University of Surrey, England & Visiting Professor, IPT (Universiti Malaya)

#### 4. Research and postgraduate courses

I have already suggested that postgraduate courses might alleviate the problems associated with specialization. Such courses might also be a preparation for research. It is certainly worth considering whether the present system of research training, where students have few or no taught courses beyond the bachelor degree, is appropriate for such an essentially general subject with its range of specialisms.

#### 5. Employment opportunities

It is clear that employment opportunities are shifting from Government to industry and that at present curricula are slow to adapt to this shift. A more rapid response may require the kind of expertise in curriculum design which academic staff do not normally possess.

#### 6. Improvements in teaching and learning

This last consideration takes me to the more general point that the present and future demands of geology graduates may differ substantially from those of the past, and that this should lead to changes not only in curricula but also in teaching and learning methods. These could be achieved more readily if at least a proportion of the academic staff of each department of geology had received appropriate training in teaching and learning in higher education.

#### 7. Interdisciplinary courses

Such a training would become essential, if the departments at any stage wished to embark on really new approaches which would be needed if courses were to be offered that were interdisciplinary. Such courses might link geology to - amongst others - environmental science, chemical engineering, economics.

#### 8. The problem of language

A final word must be said about the problem of technical terms in Bahasa Malaysia. It is clearly essential to achieve an unambiguous correspondence for technical terms in English and Bahasa Malaysia and it is good to see that work on this enterprise is proceeding.

#### 9. Conclusion

The above comments are offered in a spirit of help and cooperation. They should not be interpreted as criticisms. I hope that they may make a good thing better.

\*\*\*\*\*

## PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

### TECHNICAL TALK

P.C. ALLEN: The Wealden Facies of Northwest Europe.

Prof. P.C. Allen, Professor of Geology, University of Reading, England, gave the above talk at the Dept. of Geology, University of

Malaya, on 23 February 1983. It was attended by a crowd of 50. Prof. Allen is completing his term as External Examiner for Geology, University of Malaya.

The Lower Cretaceous Wealden rocks have been studied by Professor Allen for many years. For the past 150 years the rocks were believed to be deltaic-lacustrine but recent studies support an onshore alluvial environment of deposition. Recent petroleum exploration of the Wealden rocks have contributed new data as well as opportunities to test earlier interpretations.

The Wealden rocks outcrop over an area in Southern England, south of London as an anticline with the older Hasting Beds Group forming the core and surrounded by the younger Weald Clay Group. The Hasting rocks are represented by more sand than clay but the Weald is more clay and less sand. From fossil evidence it has been interpreted that the sand is nearly fresh water and the clay has been deposited with variable salinity from fresh to brackish water but never marine. This is also supported by carbon isotope data.

Details from two units, the older Lower Tunbridge Wells Sand and the overlying younger Grinstead Clay were given to support the new interpretation. The base of this sequence is represented by a black shale with much plant fossils which have not been seen in the past, maybe because their presence is not expected in the delta model. The black shale is succeeded by a mottled clay which is interpreted to be deep soil which has undergone fluctuating water table. Vague mottling in the rocks have now been shown to be remains of plants. The clays become more silty going up the sequence. Higher up coarser sandstone is met and the base of this layer is not parallel to the stratification but cross-cuts the stratification below at low angles. This is interpreted to be large apron sheets with an erosive base. Presence of very flat channels is evident and channels with depositional dips of 20 - 30° occur. Other features found include scour structures and 'scoops' with ripple marks going downslope, enormous flutes measuring 0.5 km across and small slumped sand bodies with onion structures. The features seen can also be seen at present in Australia, Canada and the Niger river in Mali. The delta model is not supported.

Coarsening of sand bodies up sequence is interpreted to be due to uplift of the source area believed to a massif in the London area. Uplift is caused by upward movements of a marginal fault between the massif and the depositional basin.

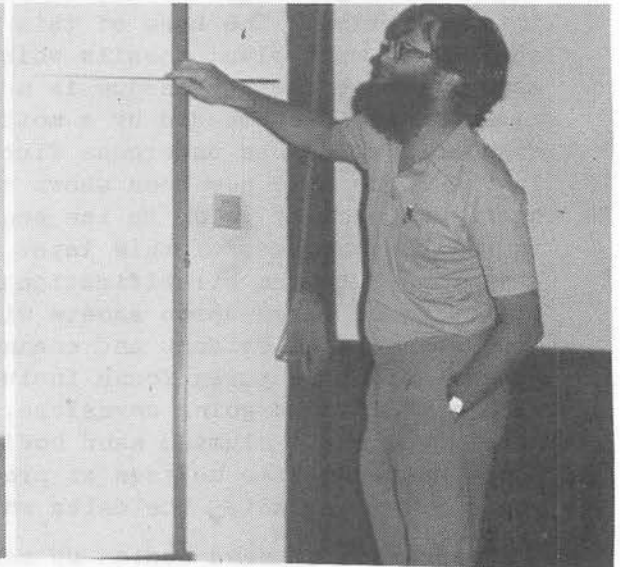
At the basal part of the succeeding clay unit new plant growths are common. The plants were *Equisetites* which were sensitive to water depth. *In situ Equisetites* with underground rhizome and a stub of perished stem above the former mud surface has been found. The plants probably perished in autumn but the rhizome propagated new growth in the following year and the sediments in which the plants have been found show seasonal varves. The top of the clay unit is red mottled clay. Siderite nodules occur in the clay. The predominance of clay over sand in this unit is related to the sinking of the London land-mass.

The whole Wealden basin has been subdivided into various sectors and detailed studies made on the mineralogical and lithological contents. High manganese garnets characteristic of Pre-Cambrian schists of Europe and Wales were found. In the sandstone unoxidized glauconite occurs and it is interpreted that the glauconite must have been rapidly

**TECHNICAL TALKS JAN-FEB 1983**



**P. C. ALLEN**



**W. K. FLETCHER**



buried. Carboniferous pebbles, Silurian graywacke, Upper Jurassic chert pebbles and others have been found. Faulting of the margin of the London landmass is suggested to have brought up the older lithologies.

In the western sector, plentiful feldspars, zircon, biotite and tourmaline have been found and sources from Cornwall and Brittany, France are likely. Using the laser microprobe the biotite has been dated to be Permian and tourmaline returns ages of Carboniferous-Permian and also Ordovician/late Pre-Cambrian. This accords well with the geology of the suggested source areas.

In the southern sector, staurolite, kyanite, sillimanite and zircon have been found suggesting a high grade metamorphic source area to the south in Brittany. Zircon has been dated to be Pre-Cambrian. Among the ages obtained there appears to be a lack of ages around 350 m.y. and this happily coincides with the Brittany 'lull'.

The 'Wealden facies' appears to be present in Malaysia as some features of the Tekai and Gagau Group bear resemblance.

T.T. Khoo

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W.K. FLETCHER: Applied Geochemistry and Renewable Resources

On 12 January 1983, Dr. W.K. Fletcher gave the above technical talk at the Dept. of Geology, University of Malaya, which was attended by 15 members. Dr. Fletcher is presently serving as the UN Expert at SEATRAD Centre, Ipoh, while on leave from the University of British Columbia, where he is Associate Professor, Dept. of Geological Sciences. What follows is an outline of the talk specially prepared by Dr. Fletcher for the benefit of GSM members.

Application of geochemical methods to mineral exploration is widely known and routinely used. Less well known is the application of similar techniques to environmental problems and increased production of renewable resources.

In addition to the major elements necessary to sustain healthy plant and animal life, micronutrients are required at trace (ppm) levels. The list of these essential trace elements continues to grow but at present is believed to include V, Cr, Mn, Co, Ni, Cu, Zn, As, Se, Cl, F, I, Mo and possibly Sn. If concentrations of these elements are below those required deficiency disorders result. Similarly, in some cases concentrations greater than those required can result in toxicity. In addition certain non-essential elements, for example Cd, Hg and Pb, can cause toxicity at abnormally high concentrations.

Biogeochemical cycling and availability of the micronutrients is complex, nevertheless for most of the elements their ultimate source is the soil parent material. It is therefore not surprising that on a regional scale trace element disorders can often be related to geology and that regional geochemical maps might be useful in delineating potential problem areas.

The technique most widely used for preparation of regional geochemical maps is the collection and analysis of drainage sediments, the basic premise being that the sediment is a natural composite sample of the products of weathering upstream of the sample site. The method is rapid and inexpensive permitting large regions to be surveyed

and areas of interest, with abnormally high or low trace element concentrations, delineated. Case studies in the U.K. and Canada have demonstrated that resulting maps can successfully outline hitherto unrecognised areas wherein abnormally high concentrations of Mo (derived from black shales) cause Mo-induced Cu deficiency in cattle. In a region of some 1,000 km<sup>2</sup> in Canada the resulting loss to the agricultural economy is some \$(C)3x10<sup>6</sup> annually. Regional geochemical patterns of Cu, Zn, Mn, Co and Se have also been related to agricultural disorders and at the same time the extent of base metal pollution, resulting from mining and related activities, defined.

