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# CATATAN GEOLOGI

## (GEOLOGICAL NOTES)

### WING SANG CHEONG TIN MINE, IPOH, PERAK - A CASE STUDY OF MINING AND QUARRYING ON THE SAME SITE\*

AW, P.C., Geological Survey of Malaysia, Ipoh, Perak

#### Abstract

*This is an example of optimum exploitation of non-renewable resources. A sub-economic tin deposit is being successfully exploited by turning the (waste) country rock into saleable construction aggregates and extracting the sparsely distributed tin ore. Granite quarrying such as this, not only provides an alternative to limestone aggregates, but also indirectly helps to conserve limestone hills for better uses. Furthermore, in the Kinta Valley, in places, granite quarrying may uncover hidden tin lodes.*

#### Introduction

Wing Sang Cheong Tin Mine began operation in 1972 using the underground method. However it was soon apparent to the management that the ore grade could not sustain an underground operation. The open cast method was then used. The waste rock, granite, was crushed and sold as construction aggregates in order to offset the operation cost. Tin was exploited whenever and wherever mineralized veins were found in the course of quarrying operations. This set-up is still extant today.

This is an example of good conservation practice. As rocks and minerals are non-renewable resources, they require orderly development so as to prevent undue waste. The practice of quarrying rock and mining tin on the same site, ensures optimum use of non-renewable resources.

This paper briefly describes the geology and mineralization in the quarry. The importance of granite quarrying in relation to finding/mining lode tin in the Kinta Valley is also discussed.

#### Location and access

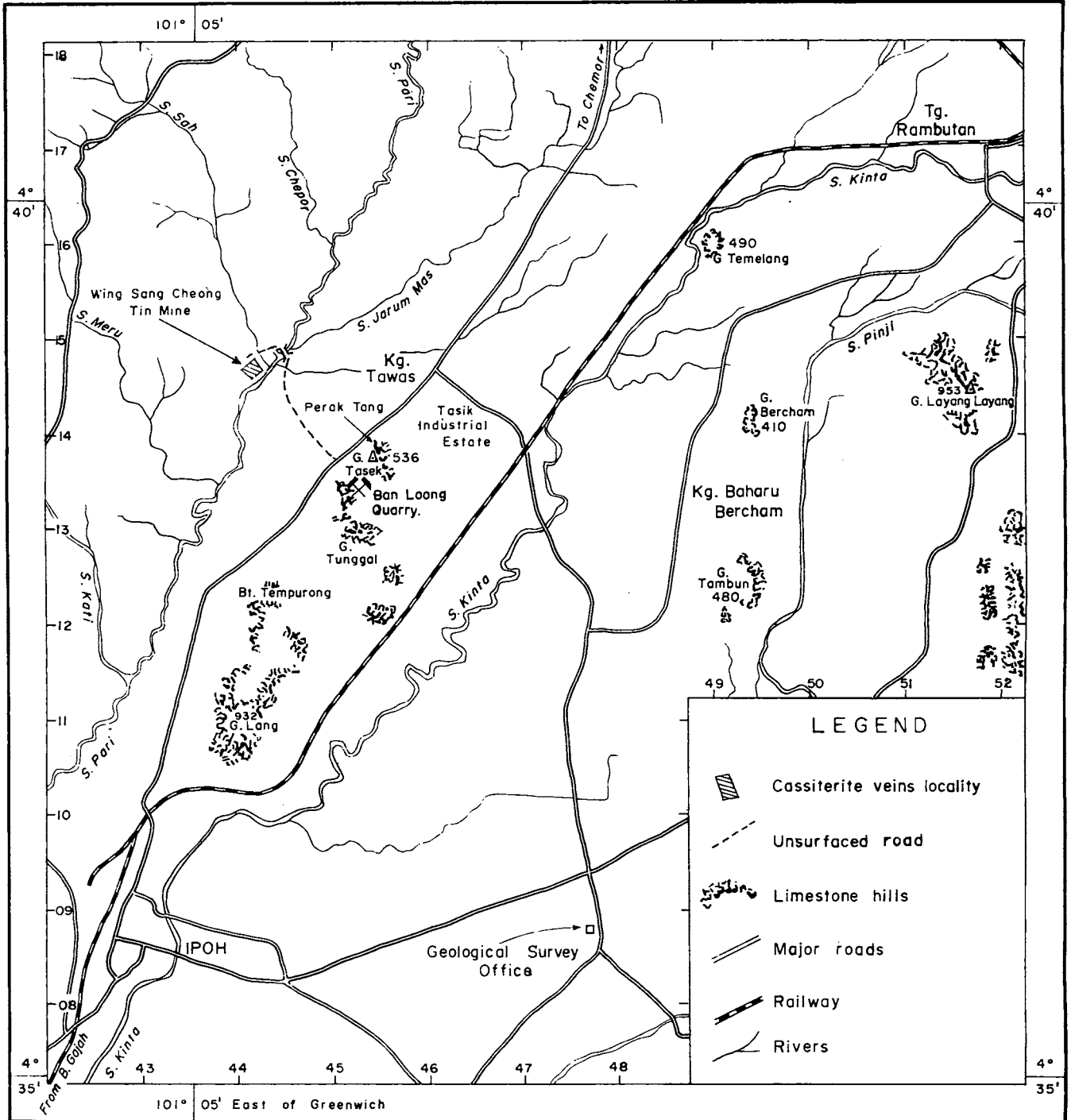
The mine is situated on Lot 51123, about 6 km to the north of Ipoh. It can be reached, via the Ipoh-Kuala Kangsar road, by a 2 km stretch of unmetalled road, with the junction located opposite Ban Loong quarry (Figure 1).

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\* Permission to publish this paper is given by the Director-General, Geological Survey of Malaysia

Figure 1. Locality map of Wing Sang Cheong Tin Mine, Ipoh, Perak.

(Part of Topo Sheet 54—simplified)



### Previous mining history

There is little published record of the mining activity in the area. The only record (Willbourn, 1924) showed that the area was leased to Au Moo Yee and Young Shan Nam. By September 1941, a lode had been followed for about 90 m, and at the northern end of it, a shaft was sunk to about 30 m. The rest of the operation was by open-cut, about 1 m of material was excavated.

The lode, striking  $010^{\circ}$  and dipping  $80^{\circ}$  east was about 30 cm wide in non-porphyrific granite. The lode consisted of quartz, chlorite, calcite, coarse-grained cassiterite, tourmaline and sulphides.

According to Mr. Yong Pitt Hian, managing director of Wing Sang Cheong Tin Mine, a French company, a few decades ago, carried out underground mining in an adjacent area to the south of the present property. Mining stopped after a section of a tunnel collapsed causing a few deaths.

Another lode within the leased area was worked in 1972. Failure to cope with the excessive water, resulted in the stoppage of the working. The old shaft is now covered by water (Figure 2).

### Wing Sang Cheong Tin Mine

Since the last few years the mine is operating more like a quarry. From the scale of operation, it is obvious that a lot of country rock has to be removed in order to uncover any mineralized veins. Mining under such condition is unlikely to be an economic proposition if not for the fact that there is a demand for the waste rock as construction aggregates.

During my visit to the mine in June 1982, there were 3 workers working on a mineralized vein. The workers traced the cassiterite-bearing vein and dislodged it from the country rock by picks and hammers (Plate 1). The rock fragments containing cassiterite were crushed using hammers into sand-sized fractions which at the end of the day were panned to obtain the cassiterite (Plates 2 and 3).

The plan and cross-sectional views of the quarry up to December 1982 are shown in Figure 2. The Government has repossessed part of the leased area for the construction of the new north-south trunk road. Approximate alignment of the road is shown in Figure 2. This necessitates the company to modify its quarrying operation.

Henceforth, quarrying will be confined to the northeastern part. Quarrying is carried out by open cut and benching, using explosives. Part of the western quarry face is shown in Plate 1. Rocks loosened by blasting are transported by lorries to the crushing plant, situated about 400 m to the north (Plate 4).

If permission from the relevant authorities is forthcoming, Mr. Yong (personal communication) intends to mine the lode which is now underwater. He proposes to make a shaft from the floor of the quarry downwards followed by tunneling south to reach the lode under the proposed trunk road.

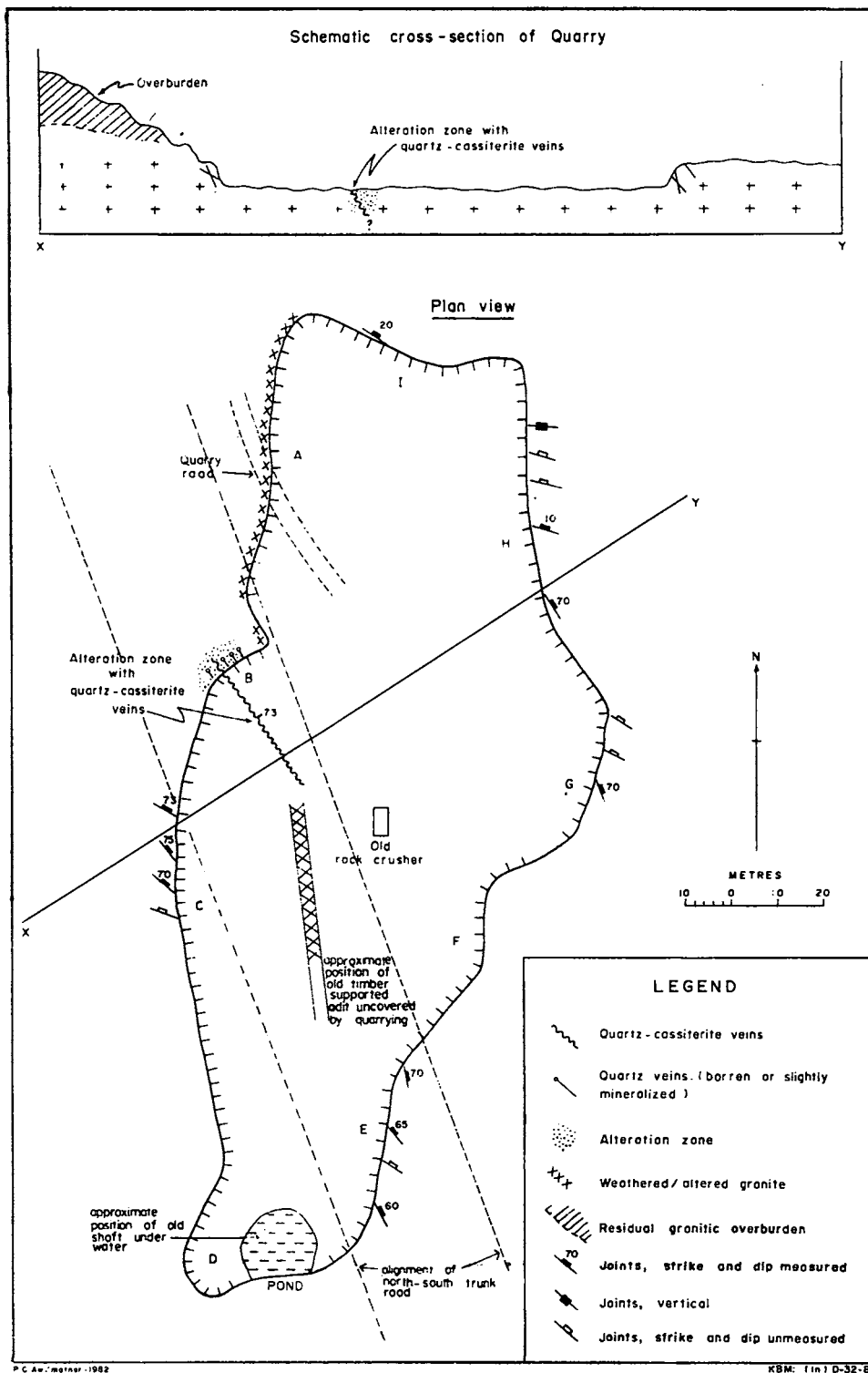


Figure 2. Plan view and cross-section of Wing Sang Cheong Tin mine, Ipoh, Perak.



Plate 1. Mineralized vein and country rock broken up by blasting. Workers dislodged cassiterite-bearing rock using picks and hammers.



Plate 2. A fragment of cassiterite-bearing rock showing coarse-grained fractured cassiterite in contact with vein quartz on one side (right) and with altered granite on another side (left).



Plate 3. Two workers taking a breather in between work on extracting cassiterite from the mineralized vein.



Plate 4. Crushing plant and stockpiles of rock aggregates.



## Geology

The quarry is working on granite which is part of a linear 4 km length boss, an off-shoot of the Keladang granite stock. The boss intruded into marble and other metasediments (Ingham and Bradford, 1960). Marble is exposed in an old mine hole about 200 m to the north.

The granite is medium to coarse-grained and is slightly porphyritic. It is jointed, with the major joints striking NNW to WNW. The discoloration in the outcrops shows that the rock has been altered to various extents. Quartz-cassiterite veins are found in the more intensely altered zone.

Essential primary minerals are quartz, microcline-perthite, plagioclase and biotite. Apatite and zircon occur as accessories. Perthite shows various degrees of cloudiness. Biotite is invariably chloritized, with some altered to muscovite. Plagioclase commonly shows spot alteration to sericite.

The most common secondary mineral is tourmaline which occurs along joints and fractures. Other secondary minerals are pyrite and arsenopyrite. Calcite and fluorite as observed by Willbourn (1924) and Chandramohan (1976) respectively, were not seen by me. However, clay minerals occurring along joint partings were identified by x-ray diffraction to be mainly kaolinite, montmorillonite and illite, with small amount of talc and gibbsite (Teoh and Leong, personal communication).

Minerals commonly associated with cassiterite are quartz, tourmaline, sericite/muscovite, albite, pyrite and arsenopyrite.