It is concluded that although the principal role of geochemical surveys will continue to be mineral exploration, resulting data are also relevant to study of trace element related agricultural and environmental problems.

G.H. Teh

\*\*\*\*\*

## BERITA PERSATUAN (NEWS OF THE SOCIETY)

### GSM ANNUAL GENERAL MEETING

The Annual General Meeting will be held at 5.30 p.m. on Saturday, 23 April 1983 at Dewan Bahasa dan Pustaka, Kuala Lumpur.

#### Agenda

1. Confirmation of the minutes of the previous AGM
2. Matters arising
3. President's Report
4. Honorary Secretary's Report
5. Hon. Assistant Secretary's Report
6. Editor's Report
7. Honorary Treasurer's and Honorary Auditor's Report
8. Election of Honorary Auditor
9. Other business
10. Announcement of the New Council (1983/84)

Members who wish to have other matters included in the agenda are requested to write in not later than 16 April 1983.

Hon. Secretary

\*\*\*\*\*

### BENGKEL PENGGUNAAN DAN PERLAKSANAAN BAHASA MALAYSIA DALAM BIDANG GEOSAINS

(Workshop on the use and implementation of Bahasa Malaysia in the fields of Geoscience)

Anjuran: Persatuan Geologi Malaysia dengan Kerjasama Dewan Bahasa & Pustaka



Tarikh: 23 April 1983

Tempat: Balai Seminar, Dewan Bahasa dan Pustaka

**Aturcara**

- 8.30 - 9.00: Pendaftaran  
 9.00 - 9.20: Ucapan Aluan Pengerusi dan Pembukaan oleh Presiden, Persatuan Geologi Malaysia  
 9.20 - 10.00: Ucapan Dasar oleh Datuk Ketua Pengarah DBP  
 10.00 - 10.30: Minum teh  
 10.30 - 1.00: Sesi 1 (Kertas Kedudukan): Penggunaan dan Pelaksanaan Bahasa Malaysia dalam pendidikan Geosains di Institusi-institusi Pengajian Tinggi, Malaysia
- i) Universiti Kebangsaan Malaysia
  - ii) Universiti Malaya
  - iii) Universiti Pertanian Malaysia
  - iv) Universiti Sains Malaysia
  - v) Universiti Teknologi Malaysia
  - vi) Institut Teknologi MARA
- 1.00 - 1.45: Makan tengah hari  
 1.45 - 3.00: Sesi 2 (Kertas Dasar): (1) Masalah Penerbitan Buku-Buku Geosains di Malaysia; (2) Penciptaan dan Pembangunan Bahasa dalam konteks Geosains  
 3.00 - 3.15: Minum teh  
 3.15 - 4.15: Sesi 3 (Forum: Ke Arah Peningkatan dan Peluasan Penggunaan Bahasa Malaysia dalam bidang Geosains di Malaysia)
- Ahli-Ahli Panel
- i) Wakil Universiti
  - ii) Wakil Penyiasatan Kajibumi Malaysia
  - iii) Wakil Sektor Perlombongan/Galian
  - iv) Wakil Swasta/Sektor Kejuruteraan
  - v) Wakil Sektor Petroleum
  - vi) Wakil Sektor Pertanian/Sains Tanah
  - vii) Wakil Dewan Bahasa dan Pustaka
- 4.15 - 5.15: Sesi (Perbincangan dan Cadangan)  
 5.15 - 5.30: Sidang Penuh dan Penutup

**1. Pengenalan/Penjelasan**

Penggunaan Bahasa Malaysia di institusi pengajian tinggi dalam bidang geosains khususnya semakin meluas. Mulai tahun 1983 ini, Bahasa Malaysia akan digunakan sebagai bahasa pengantar utama untuk pengajaran dan pembelajaran di semua institusi tersebut. Bengkel ini bertujuan mengkaji sejauh mana persediaan dan pencapaian telah, sedang dan akan dibuat oleh institusi-institusi pengajian tinggi dan sektor-sektor yang berkenaan.

Untuk tujuan bengkel ini, geosains merangkumi disiplin-disiplin sains geologi (kajibumi) dan memberi perhatian yang lebih pada disiplin geologi, amnya serta geofizik, sains tanah, geologi petroleum dan geologi kejuruteraan.

**2. Objektif**

1. Sebagai medan pertemuan dan perbincangan pakar-pakar dalam bidang Geosains untuk mengkaji masalah-masalah penggunaan dan pelaksanaan Bahasa Malaysia di institusi-institusi pengajian tinggi.
2. Bertujuan untuk mendapatkan penyelesaian dan penyelarasan peristilahan dalam bidang Geosains

3. Mengembleng usaha-usaha pihak universiti dan juga pihak swasta dalam penggunaan Bahasa Malaysia
4. Mengkaji sejauh mana terlaksananya penerbitan buku-buku bagi bidang Geosains dalam Bahasa Malaysia
5. Mencari jalan mempertingkatkan penggunaan Bahasa Malaysia dalam bidang Geosains.

### 3. Format

Ucapan dasar akan disampaikan dan diikuti dengan satu Sesi memperbincangkan keadaan sebenar penggunaan Bahasa Malaysia dalam bidang Geosains di institusi-institusi pengajian tinggi. Selepas itu dua Kertas Dasar akan dibincangkan diikuti pula dengan satu Forum, dan diakhiri dengan satu perbincangan oleh para peserta yang hadir. (Sila lihat aturcara).

### 4. Penyertaan

Terbuka kepada semua yang berminat, samada ahli atau bukan ahli Persatuan Geologi Malaysia. Para peserta boleh mendaftarkan diri untuk penyertaan menerusi ketua jabatan masing-masing atau mendaftar secara persendirian menerusi borang yang dilampirkan di bawah.

### 5. Yuran pendaftaran

Tidak dikenakan (termasuk makan tengah hari). Walaubagaimanapun, sebarang sumbangan amatlah dihargai dan dialamatkan kepada Persatuan Geologi Malaysia.

### 6. Tarikh tutup penerimaan pendaftaran

31hb Mac. 1983.

### 7. Keterangan lanjut

Untuk mendapatkan keterangan lanjut, sila hubungi

En. Mohamad Ali Hj. Hasan  
 Pengerusi Pengelola  
 Bengkel Penggunaan dan Pelaksanaan Bahasa Malaysia  
 dalam Bidang Geosains  
 Persatuan Geologi Malaysia  
 d/a Jabatan Geologi  
 Universiti Malaya  
 Kuala Lumpur 22-11.

\*\*\*\*\*

## WORKSHOP ON STRATIGRAPHIC CORRELATION OF THAILAND AND MALAYSIA

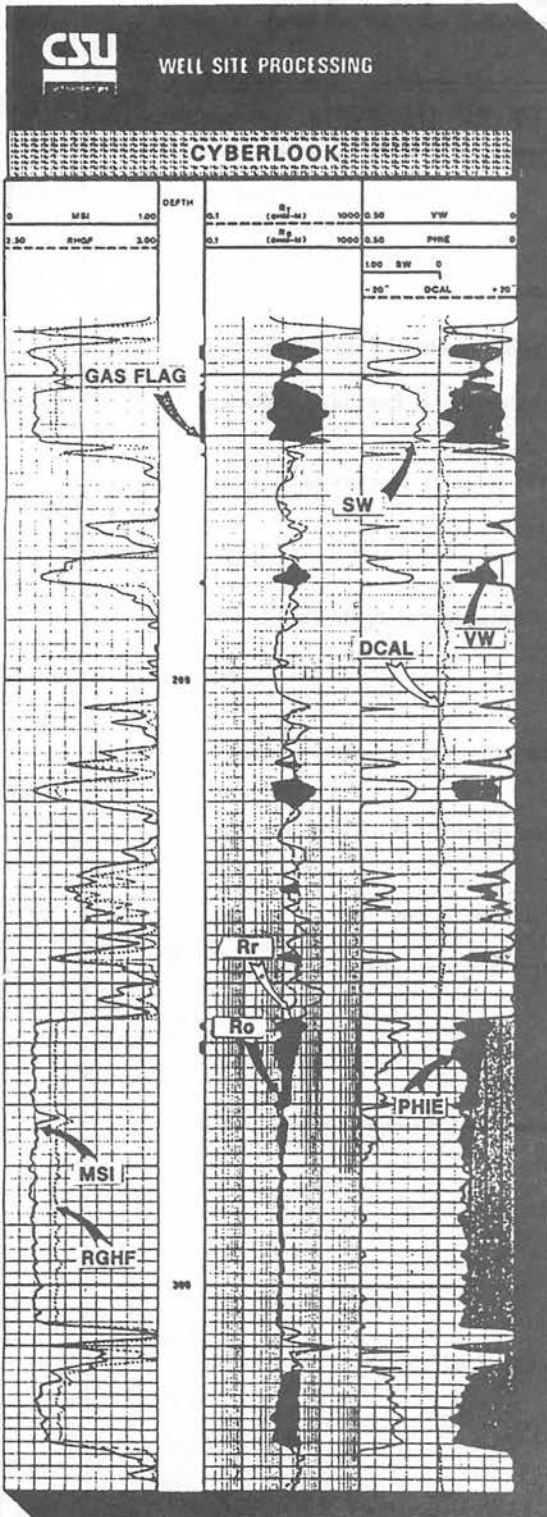
8-10 September, 1983

organized by



Geological Society of Thailand  
 Geological Society of Malaysia

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BULETIN PERSATUAN  
**GEOLOGI MALAYSIA**

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**BULLETIN OF THE GEOLOGICAL SOCIETY OF MALAYSIA**

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**Editor**  
G.H. TEH



**DECEMBER 1982**  
FIFTEENTH ANNIVERSARY  
1967 1982

**No. 15**

Price: M\$30.00 (US\$15.00)

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Orders should be addressed to: The Hon. Assistant Secretary  
GEOLOGICAL SOCIETY OF MALAYSIA  
c/o Dept. of Geology  
University of Malaya  
Kuala Lumpur 22 11  
MALAYSIA

THE SOCIETY'S FUNDS - AN INSTITUTION OF A PUBLIC CHARACTER

Ref: C.G. 162/1203

Pengawal Besar Hasil Dalam  
Negeri, Malaysia  
Bangunan Bangkok Bangk  
Tingkat Ketiga  
105 Jalan Bandar  
Kuala Lumpur

12 October 1967

D. J. Gobbett Esq.,  
Hon. Secretary  
Geological Society of Malaysia  
University of Malaya, K.Lumpur

Tuan

Fund: Kesatuan Kajibumi Malaysia

I refer to your application for approval of the above Fund as an institution of a public character under section 33(2)(c) of the West Malaysia Income Tax Ordinance, 1947.

2. I am pleased to inform you that approval has been given with effect from 1st January 1967, as per copy of Gazette Notification no. 4245 of 5.10.67 attached.

3. Gifts of money to the Fund may be allowed as a deduction in computing the assessable income of the donors. A separate account of the donations to the Fund should be kept and care taken that only expenditure properly attributable to the Fund is charged against this account.

4. A copy of the accounts of the income and expenditure of the Kesatuan Kajihumi Malaysia Fund should be rendered annually for my examination.

Saya yang menurut perintah  
Signed  
(Eu Boon Hor)  
b.p. Pengawal Besar Hasil  
Dalam Negeri, Malaysia.

c.c. Commissioner of Inland Revenue, Sabah  
Commissioner of Inland Revenue, Sarawak  
Pengawal Hasil Dalam Negeri, Kuala Lumpur

\*\*\*\*\*

FIFTH REGIONAL CONGRESS ON  
GEOLOGY, MINERAL AND  
ENERGY RESOURCES  
OF SOUTHEAST ASIA

Kuala Lumpur April 9-13 1984

GEOSEA V



## M A L A Y S I A

His Majesty's Government Gazette

Jil. 11

5hb Oktober, 1967

No. 21

WEST MALAYSIA INCOME TAX ORDINANCE, 1947

No. 4245

Institution of a public character

It is hereby notified for general information that on the application of the institution concerned, I have, this day, approved the Kesatuan Kajibumi Malaysia as an institution of a public character for the purposes of section 33(2)(c) of the West Malaysia Income Tax Ordinance, 1947, with effect from 1st January, 1967.

Lim Leong Seng  
Pengawal Besar Hasil  
Dalam Negeri, Malaysia

Dated this 20th September 1967

(CG.162/Vol. IV; CG.162/1203)

\*\*\*\*\*

## MEMBERSHIP LIST (AS AT 31 DECEMBER 1982) - OMISSIONS

Our apologies for the following names being inadvertently left out of the membership list. Members who find their names missing, please write in to the Secretary immediately. Your cooperation is much appreciated.

Philippines

C.K. BURTON, Philipinas Shell, P.O. Box 441, Manila.

A.H.G. MITCHELL, c/- UNDP Manila, P.O. Box 7285 ADC, Mia Road, Pasay City, Metro Manila.

Hans G. OESTERLE, Cities Service, P.O. Box 2283 MCC Makati, Metro Manila 3117.

Peninsular Malaysia

MOHD. Noor Ismail, Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi, Selangor

Steven WONG, ICI, c/o Wisma Damansara, Jalan Sementan, Kuala Lumpur  
ABDUL Malik b. Hashim, PEG, SSB., Lutong, Sarawak.

\*\*\*\*\*

## KEAHLIAN PROFESIONAL (PROFESSIONAL MEMBERSHIP)

The applications for Professional Membership of the following members were approved:

1. Abdul Aziz b. Sidik, MMC, 1131-D Simpang Tiga Tok Ku, Cabang Tiga, Kuala Terengganu, Terengganu
2. Yip Foo Weng, MMC, P.O. Box 936, Kuala Lumpur.

\*\*\*\*\*

## KEAHLIAN (MEMBERSHIP)

The following applications were approved:

Associate Member: Wong Chee Wai, ICI (M), Wisma Damansara, Jalan Semantan, Kuala Lumpur.

Full Member: Abdul Malik b. Hashim, PEG, SSB., Lutong, Sarawak.

\*\*\*\*\*

## PERTUKARAN ALAMAT (CHANGE OF ADDRESS)

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

1. D. Skevington, Britoil (Alpha) Ltd., Setiabudi Building, A4-6, 2nd Floor, Jalan H. Rangkayo Rasuna Said, Jakarta Selatan, Indonesia
2. I.S. Carter, Esso Exploration and Production Natuna, Inc., P.O. Box 2096, Jakarta, Indonesia.
3. Rafli Ibrahim, No. 25, Jln. SS5C/1D, Taman Seaport, Petaling Jaya.
4. Pun Vun Tat, No. 1/33 Hill Street, Cabramatta, NSW 2166, Australia.
5. K. Hiller, Feuerbachstr. 2, 3 Hannover 51, F.R. of Germany.
6. Looi Keng Mun, 20 Jalan Desa Makmur, Taman Desa, Jln. Kelang, Kuala Lumpur.
7. J.F. Lambert, 10 Minchin Court, Padbury, Western Australia 6025.
8. T.R. Sweatman, Rex Sweatman Consultants Pte. Ltd., 5 Pandan Valley, 04-707, Singapore 2159.
9. Wong Keen Ming, 57, Jalan 20/5, Petaling Jaya.
10. Chiu Hong Keong, 5 Jalan Dhanapakia Devi Satu, Taynton View, Jalan Cheras, Kuala Lumpur.
11. A.J. Winchester, Nippon Schlumberger K.K., Dai-Ichi Seimi Bldg., 26th Floor, 7-1 Nishi-Shinjuku 2-chome, Shinjuku-ku, Tokyo 160, Japan.
12. Abdul Ghani Yahya, Kg. Batu Menunggol, Pendang, Alor Setar, Kedah.
13. John D. Archer, Gaffney, Cline & Associates (S), P.O. Box 82, Singapore Changi Airport, S'pore 9181.
14. Michael R. Smith, Gaffney, Cline & Associates (S), P.O. Box 82, Singapore Changi Airport, S'pore 9181.
15. Peter H. Stauffer, 733 Northampton Drive, Pal Alto, Ca. 94303, USA.
16. Lee Chong Yan, School of Physics, Universiti Sains Malaysia, P. Pinang.
17. R.L. Pile, c/o BP Petroleum (Indonesia) Ltd., P.O. Box 2749, Jakarta, Indonesia.