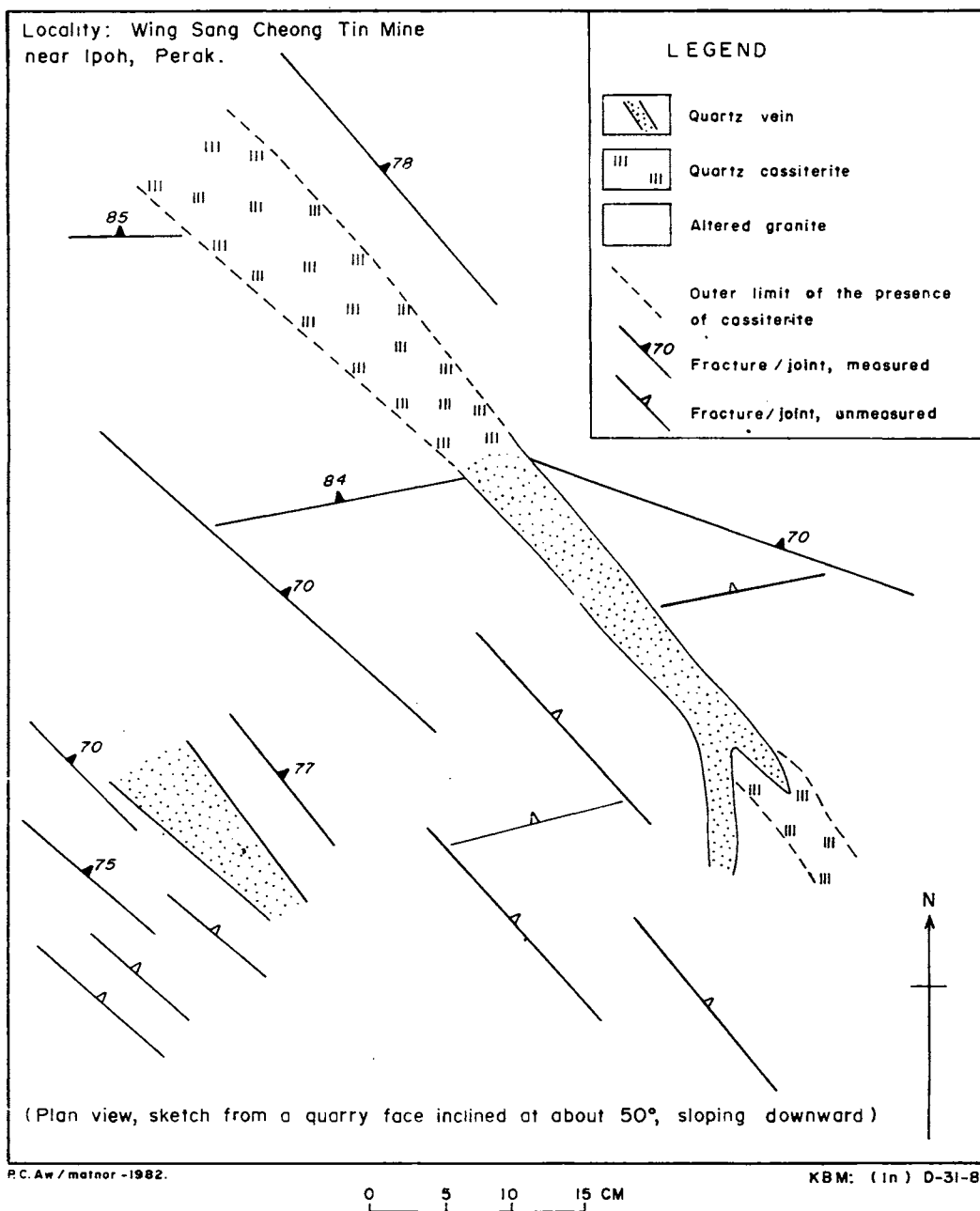
### Tin mineralization

Quartz-cassiterite veins are found in an alteration zone along a section of the western quarry face (Figure 2). The main vein strikes  $330^{\circ}$  and dips  $73^{\circ}$  to northeast. The lode described by Willbourn (1924) strikes  $010^{\circ}$  and dips  $80^{\circ}$  east. Observation made by Chandramohan (1976) shows four sub-parallel lodes as striking north and dips  $75$  to  $80^{\circ}$  east. I am unable to ascertain whether the lodes/veins vary in strike at different levels or there are more than one set of lodes/veins.

During the time of my visit in June 1982 only one vein was worked, most of the other veins were barren. The mineralized vein can be traced from the quarry face to the floor of the quarry for about 50 m. The vein pinches and swells as shown in Figure 3. Cassiterite distribution is highly irregular, where cassiterite occurs, the contact between the veins and the country rock ranges from sharp to imperceptible.

Cassiterite occurs as anhedral polycrystalline aggregate. It is coarse-grained, light-brown to brownish black in colour. In hand specimen, the cassiterite is highly fractured and veined by quartz and sulphides. Under thin section, some of the microfractures in the cassiterite are also filled by chlorite and muscovite.

Figure 3. Quartz-cassiterite veins and fractures in altered granite.



Rock chip samples were collected at 3 m intervals on either sides of the main mineralized vein. The samples were analysed for 14 elements and the geochemical results are shown in Table 1. Visual comparison of the results shows that samples collected near the mineralized veins (13 & 24) are high in As, Sn, Mn, Fe, Cu, Pb and Zn. The difference in the other elements are less obvious. The above results should be taken as tentative. It is premature to consider the above as pathfinder elements for tin mineralization. However, as an academic exercise, it may be justified to suggest that sample 27 (on the basis of high As and ?Fe contents) might be near to a mineralized vein.

#### Granite quarrying and finding lode tin

Tin mineralization is known to be associated with the granite foothills along the Keladang and Main Ranges in the Kinta Valley (Willbourn, 1924; Ingham and Bradford, 1960). Surface geological and geochemical investigations, at places, may not be able to detect buried or sub-outcropping lodes in the granite. The conventional method of prospecting for tin in the granite is an expensive undertaking. In this respect, quarrying provides an economic method in uncovering any lodes that may be present within the quarry area.

I am not advocating quarrying as a prospecting method for finding lode tin. What I am suggesting however, is that granite quarrying in the Kinta Valley may have the following advantages to the quarry operators as well as to the State of Perak:

1. It provides aggregates for construction
2. It alleviates the pressure to quarry the limestone hills, thereby conserving them for posterity or for better industrial uses. If granite aggregates provide an alternative to limestone aggregates, the present demand for the latter can be lessened. The State authorities can have more effective control over limestone quarrying and thereby helps to maintain the environment and to prevent indiscriminate exploitation of limestone hills.
3. Any sub-outcropping or buried lode can be uncovered in the course of quarrying at no extra cost. Or any signs of mineralization uncovered can be followed up by normal prospecting methods.

However, I must stress that the chances of uncovering significant tin lodes by quarrying are slim. In order to encourage the use of granite as construction stones, other incentives should be given to the granite quarry operators. For example, as the production cost of granite quarrying is much higher than limestone quarrying, the existing government duty for both types of rock need to be revised. Further incentive in the form of a tax-holiday for certain period to the prospective granite quarry operators should also be considered.

#### Conclusion

Owing to the erratic cassiterite distribution in the granite, the mine changed its operation from underground mining to open-cast method. The waste country rock excavated is sold as construction aggregates. Any mineralized vein that is uncovered by the quarrying operation is mined.

Table 1. Geochemical results on rock samples collected on either sides of mineralised vein

Distance (m) away from vein	33 SW	30 SW	27 SW	24 SW	21 SW	18 SW	15 SW	12 SW	9 SW	6 SW	3 SW	3 NE	6 NE	9 NE	12 NE	15 NE	18 NE	21 NE	24 NE	27 NE	30 NE	
Sample No.	23	22	21	20	19	18	17	16	15	14	13	24	25	26	27	28	29	30	31	32	33	12*
Pb in ppm	40	135	70	70	35	35	105	35	20	40	85	50	110	30	40	100	80	135	65	55	70	135
Cu in ppm	1	1	1	2	3	2	2	2	1	1	4	12	3	2	6	4	4	2	3	5	4	27
Pb in ppm	3	3	2	3	3	3	6	2	2	2	14	72	7	3	6	8	6	6	5	8	7	9
Zn in ppm	3	4	3	3	4	4	2	2	3	2	20	46	4	2	6	7	4	3	5	5	5	9
Mo in ppm	3.0	4.4	3.0	3.0	4.3	3.5	4.0	3.5	3.6	3.5	4.8	4.0	4.2	3.6	4.0	3.3	3.5	3.1	2.5	3.6	3.7	2.5
As in ppm	5	35	3	3	20	30	60	5	20	20	16,000	4000	30	30	8000	25	5	5	15	20	5	20
Sb in ppm	30	10	10	10	10	10	25	20	80	20	80	240	20	60	15	10	20	140	50	320	20	40
W in ppm	8	2	8	8	16	16	8	16	8	8	8	8	8	4	12	8	24	8	2	8	20	8
Ni in ppm	4	2	3	4	5	4	4	4	3	3	3	2	3	5	6	5	6	5	6	5	5	3
Co in ppm	1	4	1	1	1	2	2	1	1	1	1	1	2	1	2	1	2	1	2	2	2	1
Al in ppm	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	1.1	0.05	0.05	0.1	0.05	0.08	0.05	0.05	0.1	0.05	0.05
Fe in %	0.4	0.7	0.2	0.3	0.5	0.4	0.4	0.1	0.3	0.2	1.8	3.0	0.4	0.5	1.4	0.7	0.5	0.4	0.3	0.5	0.5	0.6
Mn in ppm	44	43	36	38	75	37	31	25	48	34	31	450	76	46	77	116	68	49	46	47	44	82
U in ppm	37.0	26.0	25.0	34.0	25.0	25.0	34.0	25.0	39.0	38	34.0	3.0	33.0	20.0	26.0	5.0	26.0	26.0	58.0	37.0	36.0	15.0

150

\* Specimen 12 is a relatively fresh granite collected near F seen Figure 2.

Analyst: Ong Hock Peng

More of such granite quarry should be encouraged to operate in the Kinta Valley. It provides an alternative to limestone aggregates. With more granite quarries, the pressure to quarry limestone hills for aggregates will lessen, thereby helping to conserve limestone hills for better uses. Quarrying granite in the Kinta Valley may also uncover hidden tin-lodes.

#### Acknowledgements

I thank Mr. Yong Pitt Hian for permission to carry out geological investigation at Wing San Cheong Tin Mine. His information on the earlier mining activities in the area is also acknowledged. I am grateful to my colleague, Mr. S. Senathi Rajah for reading the original draft of this paper. Field assistance was provided by Mr. Yeap Chu Seng.

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*Manuscript received 5 February 1983*

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# DEVONIAN CONODONTS FROM BATU GAJAH, PERAK, PENINSULAR MALAYSIA.

METCALFE, I., Department of Geology, University of Malaya

## Introduction

In 1978, the author collected over one hundred samples of limestone from exposures of Palaeozoic sediments in the south Kinta Valley (mainly west of Kampar). Samples were collected from all the stratigraphic units described by Suntharalingham (1968) and from limestones exposed in a tin mine at Batu Gajah. All the samples from west of Kampar proved barren of conodonts. However, one of three samples collected in the Lee Fatt No. 1 Mine at Batu Gajah (Grid. Ref. 816575, fig. 1) did yield two conodonts. The geology of the Batu Gajah area is not yet known in detail and any age indicative fossils recovered from the area are of importance in elucidating the stratigraphy. Carboniferous fossils are reported from an old mining pool at Batu Gajah by Ingham and Bradford (1960, p.20) but the precise location of this locality was not given. They recorded the corals *Zaphrentites?* sp. and *Siphonophyllia* 'near' *S. gigantea* (Michelin), the foraminifera *Schubertella* or *Eoschubertella* 'near' *E. obscura* and indeterminate crinoids. It was suggested by Ingham and Bradford (1960) that the fauna was of Lower Carboniferous age. However, Jones *et al.* (1966) pointed out that if the foraminifera identification was correct, the limestones cannot be older than Bashkirian (Middle Carboniferous). Devonian fossils have not been previously recorded from the Batu Gajah area.

## Conodonts and age

At the time of sampling, approximately one hundred and fifty metres of bedded, dark grey, carbonaceous limestone was exposed in the Lee Fatt No. 1 Mine with a fairly constant strike ( $017^{\circ}$ ) and dip ( $50^{\circ}$  easterly). Three samples were collected from the accessible upper part of the exposed sequence, Nos. 560, 561 and 562 located 4, 10 and 18 metres respectively below the top of the section. Samples 561 and 562 were barren of conodonts but sample 560 yielded one specimen of *Polygnathus linguiformis linguiformis* (epsilon morphotype) and one fragmentary specimen of *Polygnathus* sp. *Polygnathus linguiformis* has a known geological age range of late Lower Devonian to late Middle Devonian (Ziegler, 1977) but the epsilon morphotype (figs 2a, 2b) is restricted to the late Middle Devonian. The age of the upper part of the section at Lee Fatt No. 1 Mine is therefore inferred to be late Middle Devonian. The colour of the conodont elements represents a colour alteration index (CAI) of 5 indicating that the limestones at this locality have been heated to a minimum of  $300^{\circ}\text{C}$  and a maximum of  $400^{\circ}\text{C}$  (Epstein, Epstein and Harris, 1977).

## Correlation

The Kanthan Limestone of the Chemor area in the north Kinta valley ranges in age from Silurian to Permian (Lane *et al.*, 1979;

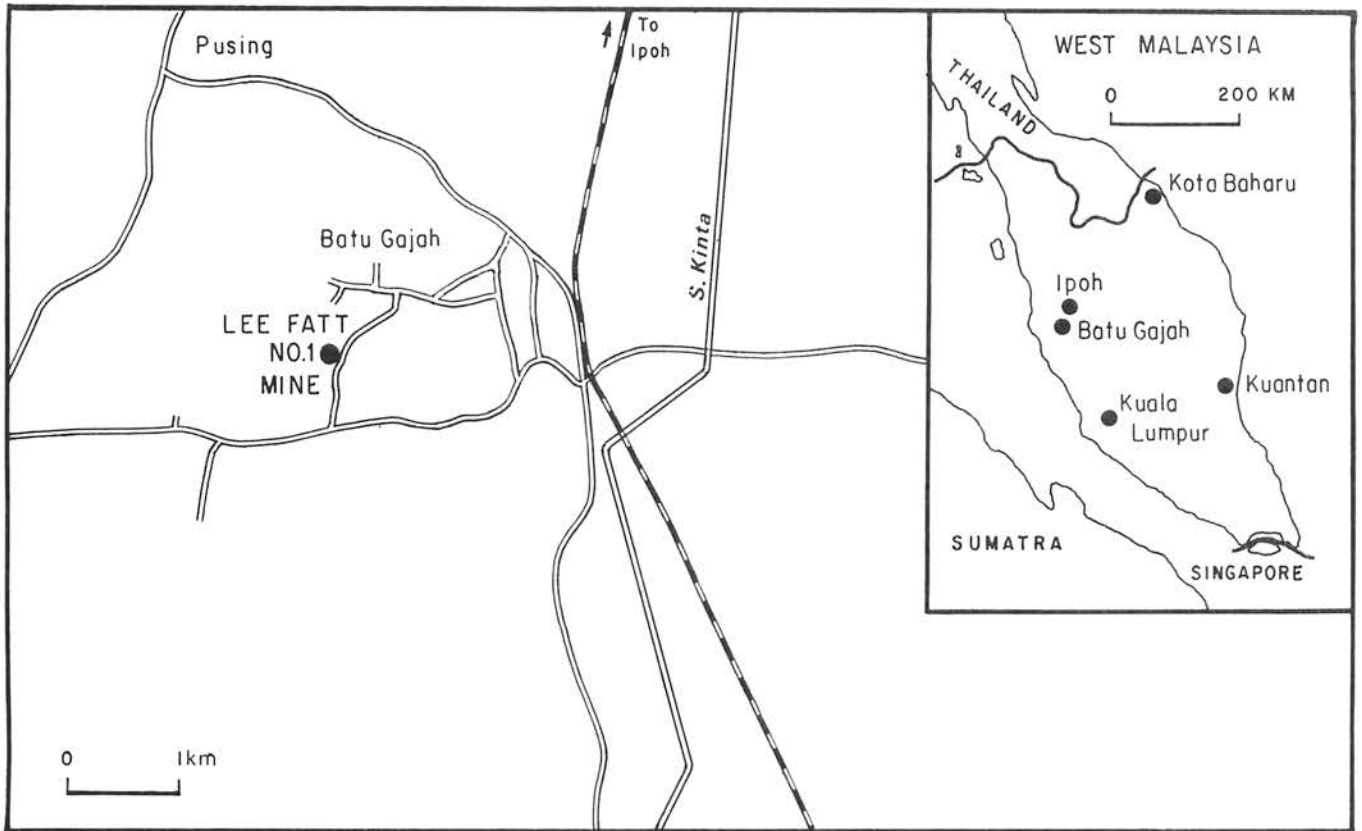


Fig. 1. Sketch map showing the location of the Lee Fatt No. 1 Mine.



Fig. 2. *Polygnathus linguiformis linguiformis* Hinde, epsilon morphotype. Specimen A593, sample 560. a. inner lateral view, b. oral view. X100.

Metcalf, 1979, 1981) and has yielded numerous Devonian conodonts representative of the late Lower Devonian to early Upper Devonian. The limestones in the Lee Fatt No. 1 Mine at Batu Gajah therefore correlate with part of the Kanthan Limestone of the north Kinta Valley. Suntharalingham (1968) described the Palaeozoic succession west of Kampar in the south Kinta Valley and delineated a Middle Devonian unit, the Thye On Beds consisting of grey, ferruginous, calcitic limestones. The underlying earlier Devonian and ? Silurian Kim Loong No. 1 Beds are mainly dolomites. In terms of both age and lithology, the limestones of the Lee Fatt No. 1 Mine correlate well with the Thye On Beds of Suntharalingham (1968).

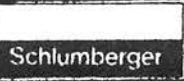
#### Acknowledgements

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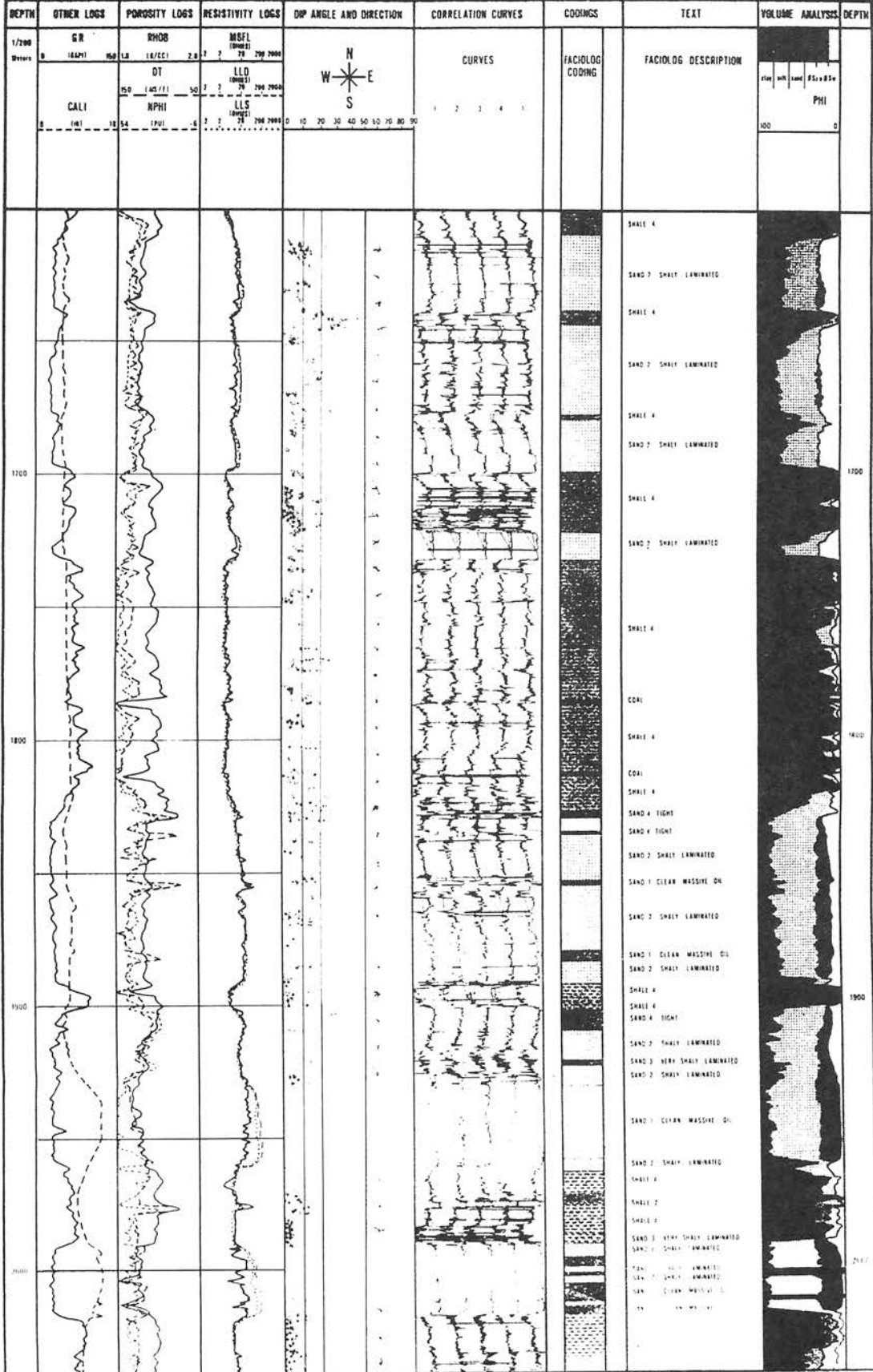
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# FACIOLOG



Wireline logging data is finding wider applications in sedimentology. This began with the study of log curve shapes to identify different depositional sequences. Recent developments have led to the use of logs to identify "electrofacies"—that is, a set of log responses that characterizes a sediment and distinguish it from others. The objective is to associate a certain type of lithofacies defined by core data with a set of log responses so that such a lithofacies can be identified in other wells without core data. This can also be used to guide the choice of interpretation model and in well to well correlations.

# PERHUBUNGAN LAIN (OTHER COMMUNICATIONS)

## WORKSHOP ON METHODS OF TEACHING EARTH SCIENCE IN ASIAN HIGH SCHOOLS \*

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

### Introduction

It has been said that the future development of developing countries rest mainly in the hands of its teachers. Earth science (geology, geophysics, geomorphology, oceanography, atmospheric science, and astronomy) has hitherto been considered an unimportant aspect of a student's education in spite of the importance of mineral resources in many Southeast Asian countries. To many, earth science is an alternative for those students who are uninterested in chemistry, biology or physics, but in many of the Southeast Asian countries earth science per se as a single subject is not being taught in any secondary schools (except the Philippines). However, elements of earth science are being covered in various subjects (especially geography, science and environmental studies).

Realising (1) that unless the citizens of Southeast Asia, are prepared to study earth sciences, they will be unable to make the proper decision regarding development and exploitation of their countries' resources, (2) that the existing teachers in the high schools of Southeast Asia have practically no training in earth science education, and realising further (3) that environmental problems involving geologic hazards and the misuse of resources are common in Southeast Asia, a workshop on the above theme was held at Rincome Hotel, Chiangmai, Thailand from July 12 to July 18, 1983. A total of 43 participants from 8 countries participated in the week long workshop. The course convenors and teachers at this workshop were John L. Rau (U. British Columbia), Prinya Nutalaya (AIT/AGID), Theerapongs Thansuthipitak (Chiangmai U), Charn Tantisukrit (Chiangmai U), Mike Woakes (Ahmadu Bello U, Nigeria), Ken Armstrong (Canada), Dale Haser (USA), Bruce Gurney (Canada) and Ian Clark (Australian Academy of Science). Malaysia was presented by Ms. Hajira Bee bt Abdul Rahman (Senior Assistant, Sri Puteri Secondary School, Ipoh, Perak), Mr. Loh Ghee Juan (Assistant Director, Science and Mathematics, Perak Education Department, Ipoh, Perak) and Mr. Mohamad Ali Hasan (University of Malaya). The breakdown of participants were: Malaysia (3), Singapore (3), The Philippines (1), Thailand (3), U.S.A. (1), Australia (1), Canada (3) and Nigeria (1).

### Objectives

The objectives of the workshop were as follows:

- 1) To provide an opportunity for science educators in Southeast Asia to consider ways that earth science might be expanded in or introduced to the high schools of Southeast Asia (grades 7-12).

\* A Report on the above theme held in Chiangmai, Thailand: 12-18 July, 1983.

- ii) To review several successful high school earth science curricula.
- iii) To consider how earth science can be fitted in the already existing science curriculum.
- iv) To consider how teachers can be trained in countries where an earth science background is not required in teacher certification.
- v) To conduct a hands-on 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.
- vi) To exhibit current texts, laboratory materials, activities, filmstrips, slides and movies that are suitable for the teaching of earth science in high school. Also to consider the need of developing local units and field trips in the teaching of earth science.

### The Workshop Format

The approach of the workshop was structured in such a way that practical 'hands-on' activities were emphasized rather than formal and theoretical lectures. In addition, film shows and panel discussions were also held and a day field trip was conducted.

On the first day, after the opening address given by the Vice Rector Chiangmai University and introduction of instructors and participants, a review of successful earth science programmes was delivered by instructors from Canada, U.S.A. and Australia. Verbal presentations and exchange of ideas from other countries' experiences in earth science were also discussed. Malaysia's representatives offered a contributive paper entitled "Earth Science Programme in the Curriculum of the Secondary Schools in Malaysia" written by Mohamad Ali Hasan (University of Malaya) and Wan Hasmah Wan Mamat (Curriculum Development Centre, Malaysia).

Throughout the Workshop a total of 16 'hands-on' activities, 3 panel discussions, 9 (30 min) film shows, and a number of group discussions and lectures took place. The hands-on activities included topics such as (1) How big is a million? (2) Footprint puzzle (3) Teaching Geologic Time (4) Teaching Plate Tectonics (5) Identification of minerals (6) Identification of Fossils (7) Teaching Planetology (8) Teaching atmospheric science (9) Origin and identification of rocks (10) Teaching oceanography (11) Teaching astronomy (12) Teaching about earthquakes (13) Teaching economic geology (14) Teaching groundwater (15) Weathering and erosion (16) Teaching earth history. These activities proved to be very useful and have already been successfully used particularly in U.S.A., Canadian and Australian high schools and even at junior tertiary level education. Most of the activities were either from the USA Earth Science Curriculum Project (ESCP) or Australian Academy of Science School Geology Project. Each of the participants were given a copy of AGI "Investigating the Earth (3rd edition)."

The 3 (one-hour or so) panel discussions centred on the following themes (i) Discussion on U.S., Canadian and Australian Earth Science Programme (ii) How do we train earth science teachers? (iii) Developing local materials for the Asian High School. Reports on these panel discussions may be published later in the WARTA.

On the last but one day, participants were brought to the field and demonstrated the methods of teaching geology in the field utilizing the geology of the Chiangmai area as an example.

A summary on the instructors' recommendations to the Asian teachers or governments and a discussion on follow-up actions by the participants took place on the last day and the seminar concluded with the presentation of certificates of attendance to all participants.

#### Summary and follow-up actions

At the end of the workshop, the instructors issued a page of recommendations for curricular change in Earth Science as shown in Figure 1.

Malaysia's follow up actions (as agreed upon by the Malaysian participants), should, among other things be:- (i) To conduct a one day 'brain-storming' workshop on "Earth Science programme in teacher training institutes and schools in Malaysia" and (ii) To organise a one week in service 'hand-on' activities for science teachers, in December 1983 and April 1984 respectively. Follow ups to these, may be the 'in service' hands-on activities for teachers in the respective states.

On an individual basis, each participant had been asked to do something to increase the importance of earth science in the curriculum of their countries respectively. Each participant therefore had been asked to do at least one follow-up activity that they will do when they return to their own home countries. The activity can be an example of a teaching method, a method of promoting earth science teaching, or a method they will use to get their government to consider earth science as part of their countries' science curriculum.

#### Conclusion

The workshop on the whole has succeeded in achieving its objectives. The workshop has given an opportunity for science educators to consider ways that earth science might be expanded or introduced in an existing curriculum and successfully exhibiting various teaching aids and activities to the participants. Perhaps, it could be more rewarding if each participant was given a teacher's guide and a set of Earth Science activities of ESCP (U.S.A.) and School Geology Project of the Australian Academy of Science, and also tips or suggestions on field trips for students in the secondary schools.

#### Acknowledgement

The trip to the above workshop will not be possible without the sponsorship and fellowship given by GSM and the organizers (AGID and Chiangmai University). To them I gratefully acknowledge their kind support.

*Article received 1 August 1983*

Recommendations for Curricular Change in Earth Science  
 (Any Scope - from a single class and teacher  
 to a massive national or multinational effort)

---

IDENTIFY.....

- Who
- a) controls the funding to support curricular change.
  - b) has the power to make the changes.
  - c) has the expertise to identify and implement the curricula and/or material changes.
  - d) has the vested interest in the success of the developed materials.

CONVINCE.....

- Each group that
- a) the ultimate outcomes must be expressed in observable behaviours that can be measured objectively.
  - b) consensus in desireable, compromise essential, and involvement of the other three groups critical for the curricular efforts to have any chance of lasting success.
  - c) worthwhile materials and curricular efforts must.....
    - 1) meet a recognized need.
    - 2) take time, effort, and a variety of resources.
    - 3) include a method of evaluating the success of the produced materials within the framework of the pre-established recognized need.

UTILIZE.....

- a) the human resources of each of the identified groups fully.
- b) local natural and/or cultural resources; concentrating on understandings and relationships that can be directly related to and used as examples for expansion to universal principles.
- c) the experiences of those who have gone this way before as models for awareness of alternatives and avoidance of pitfalls.....

Don't spend time "reinventing the wheel."

Figure 1: Recommendations for curricular change in Earth Science issued by the instructors of the workshop.

P E R T E M U A N   P E R S A T U A N  
( M E E T I N G S   O F   T H E   S O C I E T Y )

TECHNICAL TALK

**E.J. COBBING:** Correlation of the Malaysian and Indonesian granites

On the 19 July 1983, Dr. Cobbing was in Kuala Lumpur again, after a 2-month fieldtrip in the Indonesian Tin Islands and central Sumatra, to give his second talk entitled "Correlation of the Malaysian and Indonesian granites" to an audience of 30 members. In November 1981, Dr. Cobbing and his colleague Dr. Mallick, gave a talk on the "Comparison of the Peruvian and Malaysian Granites" (see WARTA Vol. 7, No. 6 & Vol. 8, No. 3).