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## PERTAMBAHAN BARU PERPUSTAKAAN (NEW LIBRARY ADDITIONS)

The following publications were added to the Library:

1. Bulletin of Institute of Mineral Engineering, nos. 9 & 10, 1983.
2. Commonwealth Science Council, Newsletter, no. 6, 1982/83 and no. 1, 1983.
3. IMM, Bulletin nos. 914, 915, 916 & 918, 1983.
4. South Pacific Marine Geological Notes, v. 2, no. 9, 1982.
5. Geosciences Newsletter, vol. 5, no. 2, 1982.
6. Bulletin Science & Technology Malaysia, v. 1, no. 3 & 4, 1982.
7. Seatrads Library, Acquisition list (Oct-Dec 1982) & (Jan-Mar 1983) and Periodical list (Dec 1982).
8. Seatrads Centre, annual report 1981.
9. Scripta Geologica, no. 66, 1982.
10. National Library Singapore adult reference collections, accession list, Nov-Dec, 1982 & Jan & Feb, 1983.
11. Palaeontological Sinica, whole no. 161, new series B, no. 17, 1982.
12. Journal of the Fac. of Science, University of Tokyo, vol. 20, no. 4, 1982.
13. Books about Singapore, 1982.
14. Proceedings of the Annual Technical Meeting 1981: Chiang Mai Univ.
15. Acta Palaeontologica Sinica, vol. 21, nos. 5 & 6, 1982.
16. Journal of Stratigraphy, vol. 6, nos. 2-3, 1982.
17. Bulletin du Bureau de Recherches Geologiques et Minieres, Sect. II, nos. 2-4.
18. Geological literature of USSR. Bibliographical yearbook for 1977 year, vols. I & II.
19. Bulletin of the National Science Museum, vol. 8, no. 4, 1982.
20. Seatrads Bulletin, vol. 3, no. 3 & 4, 1982.
21. Oklahoma Geological Survey, Bull. 132, 1983.
22. Journal of the Geological Society, vol. 140, parts 1 & 2, 1983.
23. IMM Transactions Section A, vol. 92, Jan. 1983.
24. International Subcommittee on Stratigraphic Classification of IUGS Commission on Stratigraphy, circular 63, 1983.
25. International Association on the genesis of ore deposits (IAGOD), VI Symposium: collected abstracts, 1982.
26. Directory of Geoscience Depts. in Universities in developing countries. Compiled by B.K. Tan & S. Chandra Kumar, 1983 (3rd ed.).
27. Mineralogical Society of Poland, vol. 12, no. 1, 1981.
28. Oklahoma Geology Notes, vol. 42, nos. 4-6, 1982.
29. Memoirs of the Ehime University, vol. IX, no. 3, 1982.
30. Wagga Wagga 1:250,000, metallogenic map SI-55-15, 1982.
31. Journal of Geosciences, Osaka City Univ., vol. 25, 1982.

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## BERITA - BERITA LAIN (OTHER NEWS)

### NEW PUBLICATIONS OF INTEREST

1. The Tectonic and Geologic evolutions of Southeast Asian Seas and Islands edited by Dennis E. Hayes. Geophysical Monograph 23 (US\$32).

2. The tectonic and geologic evolution of Southeast Asian Seas and Islands, part 2, edited by Dennis E. Hayes. Geophysical Monograph 27 (US\$42).

Both published by the American Geophysical Union, 2000 Florida Avenue N. W., Washington, D.C. 20009, USA.

3. Geology of the Philippines, vol. 1, (Pesos P300 or US\$35) from chief cashier, Bureau of Mines and Geo-sciences, Pedro Gil Street, Ermita, Manila, Philippines.

A new geological map has also been published and is available from the same address.

C.S. Hutchison

#### Notice of Publication

The Macmillan Press Ltd., of Basingstoke and London has just announced the publication of the textbook "Economic Deposits and their Tectonic Setting", which is authored by Professor Charles S. Hutchison of the Geology Department, Universiti Malaya, Kuala Lumpur. The price has been set at £25 hardcover and £12 paperback. The book format is 245 x 188 mm and has 365 pages.

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### VACANCY FOR GEOLOGIST IN HONG KONG

A Mapping Geologist is required in Hong Kong for an initial 2½ year contract. A minimum four years appropriate postgraduate geological experience is required in field mapping especially of volcanic and plutonic terrain. The candidate must be fluent in English and proficient in written Chinese and spoken Mandarin and/or Cantonese. Salary will be based on experience, within the range HK\$9,955 - \$17,405 per month with a terminal 25% gratuity and family passages and subsidized housing. The contract may be renewable.

Those interested should contact:  
Principal Government Geotechnical Engineer  
Geotechnical Control Office  
6th Floor, Empire Centre  
68 Mody Road  
Kowloon, Hong Kong.

C.S. Hutchison

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### INTERNATIONAL MARBLE SYMPOSIUM

Istanbul, Turkey, 13-17 June 1983.

Sponsored by the Mineral Exporters Union of Turkey, the Symposium will be held at the Marmara Etap Hotel.

#### Programme (subjects of interest)

Turkish marble

Afyon and Marmara Island Marbles  
 Physicomechanic and Technical Specifications of Turkish Marbles  
 World Marble Trade  
 Technical Working Conditions in Modern Marble Quarries  
 Use of Modern Machinery and Systems in Marble Production  
 Marble Industry in Belgium  
 Comparison and Pertinent Specifications of Turkish and Belgium  
 Marbles  
 Development of the Marble Reserve for Production  
 Technical Problems encountered in exploitation in marble quarries  
 Marble in architecture and the restoration of old archaeological  
 relics  
 Planning Project proposals for marble investors  
 Quarry Exploitation and Market Evaluation of Turkish Marbles.

For further information contact:

International Marble Symposium  
 Organising Committee  
 Cumhuriyet Cad. 295  
 Itir Apt. D. 10  
 Harbiye-Istanbul, Turkey.

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## AUSTRALIAN MINERAL FOUNDATION WORKSHOP COURSES

DRILLING PRACTICES SCHOOL : 20th June - 1st July 1983

Venue: Australian Mineral Foundation, Glenside, South Australia

This course is intended for those who manage drilling companies or drilling equipment and for those directly involved in the drilling operations.

There are no specific educational requirements for this school. Emphasis in the school is placed on using technology in drilling practices directed towards controlling costs and minimizing hole problems.

### The Course

- \* Cost control, factors affecting drilling rate and optimized drilling concepts, well planning
- \* Drilling fluids, temperature affects, treating procedures and special fluids
- \* Hole problems: lost circulation, hole stability, pipe sticking, pressure losses in the circulating system
- \* Methods to determine flow patterns and procedures that can be used to determine rapid pressure changes in the annulus
- \* Hydraulics, optimizing and maximizing bottom hole cleaning requirements
- \* Surge and swab pressures: lifting capacity of drilling fluids
- \* Current developments in drill bits, straight hole drilling procedures
- \* Primary and liner cementing, selection of casing seats, casing design and the sizing of blowout preventers
- \* Methods to predict pore pressures and to determine fracture gradients, pressure control, equipment, well head arrangements, routine procedures and special problems.

The course has been developed by Preston L. Moore, President, Preston L. Moore, Inc., of Amarillo, Texas, USA. Dr. Moore has 33 years of drilling experience and has been actively engaged in teaching drilling schools for the last 23 years. Course material includes the Drilling Manual written by Dr. Moore.

Course Fee: Member: \$A1900  
Non-Member \$A2150  
including luncheons and course dinner.

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## TIN / TUNGSTEN DEPOSITS - GEOLOGY AND EXPLORATION : 27th June - 1st July 1983

Venue: Australian Mineral Foundation, Glenside, Southe Australia

### The Course

This course is presented with about a 60:40 time allocation between tin and tungsten

The following topics will be covered:

Province analysis and classification, district analysis and exploration approaches

Deposit types with special emphasis upon low grade targets including: Porphyry tin, porphyry tungsten, tin-tungsten greisen systems, brittle fracture systems, argillic systems pegmatities, strata-bound tin tungsten (including skarns and carbonate replacement deposits)

Recognition of alteration systems and associated granitoids

Selected aspects of metallurgical problems, geochemical prospecting and ore reserve assessment.

### The Course Leader

The course is led by Associate Professor R.G. Taylor, who is currently directing the tin-tungsten research unit at the James Cook University of North Queensland. He has been involved with the tin industry at both the applied and academic levels for some 20 years and is the author of "Geology of Tin Deposits" published by Elsevier (1978).

Course Fee: Member: \$A800  
Non-Member: \$A925  
including luncheons and course dinner.

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## NUMERICAL METHODS FOR THE DESIGN OF EXCAVATIONS IN ROCK: 4th - 8th July 1983

Venue: Department of Civil Engineering, University of Queensland, Brisbane, Queensland

This course is intended for mining engineers and consultants involved in mine planning and research, for civil engineers involved in the design of excavation in rock for tunnels, caverns and the like, and for staff of teaching and research organizations.

## The Course

The planning of excavations in rock is largely controlled by such factors as, location of ore reserves, development and ventilation considerations in mining and obvious geometrical constraints in the case of tunnels and caverns. Within these restraints a number of different excavation strategies or patterns is possible. The choice of the excavation sequence and patterns will influence the behaviour of the rock and may lead to safe or unsafe ground conditions. In the past, mining strategies have been selected on the basis of experience only.