In his talk, Dr. Cobbing subdivided the granite occurrences in Peninsular Malaysia, the Indonesian Tin Islands and central Sumatra to four main types, namely, the Main Range Granites, the Eastern Belt Granites, the Cretaceous Tin Granites and the Cretaceous Arc Granites (which are related to base metal mineralisation and arc subduction). The Main Range Granites are essentially "no hornblende" granites while the presence of hornblende is enhanced in the Eastern Belt Granites.

In the Indonesian Tin Islands, there is a clear distinction between the tin-bearing (Main Range) granites and the not tin-bearing granites which occur together in a mixed zone. The Karimun Island has an eastern belt character. The Cretaceous tin granites in eastern central Sumatra, however, maybe related to the Phuket granites.

The conclusions he can arrive at from the fieldwork is that the occurrence of extensive granitic belts is only peculiar to Peninsular Malaysia while the strange mixed findings in the Indonesian Tin Islands have made interpretations of their origins more complex and intriguing.

G.H. TEH

**PRINYA NUTALAYA:** Is Bangkok Sinking?

The talk was delivered by Dr. Prinya Nutalaya to an audience of about 60 members and guests of the Society on the 28 July 1983 at the Department of Geology, University of Malaya. Dr. Nutalaya is internationally well-known for his revealing and detailed studies of Bangkok's subsidence and for his dynamism and wisdom as well. Not surprisingly, with such rare qualifications he has recently been elevated to Professorship in the Division of Geotechnical and Transportation Engineering, Asian Institute of Technology, Bangkok. Not surprisingly, as all that is good comes in lots of three in Thai beliefs, Dr. Nutalaya has been elected President of the Association of Geoscientists for International Development and President of the Geological Society of Thailand. Not surprisingly, all these rare achievements happened within the last three years.

The talk was, of course, divided into three parts - the cause, the effects and the solutions. The project to study subsidence in Bangkok was started about a decade ago and one of the major problems faced was the lack of reliable benchmarks in the Bangkok area. Earlier accurately levelled benchmarks were, of course, affected by subsidence. So a major survey and levelling project was initiated starting from a station at sea-level at the isthmus part of Thailand. Strict accuracy was demanded and accurate benchmarks were determined for various stations in the Bangkok area. Recording stations were established to monitor the rate of subsidence.

## TECHNICAL TALKS



Top: E.J. Cobbing (arrowed) having discussions at tea.

Middle: Prinya Nutalaya with his talk on Bangkok.

Bottom: Azhar Hj. Hussin & Nuraiteng Tee Abdullah and Cretan Evening.

The Bangkok metropolitan area is underlain by the Bangkok Clay which overlies sandy aquifers below. Widespread and apparently uncontrolled withdrawal of water from the aquifers below the Bangkok Clay has resulted in dewatering the Clay causing extensive areas of ground subsidence. The studies enabled a subsidence bowl to be delineated which covers the Bangkok area largely east of the Chao Phraya River. Within the subsidence bowl, a subsidence rate of more than 10 cm/year has been recorded.

The effects of subsidence are very visible in the Bangkok area. Flooding is a major problem. At present a urban centre in the Bangkok area is witnessing more days under water than above per month. Tall buildings in Bangkok standing on deep piles become progressively taller by the year as a result of subsidence of adjacent areas. This unexpected growth has made it necessary to add extra steps to permit access easier and more welcoming. Besides easily noticed damages like development of cracks in buildings, ground subsidence has also caused not easily notice, but nevertheless very irritably felt, damages like breakage of plumbing and drainage systems. Disruption of water supply has left parts of Bangkok without water for long periods. Disruption of smooth outflow of used water is just as bad.

The subsidence can be arrested by pumping back water which has been withdrawn. The overlying clay does not permit any downward percolation of water. Water has to be pumped into deep wells to get back into the aquifers. One source of water could be the Chao Phraya River. Control of groundwater withdrawal, perhaps by levying a charge, would be helpful and would provide funds for the pumping programme. Alternative source of water supply would reduce groundwater withdrawal as well. The problems faced by the programme to arrest the subsidence is obviously not only geotechnical.

It is hoped that with enlightenment, steps will be found to prevent further subsidence and the second coming of the Venice of the East. As all good things comes in three, it is hoped that the great city of Bangkok will celebrate the 300th Anniversary very much above water and in a grander scale than the 200th Anniversary just passed.

T.T. KHOO

AZHAR HJ. HUSSIN & NURAITENG TEE ABDULLAH: The Stratigraphy and Structure of the Cretan Pindos nappe

Dr. Azhar and Dr. Nuraiteng took turns to present the above-mentioned technical talk, which was billed as "Malam Crete" (Cretan Evening), following the talk by Dr. Nutalaya. To enable members get a better grasp of the various aspects of the talk, which is based on their Ph.D. theses area, the speakers have kindly furnished a summary of their talk.

*Crete is composed of at least 6 structural units, and their relationships are shown in Fig. 1. The Plattenkalk and the Tripali unit constitute the lower nappe, and the Phyllite-Quartzite nappe, Tripolitza nappe, the Pindos nappe and possibly the High-grade metamorphics constitute the upper nappe.*

The Pindos nappe is divided into 6 lithostratigraphical Formations ranging in age from Upper Triassic to probably Lower Miocene and constituting a total composite thickness of about 3000 m (Fig. 2).

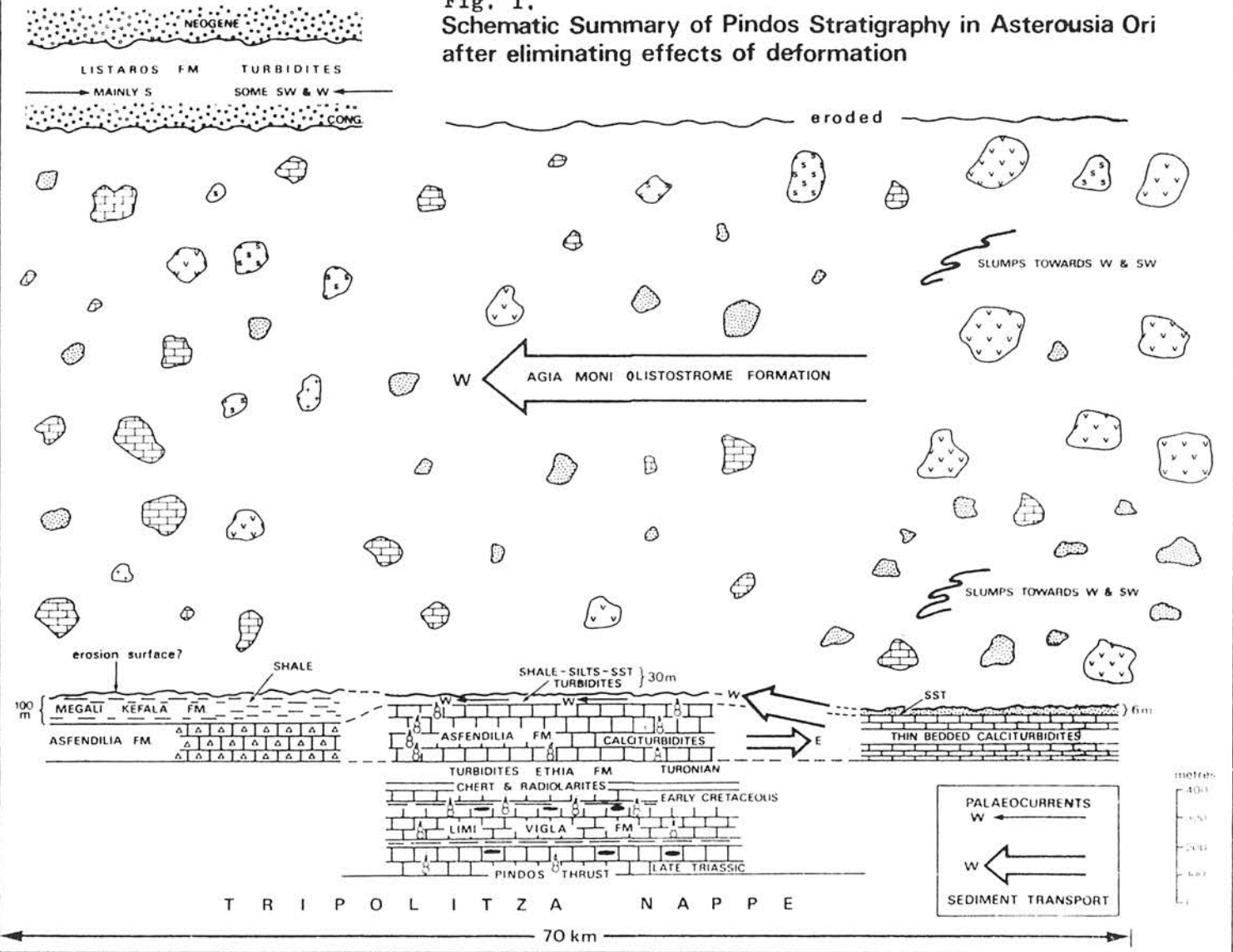
The Limi Vigla Formation was deposited in Late Triassic-Jurassic and probably Lower Cretaceous. Shale, nodular shale, breccia, oolitic-pisolitic calciturbidite, calcilutite, massive oolitic limestone,



WEST

EAST

Fig. 1. Schematic Summary of Pindos Stratigraphy in Asterousia Ori after eliminating effects of deformation



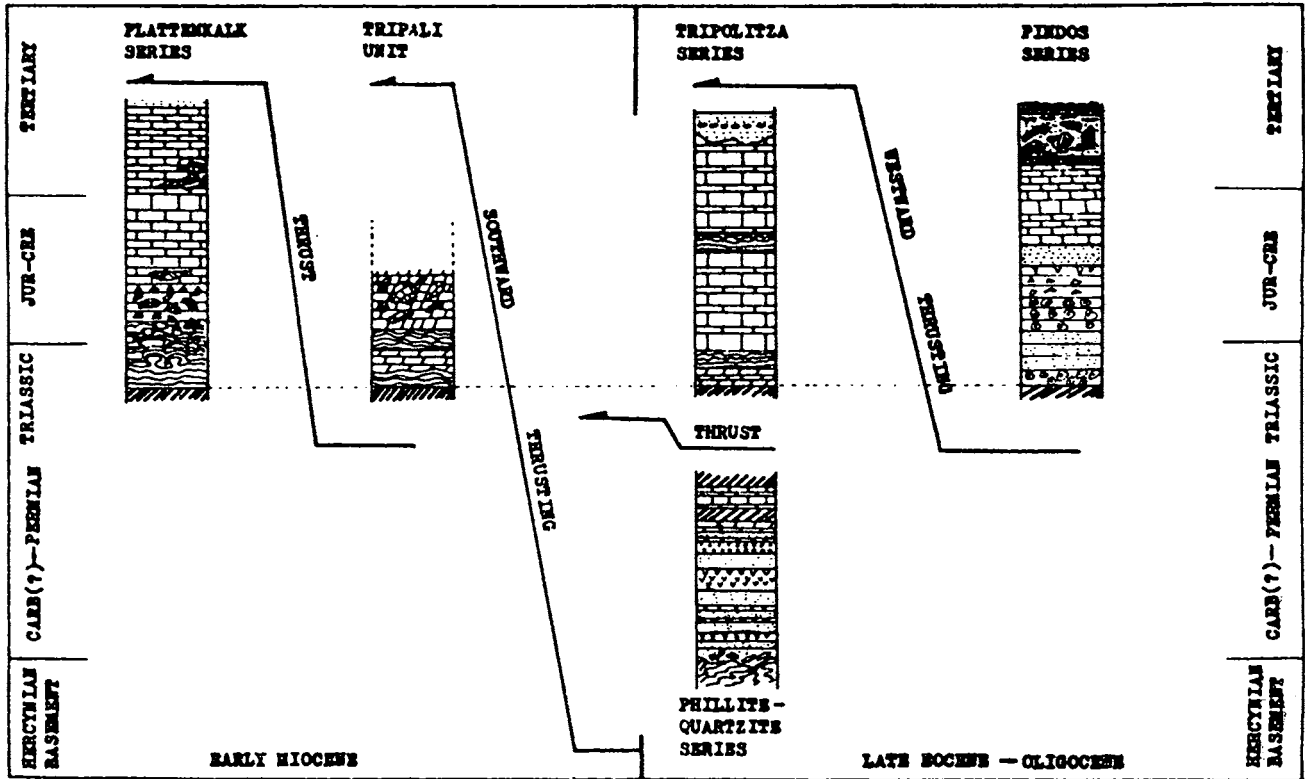


Fig. 2. The lithostratigraphical units of the Pindos nappe

ABS. AGE (m.y.)	AGE	ZONES
54	LOWER EOCENE	G.(M.) aragonensis / G.(A.) bullbrooki (P7-P8?)
		G.(M.) subbotinae (s.l.) (P6)
65	PALEOCENE	G.(G.) pseudomenardii / G.(K.) veluscoensis (s.l.) (P4-P5)
		G.(K.) angulata / G.(T.) pusilla (P3)
		G.(T.) uncinata (P2)
		G.(T.) pseuobulloides (P1)
71	EAASTRICHTIAN	Abathomphalus mayaroensis
		Recemiguembelina fructicosa / Gtr. contusa
78	CAMPANIAN	Gtr. fornicata/Gtr. tricarinata
		Globotruncana elevata
78	SANTONIAN	D. carinata / Gtr. elevata
		Dicarinella carinata

Fig. 3. Santonian to Lower Eocene foraminiferal zonal scheme for the Pindic-Ethia Series, Crete.

chert and red, Halobia-bearing limestone are present in this formation. During the Lower Cretaceous to Turonian, chert, radiolarite and siliciclastic sediments of the Ethia Formation were deposited. The Asfendilia Formation, of Upper Cretaceous to Lower Eocene age, is composed of calcibreccia, calciturbidite, calcilutite and shale. Thick breccias are found in the west. In central Asterousia Ori, the Asfendilia Formation is composed of thick calciturbidite and calcilutite. Eastwards, the formation consists of thinner bedded calciturbidite and calcilutite. This facies pattern suggests the derivation of carbonate clasts from the west.

Within the Asfendilia Formation, a total of 12 biozones based on the first appearances and extinctions of specific taxa of the Globigerinida were established to reflect the characteristic changes in the microfaunal assemblages observed throughout the interval from Upper Cretaceous to Lower Eocene (Fig. 3). The proposed zonation facilitates correlation of the sections examined here with other Pindic outcrops in Crete and in mainland Greece.

A similar faunal change was also observed in the assemblages of the larger benthonic foraminifera. The presence of these fossils in association with other shallow-water calcareous allochems (especially fragments of echinoderms and mollusks) and minor amounts of fine terrigenous material in the calciturbidites indicate that the Pindos basin was receiving derived materials from an adjacent reefal complex or complexes during this period of its depositional history.

The Megali Kefala Formation is characterized by a 6 m thick coarse-grained turbidite sequence in the east. This passes westwards into more than 100 m thick sequence of shale and silt-shale turbidites in the west. The Agia Moni Olistostrome Formation is composed of blocks of different lithologies and ages in a predominantly shale matrix. Paleocurrent directions, facies patterns and the change in thickness of the Megali Kefala Formation, as well as slumps in the Agia Moni Olistostrome, suggest that the siliciclastics were derived from the east.

In the west, the Agia Moni Olistostrome Formation is overlain by the Listaros Formation which is composed of conglomerate and turbidite. Paleocurrents suggest the transport direction was mainly to the south with minor westward movements.

The Pindos Series in the Asterousia Ori is strongly folded with axial directions on N-S and NNW-SSE. The axial planes vary from steeply dipping to slightly overturned. Near the base of the Pindos thrust sheet and in the Tertiary turbidites, some minor folds with axes oriented E-W have been found. The fold directions are interpreted as being related to two different periods of folding.

The sedimentological and structural observations together suggest the Pindos "isopic zone" in Asterousia Ori was oriented north-south, contrary to the generally held opinion that the orientation of the Cretan isopic zones is east-west. The tectonic development of Crete is interpreted to have occurred in two stages. (i) the westward transport of the upper nappe sometime in Eocene. (ii) the southward transport of the upper nappe during Oligocene-Miocene onto the lower nappe (see Fig. 1).

BERITA PERSATUAN  
(NEWS OF THE SOCIETY)

GEOSEA V - PROGRESS REPORT (JULY 1983)

Paper offers

Up to 16 July 1983, a total of 91 offers have been received. Six abstracts have been sent in and they are being evaluated by the Scientific Programme Sub-Committee as regards acceptability. The country breakdown of origin of paper is as follows: Malaysia (35), Thailand (2), Indonesia (5), Philippines (4), Singapore (2), Hong Kong (2), India (8), Bangladesh (2), S. Korea (1), Japan (5), Sri Lanka (1), PNG (2), Canada (2), USA (1), Australia (4), New Zealand (1), UK (7), France (2), Germany (2), Belgium (1), Holland (1).

It is estimated that about 150 papers will be offered and giving allowances for rejection and non-turn up of speakers, about 120 papers will be presented at GEOSEA V (including keynote papers to be invited).

Keynote papers

At present only Prof R.W. Hutchinson (Colorado School of Mines) has agreed to give a keynote paper on economic geology. Other potential keynote speakers are training courses instructors. Keynote speakers invited will not be funded by us except for the usual hospitality.

Training courses

The following responses have been received up to 16 July 1983 (non residents in brackets):

<u>Course</u>	<u>Participants</u>
1. Alluvial Deposits Evaluation	17(14)
2. Banka Drilling	2( 1)
3. Ore Microscopy	4( 3)
4. Geochemical Exploration in Tropical Terrain	8( 3)
5. Carbonate Diagenesis	6( 3)
6. Granite	5( 2)
7. Sulphide Mineralogy	2( 0)
8. Plate Tectonics - concept & development	10( 7)
9. Industrial Minerals	4( 4)
10. Tropical Soil Survey	5( 3)

From the above it appears that courses 2, 3, 7, and 9 are unlikely to be held due to poor response.

In addition to the above courses on

- a) Coal - exploration and evaluation and
- b) Uranium - exploration and evaluation

may be hosted by the Australian Mineral Foundation (AMF), one before and one after GEOSEA. We also have offers to give courses by USM geophysics group and James Cook University group on economic geology. The former needs little or no funding for speakers but the latter needs funding.

In my opinion when the dust finally settles, we may have Courses 1, 4, 5, 6, 8 and one AMF Course taking off.

Course 1 will most probably be run by MMC experts. Course 4 by Prof. Fletcher in cooperation with SEATRAD. Course 5 by Prof. Bathurst in cooperation with CCOP/ASCOPE. Course 6 by British granite experts (external funding). Dr. Barber has been recommended by some to run Course 8 (external funding).

### Field trips

Up to 16 July 1983, the response is as follows:

	<u>Trip</u>	<u>Local</u>	<u>Foreign (speakers in bracket)</u>	<u>Total</u>
1.	NW Malaya	2	8(4)	10
2.	K. Kinabalu-Tawau	7	17(11)	24
3.	Kinta Tinfield	2	5(2)	7
4.	Eastern Belt	3	6(4)	9
5.	K.L. Tinfield	5	9(5)	14
6.	Kuching-Bau-Lupar	0	12(6)	12

From the above response, it appears that all the trips will take off. Field Guides are being prepared for the above as approved by Council earlier.

### Accommodation

Replies to First Circular indicate strong interest in hostel accommodation.

Local : 6 (2 speakers)  
Foreign : 48 (33 speakers)

Federal Hotel has agreed to a 30% discount for room rates.

Thai participants will be coming south of the border by at least 2 buses and presumably most of them will be hostelites as well.

### Transport

Is being looked after by M.A. Hasan who will also arrange transport and programme for possible accompanying spouses.

### Funding

Letters of appeal have been sent out to various organizations such as Bangkok Bank, Toyota Foundation, Yayasan Sabah, COSTED and others. No yen from Toyota Foundation.

A second deluge to appeal letters will be sent out soon to solicit funds principally from International organizations. Appeal to local sources will be made at a later date presumably accompanied by detailed and more impressive Second Circular.

Only donation received to date is a personal donation of \$250/- from Dr. E.B. Yeap to show his strong support for GEOSEA and its aims.

### Sub-Committees

The Sub-Committees formed have been informed and the Training Course and Scientific Programme Sub-Committees will be meeting on 19th July and 22nd July respectively. The chairmen of the other sub-committees will call meetings of their respective sub-committees soon.

## GEOSEA V - MAIN ORGANIZING COMMITTEE

As an initial step towards the organisation of GEOSEA V, the following members have been drafted into the main organising committee.

T.T. Khoo (Chairman)	S. Paramanathan
E.B. Yeap	S. Sandrasagaram
B.K. Tan	K.M. Leong
P.C. Aw	T.W. Koh
Ismail Noor	Mohd. Ali Hasan
Y.F. Wong	Choo Mun Keong
G.H. Teh	Syed Sheikh Almashoor
	A.S. Gan

## GEOSEA V - SUB-COMMITTEES

The following sub-committees are proposed for the effective running of GEOSEA V. Members of sub-committee need not be members of the main organising committee and their services may not be required till GEOSEA V gets closer. The Chairman of each sub-committee may invite members of the Society to join the sub-committees with the conditions that the proposal must first be approved by the main organizing committee. The sub-committees operate under the supervision of the main organizing committee. Young enthusiastic Malaysians should preferably be nominated to serve to ensure availability of experienced Malaysians in future congresses.

Scientific Programme

**Responsibility:** To consider acceptability of papers offered for presentation, drawing up the scientific programme, appointing of sessions chairmen, arranging the time-table for scientific programme, inviting key-note papers and other related matters.

1. T.T. Khoo (Chairman)	7. K.M. Leong
2. S.S. Almashoor	8. M.K. Choo
3. P.C. Aw	9. P.S. Leong
4. E.B. Yeap	10. S. Paramanathan
5. B.K. Tan	11. Azhar Hussin
6. E.H. Yin	12. Idris Mohamad

Finance

**Responsibility:** Financial matters of GEOSEA. All sub-committees need to report to and seek approval from the finance sub-committee on all proposals of expenditures and income. Only this sub-committee can make financial commitments within the budget allocated by Council for the purpose.

1. T.T. Khoo (Chairman)	6. P.S. Leong
2. A.S. Gan	7. K.M. Leong
3. B.K. Tan	8. M.K. Choo
4. S.S. Almashoor	9. M. Ayob
5. Ismail Noor	10. Ahmad Said

Field Trips

**Responsibility:** All matters relating to post- GEOSEA field trips. To determine composition and size of each trip. To select excursion leaders. To cancel any trip, if necessary. Buying insurance and making participants sign indemnity forms. Arranging logistics, transport, accommodation and others. Fixing fees (for approval of finance sub-committee).

- |                        |                  |
|------------------------|------------------|
| 1. A.S. Gan (Chairman) | 5. J.K. Raj      |
| 2. K.K. Khoo           | 6. Azhar Hussin  |
| 3. E.B. Yeap           | 7. C.P. Lee      |
| 4. B.K. Tan            | 8. Tan Chin Tong |

### Training Courses

**Responsibility:** All matters relating to training courses and continuing education programmes. To invite suitable instructors, arrange lecture rooms, selection of participants, fixing fees (for approval of finance sub-committee).

- |                         |                    |
|-------------------------|--------------------|
| 1. T.T. Khoo (Chairman) | 5. Tan Boon Kong   |
| 2. E.B. Yeap            | 6. S. Paramanathan |
| 3. M.A. Hasan           | 7. Ismail Noor     |
| 4. Andres Spykerman     | 8. J.K. Raj        |

### Accommodation

**Responsibility:** All matters relating to accommodation of participants of GEOSEA and associated programmes, except field trips. To arrange hostel and hotel accommodation for participants as requested by participants. All requests for free or subsidized accommodation should be passed over to finance sub-committee.

- |                          |                  |
|--------------------------|------------------|
| 1. M.A. Hasan (Chairman) | 4. Tan Boon Kong |
| 2. Idris Mohamad         | 5. Tan Chin Tong |
| 3. Y.F. Wong             |                  |

### Transport

**Responsibility:** Transportation of participants especially invited speakers, senior officials of international and regional geoscience organizations and training courses instructors from airport to hostels or hotels. Transportation of participants from hostels to training courses and GEOSEA and back. Transportation advice and services for special circumstances. Other transport matters except for field trips.

- |                          |                    |
|--------------------------|--------------------|
| 1. M.A. Hasan (Chairman) | 4. Shamsuddin Taib |
| 2. Tan Boon Kong         | 5. Zuhudi Muda     |
| 3. Tan Chin Tong         |                    |

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## GSM COUNCIL NOMINATIONS 1984/85

### 1984/85 Council Nominations

The Council on the recommendations of the Nominations Committee have drawn up the following list of nominees for the various positions in the coming 1984/85 Council:

- |                      |   |
|----------------------|---|
| President            | : Mr. Leong Khee Meng (Carigali-BP)                         |
| Vice President       | : Dr. John Kuna Raj (University of Malaya)                  |
| Hon. Secretary       | : Mr. Mohamad Ali Hasan (University of Malaya)              |
| Hon. Asst. Secretary | : Mr. Koh Tuck Wai (Petronas-Carigali)                      |
| Hon. Treasurer       | : Mr. Gan Ah Sai (Geological Survey Malaysia)               |
| Editor               | : No nominee  |
| Councillors (2-year) | : Dr. Abdul Hamid Mohammad (Universiti Kebangsaan Malaysia) |
|                      | : Mr. E.H. Yin (Geological Survey Malaysia)                 |
|                      | : Mr. Michael Leong (Petronas)                              |
|                      | : Dr. S. Paramanathan (Universiti Pertanian Malaysia)       |

Other Council Members

The following Council Members will extend their term of office into the 1984/85 Council:

Councillors (1-year) : Mr. Andrew Spykerman (Malaysia Mining Corporation)  
                               : Mr. Choo Mun Keong (Malaysia Mining Corporation)  
                               : Dr. Syed Sheikh Almashoor (Universiti Kebangsaan Malaysia)  
                               : Dr. Yeap Ee Beng (University of Malaya)

Immediate Past President : Dr. T.T. Khoo (University of Malaya)  
 There is no election for this post and the current President will automatically assume the post.

Call for Further Nominations

The general membership are invited to make further nominations for the various positions. Please use the enclosed Nomination Form and should include the written consent of the nominee and two supporting signatures. Nominees and supporters should be Corporate Members (in good standing).

Nominations must be received by the Hon. Secretary by Friday, 30th September 1983.

Hon. Secretary

\*\*\*\*\*

## EDITORIAL ADVISORY BOARD 1983/84

P.C. Aw	C.Y. Lee
Azahar Hj. Hussin	N. Manngnoicharoen
C.K. Burton	Mohd. Ali Hasan
K.R. Chakraborty	Mohd. Ayob
M.K. Choo	M.M. Purbo-Hadiwidyo
Y.C. Chow	P.H. Stauffer
David Lee	Syed S. Almashoor
Denis Tan	Tan Boon Kong
N.S. Haile	H.D. Tjia
Ho Kiam Fui	C.H. Yeap
K.F.G. Hosking	Wan Fuad
C.S. Hutchison	E.H. Yin

\*\*\*\*\*

## GSM FINANCIAL ADVISORY COMMITTEE

A.S. Gan (Chairman)  
 T.T. Khoo  
 B.K. Tan  
 Syed Sheikh Almashoor  
 K.M. Leong  
 M.K. Choo  
 E.B. Yeap

\*\*\*\*\*



## WAKIL PERSATUAN (SOCIETY'S REPRESENTATIVE)

M.H. Loke (Penang)  
 P.C. Aw (Ipoh)  
 Denis Tan (Kuching)  
 Lim Peng Siong (Kota Kinabalu)

\*\*\*\*\*

GSM COUNCIL MEMBER: JOB DESCRIPTION (RESPONSIBILITY):  
 1983/84

1. PRESIDENTDuties

- 1) Presiding Officer at all meetings of the Society
- 2) Chairman of the Council
- 3) Immediate Past-President of succeeding Council

Special Duties

- 1) Chief Officer of the Society
- 2) Responsible for any press statements
- 3) Officiate Society's functions (e.g. Seminar/Workshop)
- 4) Ex-officio of all Society's Committees/activities
- 5) He or V.P. and Treasurer to sign all cheques of the Society
- 6) Sign confirmed GSM council minutes with Secretary
- 7) Authenticate all documents (e.g. certificate of attendance) requiring such certification

2. VICE PRESIDENTDuties

- 1) Assume office of President in case of a vacancy/absence of the President
- 2) Assist President in the administration of the business and affairs of the Society

Special Duties

- 1) Assist President (specific duties)
- 2) To assist and to coordinate all proposals for revisions of the Constitution, guidelines, rules of the Society where necessary for Council's approval

3. SECRETARYDuties

- 1) Responsible for keeping the records of the Society
- 2) Submit annual report (under the direction of the Council)
- 3) Assume duties of the President and Vice President (for any reason both unable to do so)

Special Duties

- 1) Keep minutes of Council Meeting
- 2) Distributing circulars of interest as directed by Council
- 3) Prepare list of membership annually (maintain the register of all members of the Society)
- 4) Prepare list of GSM working committee/representatives annually

- 5) Council member directory
- 6) Responsible for the Society's correspondence
- 7) Filing
- 8) Annual report to Registrar of Societies
- 9) Submit quarterly report to council
- 10) Sign confirmed minutes with the chairman.
- 11) Responsible to call for meetings of council (issue of notice of meetings)

#### 4. ASST. SECRETARY

##### Duties

- 1) Responsible for the stocks and distribution of the Society's publications
- 2) Collect any payments and transmit them to the Treasurer
- 3) Perform duties of the Secretary in the latter's absence
- 4) Assist in the Secretary's work