The course introduces an alternative concept of excavation and mine design using numerical methods to analyse different excavation strategies on a (numerical) model. This then allows the planner to determine the effects of different alternatives and to choose the most economical and safe excavation method. The numerical methods also allow determination of the effect of ground support such as cable dowels and shotcrete and the optimal location of such supports.

In this course, three of the methods which can be used for the modelling of ground behaviour are presented. The Finite Element Method, the Boundary Element Method and the Displacement Discontinuity Method. Each of these methods is applicable to specific situations and excavation geometries. The methods are practical and in use in a major Australian mine.

The participants on the course are encouraged to use the computer programmes available at the Civil Engineering Department at the University of Queensland and apply them to the specific problems of their interest. Programmes are available for the Finite Element, Boundary Element and a combined Finite-Boundary Element analysis. The programmes are easy to operate and have graphics display facilities for the presentation of results.

The course does not require any prior knowledge of computing or any of the above methods of analysis. Some knowledge of rock mechanics or geology is desirable. However there is an introduction to rock mechanics in the course summary.

## The Course Leader

The course is led by Dr. J.L. Meek, B.E., B.Sc., M. Eng. Sc. (California, USA), Ph.D. (University of Queensland). Dr. Meek is the Reader in Civil Engineering, Department of Civil Engineering, University of Queensland. His interest has focused on problems related to Mining Engineering. In his work, Dr. Meek has been associated with pioneering work in material modelling, no-tension analysis and stress analysis of cemented hydraulic fill. He has been consultant at various times to many mining projects in Australia, and author of the text "Matrix Structural Analysis" and approximately 40 papers in Computer Structural Analysis.

Course Fee: Member: A\$1000

Non-Member: \$A1125

including luncheons and course dinner.

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## A WORKSHOP ON GEOTHERMAL ENERGY RESOURCE DEVELOPMENT MANAGEMENT AND ENGINEERING

- Date:-** 11 July - 12 August 1983 (five weeks)
- Location:-** University of Denver, Denver, Colorado, USA
- Participants:-** Middle-level government planners, policy makers, and energy resource development program and project managers
- Faculty:-** Experts with extensive developing country experience from international development assistance agencies, industry, engineering firms, and the international geothermal research community.
- Topics:-** Introduction to Geothermal Engineering; Rationale for Project Development; Management Approach to Geothermal Project Development; Management Approach to Geothermal Project Identification, Planning and Preparation; Introduction to Geothermal Development Economics; Defining and Comparing Economic Analysis Approaches and Alternatives; Dealing with and Compensating for Risk and Uncertainty; Investigations for Feasibility for Dry Steam, Wet Steam and Geopressured Resources; Project Design; Project Construction and Engineering Services; Project Operations and Maintenance; Geothermal Projects Financing; Doing Business with International Firms; U.S. Manufacturers and Suppliers Presentations.
- Expenses:-** \$4,100 per participant. Includes all tuition and materials, and local and field trip transportation expenses for the full five-week period.
- Information:-** Further information may be obtained from:  
James W.D. Frasche, Office of International Programs  
Denver Research Institute, University of Denver,  
P.O. Box 10127, Denver, Co. 80208, USA.

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## WORKSHOP ON METHODS OF TEACHING EARTH SCIENCE IN ASIAN HIGH SCHOOLS Chiangmai, Thailand 12 - 18 July 1983

### Objectives

1. To provide an opportunity for science educators in Southeast Asia to consider ways that Earth Science (geology, geophysics, geomorphology, oceanography, atmospheric science, and astronomy) might be expanded in or introduced to the high schools of Southeast Asia (grades 7-12).
2. To review several successful high school Earth Science curricula.
3. To consider how Earth Science can be fitted into the already existing science curricula.
4. To consider how teachers can be trained in countries where an Earth Science background is not required in teacher certification.
5. To conduct training in Earth Science teaching methods as an example of what can be done in a teacher's workshop to strengthen the Earth Science background in science teachers of Southeast Asia.

6. To exhibit current texts, laboratory materials, activities, filmstrips, slides and movies that are suitable for the teaching of Earth Science in high schools. Also to consider the need of developing local units and field trips in the teaching of Earth Science.

### Participation

Science teachers from Asian high schools are welcome to this intensive seven day Workshop on Methods of Teaching Earth Science in High Schools. The number of participants is limited to 30. The allocation will be on the first-come-first-serve basis. Up to 100 observers are welcome to look on but they will not be able to actively participate in the Workshop. The language of the Workshop is English.

### Registration

A registration fee for participants is \$150. A registration fee for observers is \$30.

### Fellowship

A limited number of Workshop Fellowships, to cover travelling, registration and accommodation expenses are available for high school teachers from Southeast Asian Countries. Those who wish to apply please write to Dr. Prinya Nutalaya, Asian Institute of Technology, P. O. Box 2754, Bangkok 10501, Thailand. Cable address AIT-Bangkok, Telex no. 84276 TH. Phone 5239300-13 Ext. 190.

For further information please contact:

Dr. Theerapongs Thanasuthipitak  
Dept. of Geological Sciences  
Faculty of Science  
Chiangmai University, Chiangmai 50002  
Thailand.

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## APPLIED QUATERNARY GEOLOGY - TRAINING PROGRAM

August 22 - October 15, 1983

Asian Institute of Technology, Bangkok, Thailand

Sponsored by

- \* Association of Geoscientists for International Development (AGID)
- \* Government of the Netherlands
- \* Delft University of Technology
- \* Geological Survey of the Netherlands
- \* United Nations Educational, Scientific and Cultural Organization (UNESCO)
- \* Asian Institute of Technology (AIT)

### Aims

Many of the world centres of population and engineering construction are situated on geological materials deposited or modified in the Quaternary period. The nature and geotechnical properties of Quaternary formations have given rise to problems in engineering design, foundation construction, groundwater management, flood protection and

land reclamation and so forth. The geotechnical engineer working in areas of Quaternary geology must be aware of the particular geological characteristics of these areas in order to undertake his work properly while the geologist, perhaps specialised in Quaternary Geology, should be aware of the particular geotechnical problems posed by these materials in order to offer useful advice to the engineer.

The course on Applied Quaternary Geology seeks, in an eight week period, to blend together the essence of Quaternary Geology and the geotechnics relevant to engineering projects in this geological environment. The course is given as two basic streams of training, one geological and the other geotechnical, given together so that the relationships between geology and geotechnics are clearly demonstrated.

In such a short course the emphasis will be placed on practical rather than theoretical aspects. The student will receive four lectures per day and afternoon laboratory and field practicals and exercises. Visits to appropriate engineering works in the Quaternary geological environment are planned together with some whole day weekend excursions to areas of Quaternary geology.

Teachers will be outstanding professionals in the field of applied Quaternary geology and geotechnics. The course will include lectures on soil mechanics, groundwater mechanics, foundation engineering, construction materials, land reclamation, Quaternary sedimentary environments and deposition, hydrogeology, techniques for determining stratigraphy, mapping, geophysics, aerial photograph interpretation, earthquake engineering and engineering geology and site investigation. Full use will be made of the excellent laboratory facilities at the Asian Institute of Technology.

Students will be resident at the Asian Institute of Technology. Some special attention will be given to the particular problems associated with the Quaternary sediments on which the City of Bangkok stands.

### Participants

The aim of the course is to teach those younger scientists (not over 35) with a solid background, outstanding academic record and at least three years of work experience in geotechnical studies beyond the completion of their B.Sc. degree. It is anticipated that 30 participants will be selected and that some geoscientists and engineers will receive scholarships which will cover the fees for the eight week course and may include roundtrip airfare to and from Bangkok.

Course participants should have a B.Sc. or equivalent in geology, geophysics, physics, mining or civil engineering and at least three years of practical experience in applied geology or geotechnical engineering. They must be presently employed in positions where geology and/or engineering is used in their daily work. The course enrollment will be limited to 30 participants, comprising approximately 20 from Asia and the Pacific, 5 from Africa, and 5 from Latin America. Selection will be made by the Organizers.

Participants should bring a scientific calculator with them.

### Tuition and Fees

The tuition and fees are US\$1200 (or Baht 27,600) which will include one set of the course notes and transportation on field trips.



Teaching Staff

The course will be taught by well experienced professional staff. These will be from AIT, from the United States and from the Netherlands, staff from the Geological Survey, the National Laboratory for Soil Mechanics, the Delft University of Technology, the Free University in Amsterdam and the International Training Centre (ITC). Personnel from the Geotechnical and Transportation Engineering Division in AIT will provide general backing for laboratory and field studies.

Scholarships

Some travel grants and scholarships are available for outstanding students from developing countries. Applications for the scholarships should be directed to Dr. Prinya Nutalaya—Course Director, AGID-AIT G.P.O. Box 2754, Bangkok 10501, Thailand.