##### Special Duties

- 1) Responsible for advertisement of Society's publications
- 2) Responsible for review of Society's publications
- 3) Submit quarterly report to Council regarding sales of publications
- 4) Update order form
- 5) Keep record of exchange list
- 6) Responsible for distribution of all publications and manner of distributions as directed by Council
- 7) Play the role of Editor when the Editor of GSM submits any paper to the Society for publications

#### 5. TREASURER

##### Duties

- 1) In charge of financial affairs
- 2) Submit annual report
- 3) Receive all funds and perform all disbursement of funds of the Society (under direction of the Council)
- 4) Shall cause an audit to be prepared annually by the Hon. Auditor

##### Special Duties

- 1) Chairman, Financial Advisory Committee
- 2) Submit financial statements as may be required from time to time by the Council (bimonthly)
- 3) Present a duly audited statement of receipts and disbursements for the period at the GSM, showing true financial situation

#### 6. EDITOR

##### Duties

- 1) In charge of editorial business (under the general direction of the Council)
- 2) Submit an annual report of the above (1)
- 3) Have authority to solicit papers and materials for publications

##### Special Duties

- 1) To take charge of editorial business of publications as spelt out in the Editor's Guidelines
- 2) Submit quarterly (or sooner) report to Council on the progress of the editorial business and the state of matters
- 3) Renewal of KDN permits for the Society's publications
- 4) Chairman, Editorial Advisory Board

7. IMMEDIATE PAST PRESIDENTSpecial Duties

- 1) Advise the Council and to ensure continuity of the Society

8. COUNCILLORS (8) (with other office bearers)

- 1) Shall consider and decide all applications for all classes of membership
- 2) Shall have control and management of the affairs and fund of the Society
- 3) Shall determine the manner of publications of material presented for publication. Council must authorise and approve funds for all publications of the Society
- 4) Shall designate the time and place of meetings
- 5) Shall be in charge of the annual election of office bearers and decide eligibility and other questions pertaining to the election
- 6) Empowered to accept, create, and maintain special funds for publication, research, and other purposes (within the aims of the Society as stated in the Constitution)
- 7) Empowered to create and dissolve any working committee
- 8) Empowered to elect or nominate GSM representatives to various other committee(s)

9. CHAIRMAN OF GSM WORKING COMMITTEES

- 1) Responsible to draft the aims and objectives (if not available) or update rules and regulations of the committee (and also duties and responsibilities of the respective committee) for Council's approval before implementation
- 2) The Council shall appoint the Chairman, who must submit the list of committee members for Council's approval
- 3) Shall appoint not less than 3 members to form the committee of which at least one is a council member
- 4) Shall appoint his/her own secretary of the committee who is a member of the Society
- 5) A copy of minutes of meeting(s) be sent to either the President or Vice President or both
- 6) Submit a short report to the Council through the Secretary whenever the committee has completed the task. This will streamline administrative process as once report received, Council must study it, accept it and also pass a motion of thanks and dissolve the committee.
- 7) Periodic progress report to be submitted to the Council (and when requested by the Council)

10. GSM REPRESENTATIVE TO VARIOUS COMMITTEE(S)

- 1) Shall report annually to the Council (perhaps submit a report half yearly) matters such as benefits, progress, problems, recommendations, etc.

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## EDITOR'S GUIDELINES (1983)

Suggestions for conduct of the office of GSM Editor

General Procedures

1. The editor is responsible to Council on matters involving finance, and on general policy. He should therefore obtain prior Council approval for:
  - a) The decision to publish all publications
  - b) The prices set for the publications
  - c) Any change in printing process or binding type, or change in printers
  - d) The number of copies to be printed
2. The Editor has final responsibility on technical editorial matters. The final decision of any paper submitted for publication rests with the Editor who is aided by an Editorial Advisory Board. He can and should, therefore make final decisions on:
  - a) acceptance or rejection of a manuscript
  - b) format and make-up of publicationsHe should however refer difficult cases to Council for advice.
3. Papers of general interest or on the geology of the Southeast Asian region and also marine areas within the region are welcome for publication in the Bulletin. Short notes, progress reports and general items of information are best submitted to the Warta Geologi.
4. Papers should be as concise as possible. However, there is no fixed limit as to the length and number of illustrations. Therefore, papers of monograph length are also welcome. Normally, the whole paper should not exceed 30 printed pages and it is advisable that authors of papers longer than 30 printed pages should obtain the consent of the Editor before submission of the papers.
5. Scripts of papers found to be unsuitable for publication may not be returned to the authors but reasons for the rejection will be given. The authors of papers found to be unsuitable for publication may appeal only to the Editor for re-consideration if they do not agree with the reason for rejection. The Editor will consider the appeal together with the Editorial Advisory Board.
6. Unless with the consent of the Editor, papers which have been published before should not be submitted for consideration.
7. Authors must agree not to publish elsewhere a paper submitted to and accepted by the Society.
8. Authors alone are responsible for the facts and opinions given in their papers and for the correctness of references etc.

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## KEAHLIAN (MEMBERSHIP)

The following applications for membership were approved:

Full Members

Tang Poh Liing, Ang Cheng Ho Quarry Sdn. Bhd., P.O. Box 627, Kuching, Sarawak.  
 Mahisham b. Ibrahim, Jabatan Penyiasatan Kajibumi, P.O. Box 1015, Ipoh, Perak.  
 Abd. Majid b. Sahat, Jabatan Penyiasatan Kajibumi, P.O. Box 1015, Ipoh, Perak.  
 Yusoff b. Ismail, Jabatan Penyiasatan Kajibumi, P.O. Box 1015, Ipoh, Perak.  
 Dorani Johari, P.O. Box 560, Kuching, Sarawak.  
 Tay Thye Sun, 79, Jalan Taman, Singapore 1232.

Student Members

Subramanian a/l Krishnan, Department of Geology, University of Malaya.  
 Cheah Boon Huat, Department of Geology, University of Malaya.  
 Tham Kum Choong, Department of Geology, University of Malaya.  
 Leong Kheng Sun, Department of Geology, University of Malaya.  
 Kok Keng Hung, Department of Geology, University of Malaya.  
 Chong Kwong Yean, Department of Geology, University of Malaya.  
 Chuah Teong Ban, Department of Geology, University of Malaya.

Institutional Member

Sarawak Shell Bhd. Geological Operations, XGL/1, Lutong, Sarawak.  
 (Tan Bee Seng, Operations Geologist)

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## KEAHLIAN PROFESSIONAL (PROFESSIONAL MEMBERSHIP)

The following have been elected as Professional Members of the Society:

- a) Joginder Singh, Geology Department, Pahang Consolidated Co., Sungei Lembing.
- b) Mathew Raja s/o M. Mathew, Syarikat Permodalan & Perusahaan Pahang Bhd.
- c) Muthuveerappan @ Muthu, Conzinc Riotinto (M) Sdn. Bhd.
- d) Mohamad Ali b. Hasan, Jabatan Geologi, Universiti Malaya.
- e) Syed Sheikh Almashoor, Universiti Kebangsaan Malaysia.
- f) David Liau Kin Hoi, Geological Survey Malaysia, Sabah.
- g) Albert Loh Thiam Hock, MMC
- h) Andrew Spykerman, MMC.

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## PERTUKARAN ALAMAT (CHANGE OF ADDRESS)

The following member has informed the Society of his new address:

Mohammad Yamin Ali, Petronas Laboratory, Lot 1026 PKNS Industrial Area, Selangor.  
 David Manning, Department of Geology, The University, Newcastle-upon-Tyne NE1 7RU, U.K.  
 W.F. Hanna, US6S, 927 National Center, Reston, VA 22092, U.S.A.  
 Geh Poh Khong, 56 Lorong Mahsuri 10, Bayan Baru, Penang.

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## PERTAMBAHAN BARU PERPUSTAKAAN (NEW LIBRARY ADDITIONS)

The following publications were added to the Library:

1. Journal of Science of the Hiroshima U. Series C, vol. 8, no. 1, 1983.
2. IMM Transaction, vol. 92, July 1983.
3. Grondboor en hamer, nos. 5-6 (1982).
4. South Pacific Marine Geological Notes, vol. 2, no. 10, 1983.
5. Petromin, August 1983.
6. Petroleum News, vol. 14, no. 6 & 8, 1983.
7. Scripta Geologica, no. 71, 1983.
8. CCOP/SOPAC, Technical Bull. 4, 1983.
9. Proceedings of the Eleventh Session, Wellington, N.Z. 9-17, 7 Nov. 1982.
10. Oklahoma Geol. Survey, Bull. 133, 1983.
11. Geological Correlation, no. 11, 1983.
12. Seatrad library, Acquisition list, July-Sep 1983.
13. Petroleum Geol. of Taiwan, nos. 17 (1980), 18 (1981).

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## BERITA - BERITA LAIN (OTHER NEWS)

PETROLEUM AND GEOLOGICAL ENGINEERING, INC., - 1984

### SCHEDULE OF OFFERINGS

#### SINGAPORE

Waterflooding for Engineers	June 25-29, 1984
Basic Oil Field Development and Operations	July 2-6, 1984
Applications of Petroleum Fluid Data	July 9-13, 1984
Total Optimization of Production Systems	July 16-20, 1984
Oil and Gas Well Testing	July 30-Aug. 3, 1984
Corrosion Technology	Aug. 6-10, 1984
Gas Process Plant Operation	Aug. 13-17, 1984
Process and Pipeline Safety Practices	Aug. 20-24, 1984

#### INDONESIA-JAKARTA

Natural Gas Reinjection Operations	July 23-27, 1984
Natural Gas Utilization and Conservation	July 30-Aug. 3, 1984
Analysis of Field Production Curves	Aug. 8-10, 1984
Hydrocarbon Liquid Recovery	Aug. 27-31, 1984
Crude Oil Dehydration and Desalting	Sept. 3-7, 1984

**OBJECTIVES:** The objective is to organize and present useful courses for both staff and field personnel. They set forth, in a practical way, the basic knowledge, techniques and concepts for obtaining and applying valid data in actual operations. The principles taught in the courses are illustrated by means of a wide variety of problems, field examples and case histories.

**CONDUCT OF THE COURSES:** The courses consist of a balanced series of lectures, discussions, problem-solving sessions and work periods.

Formal sessions are held on a Monday through Friday basis and run from 0830 to 1200 and 1300 to 1630. Reading and problem assignments are given to reinforce course concepts.

The structure of the sessions makes it possible for the participants to exchange information and experience on a variety of oil and gas industry problems. Informal discussions of field operations, encouraged throughout the course, lead to a sharing of knowledge.

A manual prepared especially for the course is used to introduce most of the topics considered. The basic material in the manual is supplemented with reprints of recent articles reference lists on key topics, problems with solutions, field examples and case histories.

For more information: PETROLEUM AND GEOLOGICAL ENGINEERING, INC.,  
1839 Rolling Hills/Norman,  
Oklahoma 73069/U.S.A.  
Telephone: (405)-364-9626  
TWX 910-830-6532 PETRO GEO NORM  
Cable: PETRO GEO

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## INTERNATIONAL SYMPOSIUM ON LOW COST ROAD TUNNELS

University of Oslo, Norway, June 20-23, 1984

The symposium will aim at design and procedures for minimizing the cost of construction and maintenance of road tunnels in hard rock. Realizing the interaction between the various factors, the symposium will deal with the subject under the following four sessions:

### I Traffic and safety aspects

- Geometry, speed and capacities
- Road markings and lighting
- Ventilation and emergency installations
- Accident rates and causes

### II Planning and structural design

- Required geological data
- Temporary and permanent support
- Water and frost protection
- Pavement and drainage

### III Construction methods and procedures

- Contract formulation
- Equipment and working procedures
- Support installation and control
- Technical installations

### IV Maintenance and operation

- Traffic installations
- Support system control
- Drainage efficiency
- Pavement conditions

Symposium Address: International Symposium on LOW COST ROAD TUNNELS  
(LCRT), P.O. Box 6390 Etterstad,  
N-Oslo 6 Norway.  
Telephone: +472 46 69 60  
Telex: 71 238 sreg N

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# FOSSIL FUELS OF EUROPE

## CONFERENCE AND EXHIBITION

The theme of the meeting will focus on current perceptions of the geologic evolution of Europe with emphasis on those factors concerning the creation and preservation of fossil fuels. New data are available and even more important, new concepts to guide our exploration efforts in Europe and elsewhere help in organizing and examining that data more intelligently.

The Fossil Fuels of Europe Conference and Exhibition is sponsored by the American Association of Petroleum Geologists.

### TECHNICAL PROGRAM

#### Monday morning, July 16

##### Session 1 - BASIN EVOLUTION AND GEOTHERMAL GRADIENTS

Presiding: J.F. Dewey, P.W.J. Wood  
 P.Y. Chenet, L. Montadert, I. Morelli: Structure and evolution of some continental rifts - Consequences for their thermo-mechanical behaviour  
 X. Le Pinchon: Subsidence, heatflow and mechanisms of extension within the crust  
 S. Hellinger, J.G. Sclater: Two layer extensional models for the evolution of sedimentary basins

#### Monday afternoon, July 16

##### Session 2 - BASIN EVOLUTION AND GEOTHERMAL GRADIENTS

Presiding: J. Brooks, D.H. Welte  
 E.R. Oxburgh: Convection, conduction and the thermal gradients of sedimentary basins  
 M. Harrison: Microcline thermochronology - An approach to determining the temperature history of sedimentary basins  
 A. Cook, D. Murchison: Anisotropy, deformation and thermal gradients  
 J.F. Dewey, W.C. Pitman: Structural and thermal evolution of small pull-apart basins  
 D.H. Welte, A. Yuantitative determination of the geologic and thermal evolution of sedimentary basins

#### Tuesday morning, July 17

##### Session 3 - STRUCTURE AND BASINS OF THE ALPINE SYSTEM

Presiding: A.W. Bally, J. Sutton  
 S. Mueller: Deep Seismic sounding in Europe  
 D.H. Matthews: Sedimentary basins and crust and upper mantle reflections  
 W. Kampshuur, N.P. Press: Tectosat study of the northwest european margin from satellite imagery and structural data  
 D. Bernoulli: Basin evolution in the Atlantic/Tethyan System  
 M.T. Fahlbouty, F. El-Baz: The Mediterranean Sea - Its origin and evolution

#### Tuesday afternoon, July 17

##### Session 4 - STRUCTURE AND BASINS OF THE ALPINE SYSTEM

Presiding: R. Trümpy, J.S. Jennings  
 D. Roeder: Tectonic evolution of the Appennines  
 F. Ricci-Lucci: Orogenic Clastic wedges



- D.J. Stanley: Welded slump-graded sandcouplets -  
Evidence for slide-generated turbidity currents in the  
Gres d'Annot
- H.W. Ladwein: Source rocks in the Vienna Basin and their  
importance for hydrocarbon exploration along the northern  
edge of the Alps
- M. Pieri: Italian oil and gas resources - Present  
situation and future development

Wednesday morning, July 18

CASE STUDIES I

- Presiding: P. Kent, D. Roeder
- C. Cornelius: Heavy and tar sand oil deposits of Europe
- D. Durand: Geochemical relationship between petroleum and coal
- J. Masters: The overthrust problem - As exemplified in  
Western Canada
- A. Perrodon: Rhine Graben, Paris Basin and Aquitaine Basin -  
A comparative study
- D. Leythaeuser, A.S. McKenzie: Effects of deep-seated igneous  
intrusions in northwest Germany on generation of hydrocarbons  
in Lower Jurassic source strata

Wednesday afternoon, July 18

CASE STUDIES II

- Presiding: M.T. Halbouty, J. Masters
- J. Brooks, C. Cornford: Geological controls on the composition  
of North Sea oils
- R. Leonard: Generation and migration of hydrocarbons on the  
southern Norwegian shelf
- J.C. Goff: Oil generation, migration and entrapment in Jurassic  
rocks of the East Shetland Basin
- J.F. Dewey, A.W. Bally: Wrap-up and general discussion

FIELD TRIPS

- Trip 1: The Classical Neocomian around Neuchatel (historical strato-  
types of the Valanginian and the Hauterivian).  
Saturday, July 14.  
Leader: Jürgen Remane, University of Neuchatel.
- Trip 2: Alps of Central and Eastern Switzerland.  
Thursday, July 12 through Saturday, July 14.  
Leader: Rudolf Trümpy, Universita and Polytechnical  
Institute of Zurich.
- Trip 3: Molasse, Flysch and Helvetic Nappes of Western and Central  
Switzerland.  
Thursday, July 12 through Saturday, July 14.  
Leaders: P.W. Homewood, University of Fribourg and A. Matter,  
W. Winkler, R. Herb, University of Bern.
- Trip 4: Geotraverse from Geneva to Chamonix.  
Thursday, July 19.  
Leader: Jean Charollais, University of Geneva.
- Trip 5: Jurassic and Lower Cretaceous Carbonates in the Area  
Surrounding Geneva.  
Thursday, July 19.  
Leader: Eric Davaud, University of Geneva.
- Trip 6: Oligocene Flysch to Molasse Transition.  
Saturday, July 14.  
Leader: Jean Charollais, University of Geneva.

- Trip 7: Geology of the Prealps and Ultra-Helvetic Nappes.  
Friday, July 13 through Saturday, July 14.  
Leader: Aymond Baud, Musée Géologique, Lausanne.
- Trip 8: Geology of the Helvetic Nappes  
Friday, July 13 through Saturday, July 14.  
Leader: Henri Masson, Geological Institute, University of Lausanne.
- Trip 9: Geology of the Penninic Zone in Zermatt Area.  
Thursday, July 19 through Friday, July 20.  
Leader: Arthur Escher, Geological Institute, University of Lausanne.
- Trip 10: Ophiolites of the Nappe des Gets in the Prealpine Environment.  
Saturday, July 14.  
Leader: Félice Jaffé, Geneva University.

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## INTERNATIONAL GEOLOGICAL CONGRESS

MOSCOW, AUGUST 1984.

A. TECHNICAL SECTIONS

- Stratigraphy (ICS): M.G. Bassett (U.K.), I. Chlupac (Czechoslovakia),  
A.I. Zhamoida (U.S.S.R.).
- Palaeontology (IPA): A. Yu Rozanov (U.S.S.R.), O.H. Walliser (F.R.G.).
- Quaternary Geology and Geomorphology: H. Faure (France), K.V. Nikiforova  
(U.S.S.R.).
- Sedimentology: K. Crook (Australia), P.P. Timofeev (U.S.S.R.).
- Geophysics: V.V. Belousov (U.S.S.R.), St. Müller (Switzerland),  
D.A. Valencio (Argentina).
- Petrology (Igneous and Metamorphic Rocks): O.A. Bogatikov (U.S.S.R.),  
I. Kushiro (Japan).
- Mineralogy: F.V. Chukhrov (U.S.S.R.), S. Hafner (F.R.G.), I.N. Kostov  
(Bulgaria).
- Geochemistry and Cosmochemistry: V.L. Barsukov (U.S.S.R.), M.H.  
Grünenfelder (Switzerland), B. Hitchon (Canada).
- Precambrian Geology: H.L. James (U.S.A.), W. Neumann (D.D.R.), N.P.  
Shcherbak (U.S.S.R.).
- Geology of Ocean Basins: W. Hey (U.S.A.), Yu. M. Pushcharovsky (U.S.S.R.).
- Tectonics: A.V. Peyve (U.S.S.R.), R. Trümpy (Switzerland)
- Metallogenesis: N. Fisher (Australia), L. Kostelka (Austria), N.P.  
Laverov (U.S.S.R.).
- Oil and Gas Fields: A.W. Bally (U.S.A.), F.N. Talukdar (India),  
A.A. Trofimuk (U.S.S.R.).
- Solid Fuel Mineral Deposits: V.S. Borisov (U.S.S.R.), R. Feis (France).
- Non-Metallic Mineral Ores: P.J. Cook (Australia), G.E. Murray (U.S.A.),  
H.H. Murray (U.S.A.), V.P. Petrov (U.S.S.R.).

- Hydrogeology: G. Castany (France), G.V. Kulikov (U.S.S.R.).
- Engineering Geology: M. Arnould (France), M. Langer (F.R.G.), E.M. Sergeev (U.S.S.R.)
- Remote Sensing: P. Bankwitz (D.D.R.), W.D. Carter (U.S.A.), N.V. Mezhelovsky (U.S.S.R.), V.M. Moralev (U.S.S.R.).
- Comparative Planetology: M.S. Markov (U.S.S.R.), H. Mazursky (U.S.A.), L. Silver (U.S.A.).
- Mathematical Geology: D. Merriam (U.S.A.), D.A. Rodionov (U.S.S.R.), R. Sinding-Larsen (Norway).
- History of Geology: R. Hooykaas (Netherlands), V.V. Tikhomirov (U.S.S.R.), T. Vallance (Australia).
- Geological Education: D.E. Ajakaiye (Nigeria), V.E. Khain (U.S.S.R.), Ch. Pomerol (France).

#### B. COLLOQUIA

- Geology of the U.S.S.R.: L.I. Krasni (U.S.S.R.), V.M. Volkov (U.S.S.R.).
- Energy Resources of The World: M. Halbouty (U.S.A.), R.W. Hutchison (Canada), R.F. Meyer (U.S.A.), R.A. Sumbatov (U.S.S.R.).
- Palaeoceanography (CMG, DSDP & ILP-WG2, WG3): K.J. Hsü (Switzerland, A.P. Lisitsin (U.S.S.R.))
- Arctic Geology: I.S. Gramberg (U.S.S.R.), J. Thiede (F.R.G.).
- Tectonics of Asia: T.K. Huang (China), A.L. Yanshin (U.S.S.R.).
- Earthquake and Geological Hazard Prediction: H. Berckhemer (Denmark), S.A. Fedotov (U.S.S.R.).

#### C. INTERNATIONAL LITHOSPHERE PROGRAMME - SPECIAL SESSION

- R. Price (Canada), A.L. Yanshin (U.S.S.R.)

Evolution of Sedimentary Basins and their Mineral and Energy Resources.

Circum-Pacific Orogenic Belts and Evolution of the Pacific Ocean Basin.

Archaean Lithosphere and Early Crustal Evolution.

Recent and Quaternary Plate Motions.

Palaeoenvironmental Evolution of the Oceans and the Atmosphere.

Geochemical and Geophysical Modelling of Plate Tectonics.

Geological, Geophysical and Geochemical Constrains on the Deep Structure of the Continents and Ocean Basins.

Continental Drilling.

Groundwater Exploration and Development in Semi-Arid Zones.

Proterozoic Crustal Dynamics and Lithospheric Evolution.

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## KURSUS-KURSUS LATIHAN (TRAINING COURSES)

A bracketed date (Mar-Apr 1983) denotes entry in that issue carried additional information.

January 1984-March 1984

Remote sensing application and digital image processing (Enschede, The Netherlands). Certificate courses on techniques for national resources surveys, organized annually by the International Institute of Aerial Surveys and Earth Sciences (ITC). Sponsored by Unesco, English. For information: ITC Student Affairs Office, P.O. Box 6, 7500 AA Enschede, The Netherlands.

January 16-July 13, 1984

Post-experience courses on water resources technology in developing countries (Birmingham, U.K.). For information: Dr. N.T. Kettegoda, Dept. Civil Engineering, University of Birmingham, Box 363, Birmingham, U.K. B15 2TT.

February 1984 - March 1984

Geochemical prospecting techniques (Tervuren, Belgium). Annual course sponsored by the Royal Museum of Central Africa and UNDP. French. For information: Musee royal de l'Afrique centrale, Steenveg op Leuven, 13, B-1980 Tervuren, Belgium.

February 1984 - November 1984

Photointerpretation applied to geology and geotechnics (Bogota, Colombia). Course organized by the Interamerican Centre of Photointerpretation (CIAF) in cooperation with ITC and Unesco. Spanish. For information: Academic Secretariat of the CIAF, Apartado Aereo 53754, Bogota 2, Colombia.

February 15 1984 - December 15 1984

Geothermics (Pisa, Italy). Certificate course organized annually by the Istituto Internazionale per le Ricerche Geotermiche and sponsored by Unesco, UNDP and Italy. English. For information: Dr. Mario Fanelli, Istituto Internazionale per le Ricerche Geotermiche, Via Buongusto 1, 56100 Pisa, Italy. Telephone (050) 41503 or 46069.

March 5 - 30 1984

Geological and hydrological hazards (Denver, Colorado, USA). Training course for foreign scientists organized by the U.S. Geological Survey. English. For information. Training Section, Office of International Geology, U.S. Geological Survey, National Center, M/S 917, Reston, VA 22092, USA.

March 1984 - April 1984

Mineral exploration (Paris, France). Short course based on a simulation method organized annually by the Ecole Nationale Supérieure des Mines and sponsored by Unesco. French. For information: Prof. H. Pelissonnier, Ecole des Mines, 60 Bd Saint Michel, 75272 Paris, Cedex 06, France.

April 23 - May 25 1984

Applications in geologic and hydrologic exploration and planning (Sioux Falls, South Dakota, USA). International Workshop. For information: Chief, Training and Assistance, U.S. Geological Survey, EROS Data Center, Sioux Falls, SD57198, USA. Telephone: (605) 594-6114.

May 28 - June 29 1984

Remote sensing: geologic applications (Flagstaff, Arizona, USA). Advanced training program for foreign scientists organized by U.S. Geological Survey. English. For information: U.S. Geological Survey Training Center, 917 National Center, 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.

July 1984 - August 1984

Summer course on earth sciences: Crystallography, Mineralogy, Metallogeny (Madrid, Spain). Annual course organized by the Department of Geology and Geochemistry of the Universidad Autonoma de Madrid and sponsored by Unesco. Spanish. For information: Prof. T. Monseur, Departamento de Geologia y Geoquimica, Facultad de Ciencias, Universidad Autonoma de Madrid, Canto Blanco, Madrid 34, Spain.

September 1984 - November 1984

Geothermal energy (Kyushu, Japan). Annual short course organized by the Government of Japan and sponsored by Unesco. English. For information: Japan International Cooperation Agency (2nd Training Division, Training Affairs Department), P.O. Box 216, Shinjuku Mitsui Building, 2-1 Nishi-shinjuku, Shinkuku-ku, Tokyo 160, Japan.

September 1984 - November 1984

Mining exploration and exploration geophysics (Delft, The Netherlands). Annual diploma courses organized by the International Institute for Aerial Survey and Earth Sciences and sponsored by Unesco. English. For information: ITC (ME), 3 Kanaalweg, 2628 Delft, The Netherlands.

October 1984 - November 1984

Tectonics, seismology and seismic risk assessments (Potsdam, G.D.R.). One month training course organized annually by East German 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.

October 1 - November 2, 1984

Remote sensing: Geologic applications (Flagstaff, Arizona, USA). Advanced training program for foreign scientists organized by U.S. Geological Survey. English. For information: U.S. Geological Survey Training Center, 917 National Center, Reston, Virginia 22092, USA.

October 1984 - September 1985

Fundamental and Applied Quaternary Geology (Brussels, Belgium). Annually organized training course leading to a Master's degree on Quaternary Geology by the Vrije Universiteit Brussel (IFAQ) and sponsored by Unesco. English and French. For information: Prof. Dr. R.

Paepe, Director of IFAQ, Kwartairgeologie, Vrije Universiteit  
Brussel, Pleinlaan 2, B-1050, Brussels, Belgium.

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## KALENDAR (CALENDAR)

A bracketed date (Mar-Apr 1983) denotes entry in that issue carried additional information.

### 1984

- March 18 - 25 : Land subsidence (3rd International Symposium), Venice, Italy. Sponsored by IAH. (A. Ivan Johnson, 3rd International Symposium on Land Subsidence, Woodward-Clyde Consultants, 7600 East Orchard Road, Englewood, Co. 80111, USA).
- March 19 - 23 : Offshore Mineral Resources (2nd International Seminar), Brest, France, Languages: French and English (Mr. Louis Galtier, Association Germinal, B.P. 6009, 45060 Orleans, Cedex, France).
- March 25 - 29 : Soil salinity under irrigation - processes and management (International Meeting), Bet Dagan, Israel. Sponsored by ISSS and Israel Society of Soil Science. (Dr. B. Yaron, P.O. Box 3054, Tel-Aviv 61030, Israel).
- March 26 - 30 : Computer applications in the mineral industries (18th International Symposium), London, U.K. Organized by the Institution of Mining and Metallurgy. (The Conference Office, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK).
- March 26 - 30 : Recent advances in mineral science and technology (International Conference), Johannesburg, South Africa. Sponsored by the South African Council for Mineral Technology. (The Conference Secretary (C.25), Mintek, Private Bag X3015, Randburg, 2125 South Africa) (May-Jun 1983).
- March 27 - 31 : Landplan II - Geoscience applied to urban problems in SE Asia (Workshop), Kuala Lumpur. (Organizing Secretary, Landplan II, Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia).
- April 9 - 13 : Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA V), Kuala Lumpur, Malaysia. Sponsored by Geological Society of Malaysia. (T.T. Khoo, Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia).
- April 12 - 13 : Diagenesis and low-temperature metamorphism (Meeting), Bristol, U.K. (D. Robinson, Department of Geology, The University, Queen's Building, University Walks, Bristol BS8 1TR, U.K.).
- May 10 - 12 : Mineralisation in volcanic processes (Geological Society and Volcanic Studies Group Joint Meeting), Aberystwyth, Wales, U.K. (Geological Society, Burlington House, Piccadilly, London W1V 0JU, UK).