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## 10TH INTERNATIONAL GEOCHEMICAL EXPLORATION SYMPOSIUM 3RD SYMPOSIUM ON METHODS OF GEOCHEMICAL PROSPECTING

The Geological Surveys of the Nordic Countries invite you to attend the joint 10th International Geochemical Exploration Symposium and the 3rd Symposium on Methods of Geochemical Prospecting which will be held in Espoo/Helsinki from August 29 to September 2, 1983. The Symposium is a joint meeting of the Association of Exploration Geochemists and The International Association of Geochemistry and Cosmochemistry, working group on geochemical prospecting.

Location and Date

The joint Symposium will take place in Espoo at Dipoli International Congress Center, on the outskirts of Helsinki from Monday August 29 through Friday September 2, 1983.

Topics

## Oral presentations

1. Bedrock Geochemistry
2. New approaches in Exploration Geochemistry
3. Till Geochemistry in Exploration
4. Mode of Occurrence of Elements and Nonlithological Factors affecting Dispersion Patterns
5. Other subjects

## Poster presentations

6. Reconnaissance Geochemistry
7. Statistical Methods
8. Other subjects.

Scientific Program

The program will include invited lectures, contributed papers, short presentations of last minute results and panel discussions.

Special Features

1. Discussions on the replies in the questionnaire of Circular 1.
2. Discussions on the involvement of geochemistry in aid programs.
3. State of the art reports and keynote lectures by recognized scientists.
4. Pre-symposium 2-day workshops on: 1. till geochemistry; 2. biogeochemistry; 3. hydrogeochemistry; 4. bulk standard samples to be used in exploration geochemistry; 5. thresholds and anomaly interpretation. The different workshops will run simultaneously. No extra fee for participation will be charged.
5. Discussion on the results of the workshops.

Field Trips

1. Ores and geochemistry of N. Fennoscandia. Includes sulphide deposits of Bidjovagge, Viscaria, and Aitik; Fe-ores of Kiruna and Kolari; Cr-ore of Kemi.
2. Sulphide ores and geochemical prospecting in the Skellefte district, N. Sweden. W, Sn, Sb in Seinajoki, sulphide deposits in SW. Finland.
3. Use of till in exploration, Central Finland.
4. Sulphide deposits of Central Finland. Outokumpu, Pyhasalmi, Vihanti.
5. Ore deposits in Bergslagen, Central Sweden.
6. Uranium occurrences and geochemical uranium exploration in Sweden.
7. Caledonian sulphide deposits. Disseminated lead deposits; molybdenum deposits. Geochemical cases.
8. Uranium occurrences, alkaline igneous rocks, geochemical exploration in South Greenland.
9. Geology and exploration in Soviet Karelia, visits to scientific institutes in Leningrad.

Address for correspondence

Dr. Alf Bjorklund, 10th IGES-3rd SMGP  
 Geological Survey of Finland  
 SF-02150 Espoo 15, Finland  
 Telephone: National (90) 46931  
                   International +358 0 46931  
 Telex: 123185 geolo sf.

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## TRAINING COURSES

A bracketed date (Mar-Apr 1982) denotes entry in that issue carried additional information.

April 25 1983 - May 27 1983

Remote Sensing: Applications in geologic and hydrologic exploration and planning (Sioux Falls, South Dakota, USA). Workshop for foreign nationals. English. For information: Office of International Geology, Training Section, U.S. Geological Survey, 917 National Center, Reston, Virginia 22092, USA.

May 1983 - June 1983

Small Scale Mining (Bangalore, India). An international short course with 10 days of lectures and seminars and 10 days of field trips. Sponsored by AGID and Bangalore University. English. Date changed from November - December 1982. For information: C. Naganna, Director School of Earth Science, Bangalore University, Jnana Bharati, Bangalore 560056, India.

May 30 1983 - July 1 1983; October 3 1983 - November 4 1983; May 28 1984 - June 29 1984; October 1 1984 - November 2 1984

Remote Sensing: Geological applications (Flagstaff, Arizona, USA). Advanced training program for foreign scientists. English. For information: Training Section, Office of International Geology, U.S. Geological Survey, National Center, M/S 917, Reston, Virginia 22092, USA.

June 1983 - August 1983

Principles and Methods of Engineering Geology (Budapest, Hungary): Certificate course sponsored by Unesco. English. For information: Hungarian Geological Institute, Nepstadion ut 14, P.O. Box 106, H 1142; Budapest, Hungary.

June 20 - July 1 1983

Drilling Practices School (Glenside, South Australia). AMF course on using technology in drilling practices directed towards controlling costs and minimizing hole problems. English. For information: The Director, Australian Mineral Foundation, P.O. Box 97, Glenside, South Australia 5065. (Jan-Feb 1983)

June 27 - July 1 1983

Tin/Tungsten Deposits - Geology and Exploration (Glenside, South Australia). AMF course with about 60:40 time allocation between tin and tungsten. For information: The Director, Australian Mineral Foundation, P.O. Box 97, Glenside, South Australia 5065. (Jan-Feb 1983)

July 4 - July 8 1983

Numerical Methods for the Design of Excavations in Rock (Brisbane, Queensland). AMF Course for mining engineers, civil engineers and staff of teaching and research organisations. For information: The Director, Australian Mineral Foundation, P.O. Box 97, Glenside, South Australia 5065. (Jan-Feb 1983).

July 11 - August 12 1983

Workshop on Geothermal Energy Resource Development Management and Engineering (Denver, Colorado, USA). For information: James W.D. Franche, Office of International Programs, Denver Research Institute, University of Denver, P.O. Box 10127, Denver, Colorado 80208, USA (Jan-Feb 1983).

July 1983 - August 1983

Summer course on Earth Sciences: Crystallography, Mineralogy, Metallogeny (Madrid, Spain): Short course sponsored by Unesco. Spanish. For information: Departamento de Geologia y Geoquimica, Facultad de Ciencias, Universidad Autonoma de Madrid, Conto Blanco, Madrid 34, Spain.

July 12 - July 18 1983

Workshop on Methods of Teaching Earth Sciences in Asian High Schools (Chiangmai, Thailand). English. For information: Dr. Theerapongs Thamasuthipitak, Dept. of Geological Sciences, Faculty of Science, Chiangmai University, Chiangmai 50002, Thailand (Jan-Feb 1983).

August 1983 - October 1983

Geochemical Prospecting Methods (Prague, Czechoslovakia): Certificate course organized by Geological Survey of Czechoslovakia and sponsored by Unesco, IAGC and Czechoslovakia. English. For information: GEOCHIM CSSR UNESCO, Geological Survey, Malostranske nam. 19, 118 21 Prague, Czechoslovakia.

August 22 - October 15 1983

Training Programme on Applied Quaternary Geology (AIT, Bangkok). Sponsored by AGID, UNESCO, AIT and others. Scholarships available. Contact: Dr. Prinya Nutalaya, Course Director, AGID-AIT, GPO Box 2754, Bangkok, 10501, Thailand. (Jan-Feb 1983)

September 1983 - October 1983

Geothermal Energy (Kyushu, Japan). Short course organized by Japan in cooperation with Unesco. English. For information: Unesco, 7 place de Fontenoy, 75700 Paris, France.

September 1983 - August 1984

Mining Exploration and Exploration Geophysics (Delft, The Netherlands). Diploma courses organized by the International Institute for Aerial Survey and Earth Sciences. Sponsored by Unesco. English. For information: ITC Student Affairs, P.O. Box 6, 7500 AA Enschede, The Netherlands.

September 12 1983 - October 14 1983

Remote Sensing: Application in vegetation assessment and land use planning (Sioux Falls, South Dakota, USA). (Workshop for foreign nationals. English. For information: Training Section, Office of International Geology, US Geological Survey, National Center, M/S 917, Reston, Virginia 22092, USA.

October 1983 - September 1984

Fundamental and Applied Quaternary Geology (Brussels, Belgium). Organized by the Vrije Universiteit Brussel (IFAQ) and sponsored by Unesco. English. For information: Prof. Dr. R. Paeppe, Director of IFAQ, Kwartairgeologie, Vrije Universiteit Brussel, Pleinlaan 2, B-1050, Brussels, Belgium.

October 1983 - November 1983

Seismology and Geophysics (Potsdam, G.D.R.). Training course organized by East Germany Academy of Sciences in collaboration with Unesco. English. For information: Prof. Dr. H. Kautzleben, Director, Central Earth's Physics Institute, Academy of Sciences of the German Democratic Republic, Telegraphenberg, DDR 1500 Potsdam, G.D.R.

February 6 1984 - March 2 1984

Remote Sensing: Digital image processing (Flagstaff, Arizona, USA). Advanced training program for foreign scientists. English. For information: Training Section, Office of International Geology, U.S. Geological Survey, National Center, M/S 917, Reston, Virginia 22092, USA.