- May 14 - 18 : Geomechanics (4th Australia-New Zealand Conference), Perth, Western Australia. (The Conference Manager, 4th A.N.Z. Geomechanics Conference, The Institution of Engineers, Australia, 11 National Circuit, Barton, ACT 2600, Australia).
- May 20 - 23 : Industrial minerals (6th International Congress), Toronto, Canada. (B.M. Coope - Editor, Industrial Minerals, 45/46 Lower Marsh, London SE1, UK).
- May 21 - 23 : Aggregates (International Symposium), Nice, France. Sponsored by IAEG. Languages: English and French. (M. Louis Prime), L.C.P.C., 58 boulevard Lefebvre, 75732 Paris Cedex 15, France).
- May 21 - 23 : Climate: Present, past and future (Symposium), New York, N.Y., USA. Sponsored by Columbia University in honour of Rhodes W. Fairbridge. (John E. Sanders, Dept. of Geology, Columbia University, 606 West 120 Street, New York, NY 10027, USA).
- May 21 - 23 : Groundwater resource utilization and contaminant Hydrogeology (International Symposium), Montreal, Quebec, Canada. Sponsored by Canadian National Chapter of IAH and CWWA. Languages: English and French. (Mr. H. Sommelet, Geomines Ltd., 1010 Sherbrooke St. W., Suite 2202, Montreal, Quebec, Canada H3A 2R7).
- June 5 - 11 : Geology of the Himalayas (International Symposium), Chengdu, China. Field excursion to Tibet. Languages: Chinese and English. (Mr. Li Tingdong, Secretary-General of the Organizing Committee, c/o Chinese Academy of Geological Sciences, Baiwanzhuan, Beijing, P.R. China).
- June 6 - 9 : Interpraevent (Interdisciplinary Symposium on mountain rivers, torrents, snow avalanches, slope stability, etc.) Villach, Austria. (Interpraevent 1984, Postfach 134, A-9501, Villach, Austria).
- June 15 - 17 : Sedimentology of nearshore and shelf sands and sandstones (Research Symposium), Calgary, Canada. (R. John Knight, Petro-Canada, P.O. Box 2844, Calgary, Alberta, Canada T2P 3E3).
- June 18 - 23 : 7th International Peat Congress, Dublin, Ireland. Study tours and post-congress tours. (International Peat Congress, c/o Bordna Mona, Lower Baggot Street, Dublin 2, Ireland).
- June 20 - 23 : Geomembranes (International Conference), Denver, Colorado, USA. Conference to precede the Impermeable Barriers for Soil and Rock Symposium. (A. Ivan Johnson, Woodward-Clyde Consultants, P.O. Box 4036, Denver, Co. 20204, USA).
- June 23 - 26 : Practical applications of groundwater geochemistry (Workshop), Banff, Alberta, Canada. (Dr. E.I. Wallick, Alberta Research Council, 5th Floor, Terrace Plaza, 4445 Calgary Trail South, Edmonton, Alberta, Canada T6H 5R7).

- June 23 - 30 : Melanges of the Appalachian Orogen (Penrose Conference), Newfoundland. (B. Lorenz, Department of Earth Sciences, Memorial University, St. Johns, Newfoundland, Canada A1B 3X5)
- June 24 - 27 : Codata (9th International Conference), Jerusalem, Israel. (The Secretariat, 9th International CODATA Conference, 122 Hayarkon Street, P.O. Box 3054, 61030 Tel Aviv, Israel)
- June 26 - 28 : Deep structure of the continental crust (International Symposium), Ithaca, N.Y., USA. (Muawia Barazangi, Department of Geological Sciences, Cornell University, Ithaca, NY 14853, USA).
- July : Volcanic Soils (International Panel) Tenerife, Canary Islands. (M.E. Fernandez Caldas, Dpto. de Edafologia, Univ. de la Laguna, Tenerife, Islas Canarias, Spain)
- August : Mapping of the soil-water balance (Meeting), Budapest, Hungary. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)
- 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)
- Aug 27 - 31 : Water movement in heavy clay soils (Meeting), Wageningen, Netherlands. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)
- Sept 3 - 8 : 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)
- Sept 10 - 14 : Titanium (5th International Conference), Munich, F.R.G. (Deutsche Gesellschaft fur Metallkunde EV, Adenauerallee 21, D-6370 Oberursel 1, F.R.G.)
- Sept 16 - 22 : Landslides (4th International Symposium), Toronto, Canada. Sponsored in part by IAEG (Mr. J.L. Seychuk, Chairman, Organizing Committee, ISL/84, P.O. Box 370, Station A, Rexdale, Ont., Canada M9W 5L3)



- Oct 1 - 5 : Remote sensing of environment (18th International Symposium), Paris, France. (Environmental Research Institute of Michigan, P.O. Box 8618, Ann Arbor, MI 48107, USA)
- Oct 14 - 20 : Mineral processing and extractive metallurgy. (International Conference), Kunming, P.R. China. (The Secretary, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK)
- Oct 31 - Nov 7 : Seismology and physics of the earth's interior (Regional Assembly of the International Association) Hyderabad, India. (Organizing Committee, IASPEI Regional Assembly, National Geophysical Research Institute, Hyderabad 500 007, India)
- Nov/Dec : Land evaluation for soil erosion hazard assessment (Meeting), Enschede, Netherlands. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)
- Nov 5 - 8 : Geological Society of America (Annual Meeting), Reno, USA. (S.S. Beggs, Geological Society of America, P.O. Box 9140, 330 Penrose Place, Boulder, Co. 80301, USA)
- Nov 19 - 22 : 12th World Mining Congress, New Delhi, India (Organizing Committee, Institute of Engineers, 8 Gokhale Road, Calcutta 700 020, India)
- Nov 20 - Dec 5 : Late Quaternary Sea-Level Changes (International Symposium and Field Meeting), Argentina and Chile. IGCP - 200 and INUA Commission on Quaternary Shorelines. (Prof. Dr. Enrique Schnack, Centro de Geologia de Costas, C.C. 722, Correo Central, ARG-7600, Mar del Plata, Argentina)
- Dec 2 - 5 : Future petroleum provinces of the world (AAPG W.E. Pratt Memorial Conference), Phoenix, Ariz., USA. (AAPG, P.O. Box 979, Tulsa, OK 74101, USA)
- Dec 2 - 6 : Society of Exploration Geophysicists, (54th Annual Meeting), Atlanta, Georgia, USA. (J. Hyden, SEG, Box 3098, Tulsa, Oklahoma 74101, USA)

### 1985

- January : International Association of Hydrogeologists (International Congress), Tucson, Arizona, USA. Sponsored by IAH and AGU. (Eugene S. Simpson, Dept. of Hydrology and Water Resources, College of Earth Sciences, The University of Arizona, Tucson, AZ 85721, USA)
- January : Acid-Sulphate Soils (meeting), Dakar, Senegal. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)
- Feb 11 - 14 : Asian Mining '85 (2nd Conference), Manila, Philippines. (Meeting Secretary, The Institute of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK)

- April 10 - 12 : Forum on the Geology of Industrial Minerals, ann. mtg. Tucson, Ariz. (H. Wesley Peirce, Arizona Bureau of Geology & Mineral Technology, 845 N. Park Ave. Tucson 85719. Phone 602/621-7906)
- June : Tunnelling (4th International Symposium), Brighton, UK. (The Secretary, Institute of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK)
- June 9 - 15 : Water Resources (5th World Congress), Brussels, Belgium. (Dr. L.W. Debacker, c/o Brussels International Conference Centre, Parc des Expositions, Place de Belgique, B-1020 Brussels, Belgium)
- July 28 - Aug 2: 8th International Clay Conference, Denver, Colorado. Sponsored by AIPEA. (Dr. A.J. Herbillon, Groupe de Physico-Chimie Minerale et de Catalyse, Univ. Catholique de Louvain, Place Croix du Sud 1, B-1348 Louvain-la-Neuve, Belgium)
- Aug 19 - 23 : Sixth Gondwana Symposium. Columbus, Ohio, USA. Sponsored by IUGS and Geological Society of America. (D. Elliott, Inst. of Polar Studies, Ohio State University, 103 Mendenhall, 125 South Oval Mall, Columbus, Oh 43210, USA)
- Sep 8 - 13 : Hydrogeology in the service of man (18th IAH Congress - International Symposium), Cambridge, UK. (J. Day, Hydrogeology Unit, Maclean Building, Crowmarsh Gifford, Wallingford, OX10 8BB, UK)
- Sept 9 - 13 : Fossil and living brachiopods (Meeting), Brest, France. (Congres Brachiopodes, Univ. Bretagne occidentale, Laboratoire du Paleozoique - 6, av. Le Gorgen 29283 Brest Cedex, France)
- Sept 15 - 21 : Geomorphology, resources, environment and the developing world (International Conference), Manchester, UK. (Prof. Ian Douglas, School of Geography, University of Manchester, Manchester M13 9PL, UK)
- Sept 22 - 28 : Chemrawn IV: Chemistry and resources of the global Ocean (Meeting), Woods Hole, Mass., USA. (Prof. G. Ourisson, Centre de Neurochimie, Universite Louis Pasteur, 5 rue Blaise Pascal, F-67084 Strasbourg, France)
- Sept 22 - 26 : High heat production granites, hydrothermal circulation and ore genesis, mtg. St. Austell, Cornwall. (Institution of Mining & Metallurgy, 44 Portland Place, London W1N 4BR. Phone: 01-580 3802. Tel-ex. 261410)

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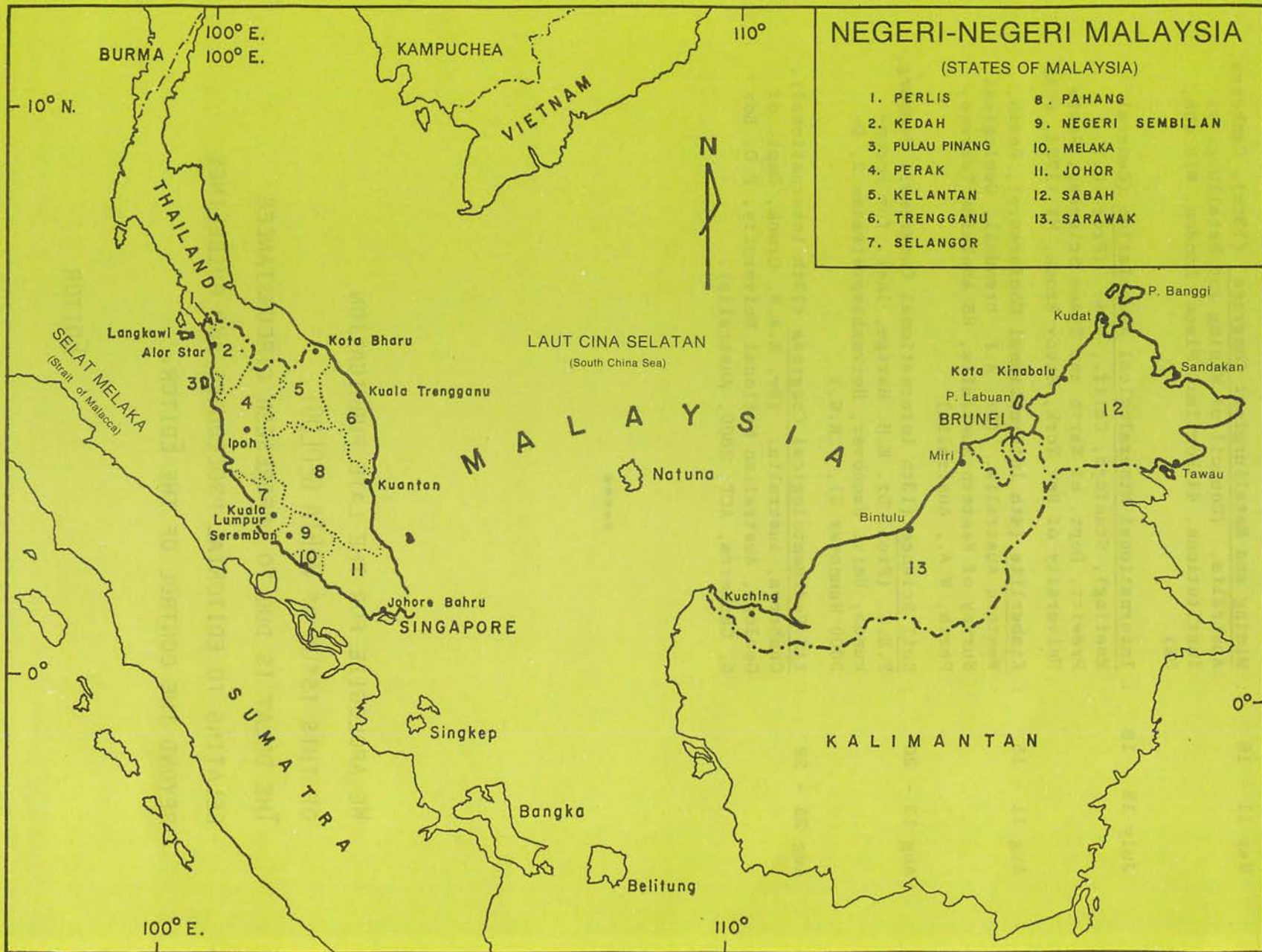
- May 11 - 16 : Mining and Metallurgical Congress (13th), Canberra, Australia. (Council of Mining and Metallurgical Institutions, 44 Portland Place, London, W1N 4BR, UK)
- July 13 - 18 : International Mineralogical Association (General Meeting), Stanford, Calif., USA. (Prof. C.T. Prewitt, Dept. of Earth and Space Sciences, State University of New York, Stony Brook, NY 11794, USA)
- Aug 11 - 15 : Kimberlite (4th International Conference), Perth, Western Australia. (Dr. A.F. Brendall, Geological Survey of Western Australia, 66 Adelaide Terrace, Perth, W.A., Australia)
- Aug 13 - 20 : Soil Science (13th International Congress), Hamburg, F.R.G. (Prof. Dr. K.H. Hartge, Inst. für Bodenkunde, Univ. Hannover, Herrenhaserstrasse 2, D-3000 Hannover 21, F.R.G.)
- Aug 25 - 29 : IAS Sedimentological Congress (12th International), Canberra, Australia. (Dr. K.A.W. Crook, Dept. of Geology, Australian National University, P.O. Box 5, Canberra, ACT, 2600, Australia).

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WE APOLOGIZE FOR THE LATE PUBLICATION  
OF THIS ISSUE OF WARTA GEOLOGI.  
THE DELAY IS DUE TO UNFORESEEN CIRCUMSTANCES  
RELATING TO EDITORIAL PROCEDURES AND GUIDELINES  
BEYOND THE CONTROL OF THE EDITOR.

EDITOR

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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

10° N.

100° E.  
100° E.

110°

THAILAND

N

SELAT MELAKA  
(Strait of Malacca)

LAUT CINA SELATAN  
(South China Sea)

MALAYSIA

Natuna

BRUNEI

KALIMANTAN

SUMATRA

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100° E.

110°

0°

Langkawi  
Alor Star

Kota Bharu

Kuala Trengganu

Kuala Lumpur  
Seremban

Johore Bahru  
SINGAPORE

Singkep

Bangka

Belitung

P. Banggi  
Kudat

Kota Kinabalu

P. Labuan

Miri

Bintulu

Kuching

Sandakan

Tawau