July 1984

Regional Geochemical Exploration in Tropics (Recife, Brazil). 3-week workshop. For information: Prof. Arao Horowitz, Coordenador do Programa de Mestrado em Quimica, Univ. Federal de Pernambuco, Cidade Universitaria, 50000 Recife, Brazil.

## KALENDAR (CALENDAR)

A bracketed date (Mar-Apr 1982) denotes entry in that issue carried additional information.

1983

- Apr 16 : Metamorphism in Shear Zones (Geological Society Tectonic Studies Group Meeting), Cardiff, Wales. (Dr. W. Gibbons, Department of Geology, University College of Wales, Cardiff, UK).
- Apr 17 - 20 : Soil Mechanics and Foundation Engineering, (8th European Conference), Helsinki, Finland. (Secretary-General, VIII ECSMFE, c/o VTT/GEO, SF-02150 Espoo 15, Finland).
- May 2 - 6 : Methods and Instruments for the Investigation of Ground-water systems, (International Symposium), Noordwijkerhout, The Netherlands. Co-sponsored by UNESCO, IHP, IAHS & IAH. Languages: English and French. (Secretary, Organizing Committee, Congress Bureau of the Corporate, Communication Dept., TNO, 148 Juliana van Stolberglaan, 2595 CL The Hague, The Netherlands).
- May 10 : Geology Applied to Civil Engineering Problems in the Developing Countries of SE Asia (Geological Society Joint Ordinary General Meeting and Engineering Group Meeting), London, UK. (Mrs. J. Greenfield, Burlington House, Piccadilly, London W1V 0JU, UK).
- May 11 - 13 : Geological Association of Canada Mineralogical Association of Canada, Canadian Geophysical Union (Joint Annual Meeting), Victoria, British Columbia, Canada. (G. McArthur, Room 418, 617 Government Street, Victoria, BC V8V 1X4, Canada).
- May 17 - 18 : Marine Petroleum Source Rocks (Geological Society Joint Meeting, Petroleum Geochemistry and Marine Studies Group), London, UK. (Dr. Jim Brooks, Exploration Division, BNOC, 150 St. Vincent Street, Glasgow G25 1J, UK).
- May 18 - 20 : Soil and Rock Investigations by In-Situ Testing (International Symposium), Paris, France. Co-sponsored by IAEG and ISSMFE. Languages: English and French. (M. Andre Peter, BRGM., Boite Postale 6009, 45060 Orleans Cedex, France).
- May 19 - 20 : Chemical and Physical Aspects of Subduction Related Magmatism (Geological Society Volcanic Studies Group Meeting), Leeds, UK. (Dr. M.F. Thirlweall, Dept. of Earth Sciences, The University, Leeds 2, Yorkshire, UK).
- June : Engineering Geological Problems of River Valleys (Symposium), Poland, (Doc. Dr. Hab E., Falkowski Institute of Hydrogeology and Engineering Geology, Warsaw University, Al Zwirkkii Wigury 93, 02-089 Warsaw, Poland).
- Jun 12 - 17 : 4th Geosat Workshop, Flagstaff, Arizona. Will cover LANDSAT 4, geobotany, and remote sensing of clays. (The Geosat Committee, 153 Kearny, Suite 309, San Francisco, Ca. 94108, USA).
- Jun 13 - 17 : International Marble Symposium, Istanbul, Turkey. Languages: English and Turkish. Contact: International

Marble.Symposium, Organizing Committee, Cumhuriyet Cad. 295, Itir Apt. D 10, Harbiye-Istanbul, Turkey.

- Jun 19 - 25 : Soil Mechanics and Foundation Engineering (7th ISSMFE Conference), Vancouver, British Columbia, Canada. (Pan American Conference, 6060 Marine Drive, West Vancouver, BC, Canada V7W 2S3).
- Jul 4 - 7 : Petrology of Weathering and Soils (International Colloquium), Paris, France. Languages: English and French. (Prof. Daniel Nahon, Laboratoire de Petrologie de la Surface, Universite de Poitiers, 40 avenue Recteur Pineau, 86022 Poitiers Cedex, France).
- Jul 18 - 23 : Paleoecology (1st International Congress), Lyon, France. Secretaire, 1<sup>er</sup> Congre int. de paleoecologie, Universite Claude Bernard, Dept. des Sciences de la Terre, 27-43 boulevard du 11 Novembre, 69622 Villeurbanne Cedex, France).
- Jul 19 - 21 : Paleoceanography (1st International Conference), Zurich, Switzerland. The Conference will take the place of a 4th Planktonic Conference. (Ueli Briegel, Geological Institute, ETH-Zentrum, 8092 Zurich, Switzerland).
- Aug 7 - 12 : Fossil Corals (Symposium), Washington, D.C. (W.A. Oliver, Jr., US Geological Survey, E-305 Natural History Building, Smithsonian Institution, Washington, D.C. 20560, USA).
- Aug 15 - 27 : IUGG (18th General Assembly), Hamburg, FRG. (Local Organizing Committee, IUGG 1983, Hamburg Messe und Congress GmbH, Congress Organization, Postfach 30 23 60, D-2000 Hamburg 36, FRG).
- Aug 27 : Krakatau Eruption (Centennial Symposium), Jakarta, Indonesia. (D. Sastrapradja, Indonesia Institute of Sciences, Box 250, Jakarta, Indonesia).
- Aug 28 - Sep 2 : World Petroleum (11th Congress), London, UK. (W.B. Waugh, Secretary-Treasurer, Canadian National Committee, World Petroleum Congress, c/o Shell Canada Limited, P.O. Box 400, Terminal A, Toronto, ON, Canada M5W 1E1).
- Aug 28 - Sep 3 : Groundwater in Water Resources Planning (Meeting), Koblenz, F.R.G. Sponsored by Unesco/IHP. (IHP/OHP Sekretariat, c/o Bundesanstalt fur Gewasserkunde, Postfach 309, D-5400 Koblenz, F.R.G.).
- Aug 29 - Sep 2 : Methods of Geochemical Prospecting (10th IGES and 3rd SMGP), Espoo, Finland). Sponsored by AEG and IAGC. Pre- and post-symposium field trips to Scandinavia, Greenland and Soviet Karelia. (A. Bjorklund, 10th IGES - 3rd SMGP, Geological Survey of Finland, SF-02150 Espoo, Finland). (Jan-Feb 1983).
- Aug 29 - Sep 8 : International Association of Geochemistry and Cosmochemistry, (4th International Symposium of Water-Rock Interaction), Misasa, Japan. Technical sessions and post-Symposium field trips. Sponsored by Institute for Thermal Research Society of Japan. (H. Sakai, Secretary-General, WRI-4, Institute for Thermal Spring Research, Okayama University, Misasa, Tottori-ken 682-02, Japan).
- Aug 31 - Sep 2 : Geoscience and Remote Sensing (International Symposium), San Francisco, California, USA. (M. Buettner, M.S.L -

156, Lawrence Livermore National Laboratory, P.O. Box 5504, Livermore, Ca. 94550, USA).

- Sep : International Symposium on Engineering Geology and Underground Construction, Lisbon, Portugal. (Sociedade Portuguesa de Geotecnia, c/o L.N.E.C., Av. Brasil, 101, 1799 Lisboa Codex, Portugal).
- Sep : Geomaterials: Rocks, Concretes, Soils (Meeting), Evanston, Ill. USA. (Secretary-General, IUFAM, Chalmers University of Technology, Fack, S-40220 Gothenburg 5, Sweden).
- Sep 5 - 9 : Blueschists and Related Eclogites (Penrose Conference, Bellingham and Seattle, Washington, USA. (Edwin H. Brown, Dept. of Geology, Western Washington University, Bellingham, WA 98225, USA).
- Sep 12 - 17 : Carboniferous Stratigraphy and Geology, (10th International Congress), Madrid, Spain. (Comite organizador del X Congreso Internacional de Estratigrafia y Geologia del Carbonifero, Instituto Geologico Minero de Espana, Rios Rosas, 23-Madrid - 3, Espana).
- Sep 16 - 17 : Correlation of Caledonian Stratabound Sulfides (Symposium), Ottawa, Canada. Organized in collaboration with IGCP Project 60. Pre- and post-symposium field trips. (D.F. Sangster, Geological Survey of Canada, Room 699, 601 Booth Street, Ottawa, ON, Canada K1A 0E8).
- Sep 19 - 23 : World Energy, (12th Conference), New Delhi, India. (E. Ruttley, World Energy Conference, 34 St. James Street, London SW1A 1HD, UK).
- Sep 19 - 24 : Quaternary (6th Meeting), Galicia, Spain. (Sr. Secretario del Grupo Espanol de Trabajo del Cuaternario, Instituto de Edafologia y Biologia Vegetal, Serrano, 115 duplicado, Madrid-6, Spain).
- Oct : International Council for the Exploration of the Sea (71st Statutory Meeting), Goteborg, Sweden. (General Secretary ICES, Palaegade 2-4, 1261 Copenhagen, Denmark).
- Dec : Groundwater 1983 (IAH Symposium), Sydney, Australia. (W. Williamson, Ibis House, 201/211 Miller St., P.O. Box 952, North Sydney, NSW 2060, Australia).

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- Feb 9 - 14 : Recent Crustal Movements of the Pacific Region (International Symposium), Wellington, New Zealand. Sponsor, Royal Society of New Zealand. (Secretary, H.M. Bibby, Geophysics Division, DSIR, P.O. Box 1320, Wellington, New Zealand).
- Feb 22 - 25 : Applied Mineralogy in the Minerals Industry (2nd International Congress), Los Angeles, Ca., USA. (The Organizing Committee Chairman, ICAM 84, P.O. Box 310, Danbury, CT 06810, USA).
- Mar/Apr : Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA V), Kuala Lumpur, Malaysia. (T.T. Khoo, Geological Society of Malaysia, Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia). (Nov-Dec 1982).



- Mar 26 - 30 : Computer applications in the mineral industries (18th International Symposium), London, UK. Organized by the Institution of Mining and Metallurgy. (The Conference Office, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK).
- May 21 - 23 : Aggregates (International Symposium), Nice, France. Sponsored by IAEG. Languages: English and French. (M. Louis Primel, L.C.P.C., 58 boulevard Lefebvre, 75732 Paris Cedex 15, France).
- Aug 4 - 14 : 27th International Geological Congress, Moscow, USSR. (N.A. Bogdanov, General Secretary, Organizing Committee of the 27th IGC, Staromonetny per. 22, Moscow 109180, USSR).
- Aug 9 - 18 : Crystallography, (13th General Assembly and International Congress), Hamburg, F.R.G. (E.E. Snider, American Crystallographic Association, 335 East 45th Street, New York, NY 10017, USA).
- Aug 24 - 30 : 6th International Palynological Conference, Calgary, Canada. Sponsored by ICP, CAP, CSPG, the University of Calgary, and Arctic Institute of North America. Pre- and post-Conference excursions. (L. Kokoski, Conference Office, Faculty of Continuing Education, Education Tower Room 102, Calgary, Alberta, Canada T2N 1N4).
- Sep : Caledonide Orogen, (IGCP Project 27, Working Group Meeting), Edinburgh, Scotland. Pre-Meeting excursions in Ireland, Scotland, England and Wales. (A.L. Harris, The University of Liverpool, Jame Herdman Laboratories of Geology, Brownlow Street, P.O. Box 147, Liverpool L69 3BX, UK).
- Nov 5 - 8 : Geological Society of America, (Annual Meeting), Reno, USA. (S.S. Beggs, Geological Society of America, P.O. Box 9140, 3300 Penrose Place, Boulder, Co. 80301, USA).
- Dec 2 - 6 : Society of Exploration Geophysicists, (54th Annual Meeting), Atlanta, Georgia, USA. (J. Hyden, SEG, Box 3098, Tulsa, Oklahoma 74101, USA).

#### 1985

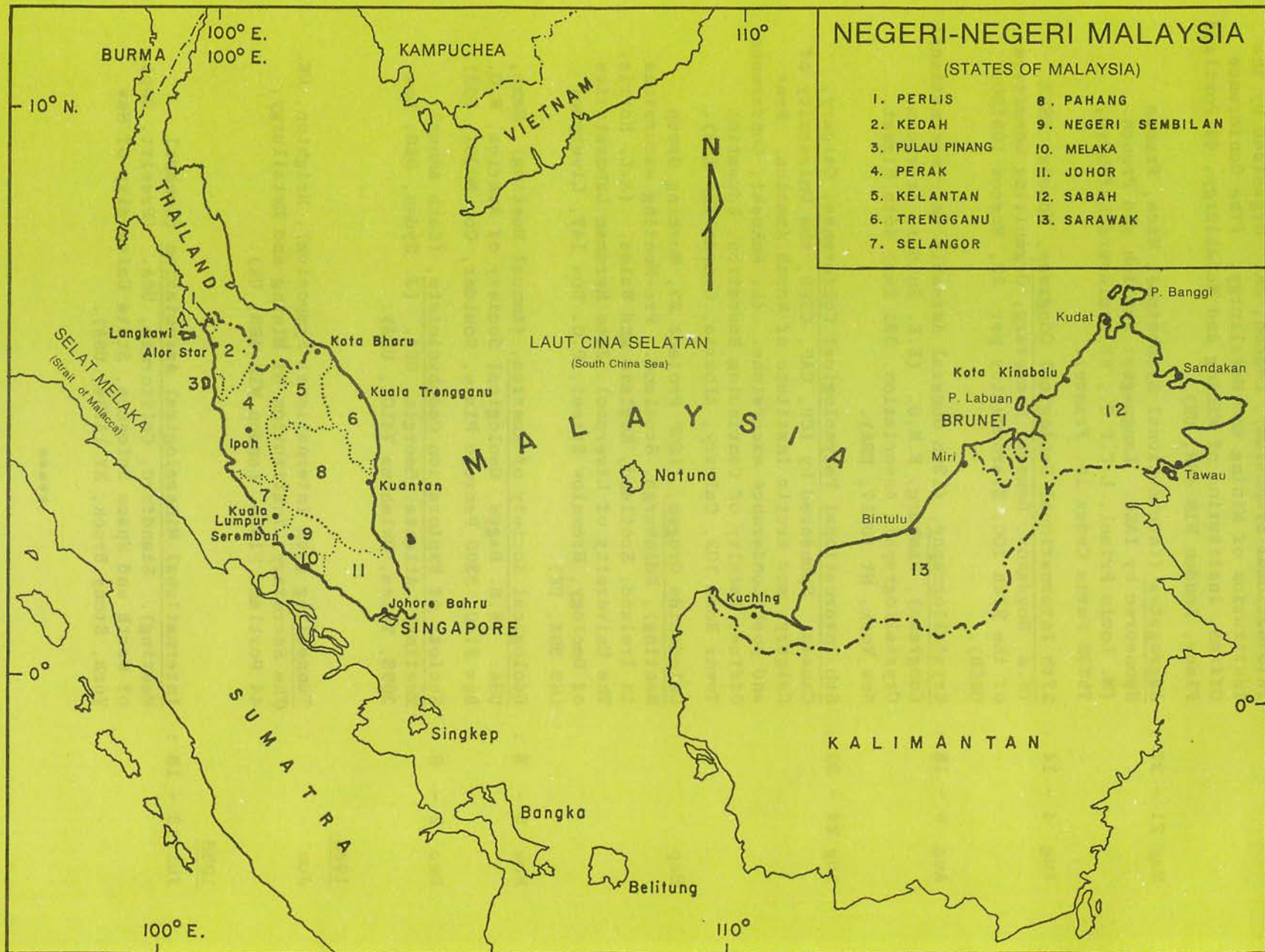
- Jun : Tunnelling (4th International Symposium), Brighton, UK. (The Secretary, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK).

#### 1986

- Jul 13 - 18 : International Mineralogical Association (General Meeting). Stanford, California, USA. (Prewitt, Dept. of Earth and Space Sciences, State University of New York, Stony Brook, NY 11794, USA).

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# NEGERI-NEGERI MALAYSIA

(STATES OF MALAYSIA)

- |                 |                    |
|-----------------|--------------------|
| 1. PERLIS       | 8. PAHANG          |
| 2. KEDAH        | 9. NEGERI SEMBILAN |
| 3. PULAU PINANG | 10. MELAKA         |
| 4. PERAK        | 11. JOHOR          |
| 5. KELANTAN     | 12. SABAH          |
| 6. TRENGGANU    | 13. SARAWAK        |
| 7. SELANGOR     |                    |

BURMA  
KAMPUCHEA  
VIETNAM  
THAILAND  
10° N.  
100° E.  
100° E.  
110°  
N  
Langkawi  
Alor Star  
KOTA BHARU  
Kuala Trengganu  
Ipoh  
Kuantan  
Kuala Lumpur  
Seremban  
Johore Bahru  
SINGAPORE  
SINGAPURA  
SINGKEP  
Bangka  
Belitung  
Laut Cina Selatan  
(South China Sea)  
MALAYSIA  
NATUNA  
BRUNEI  
KOTA KINABALU  
P. Labuan  
Miri  
Bintulu  
Kuching  
P. Banggi  
Kudat  
Sandakan  
Tawau  
0°  
0°  
100° E.  
110°