

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

Jil. 6, no. 2 (Vol. 6, no. 2)

Mar-Apr 1980

KANDUNGAN (CONTENTS)

CATITAN GEOLOGI (GEOLOGICAL NOTES)

H.D. Tjia: Recumbent folds in rocks of the Kenny Hill Formation
indicate sense of tectonic transport 23

MESYUARAT PERSATUAN (MEETINGS OF THE SOCIETY)

J.J. Nossin: Remote sensing systems as an information base 25

A.A. Meyerhoff: Against the Plate Tectonics Hypothesis 25

Tarutao Island Field Trip – report 26

Geology of NW Peninsular Malaysia Seminar -- report and abstracts
of papers 30

Presidential Address 35

Annual General Meeting 37

BERITA PERSATUAN (NEWS OF THE SOCIETY)

Resignation of Hon. Editor 38

Appointment of new Editor 38

Appointment of acting Hon. Asst. Secretary 38

New Library additions 38

Membership 39

Change of address 39

BERITA-BERITA LAIN (OTHER NEWS)

Schlumberger Interpretation Seminar 40

SGS – Redwood Training Courses 1980 at Singapore 41

UNESCO-Sponsored Post-Graduate & Training Courses 41

Workshop on Age Dating 44

International Symposium on Metallogeny 45

Eurotunnel '80 45

Second International Tinplate Conference 47

New Publications for the Exploration Geologist 47

Book Reviews 48

Mineralogy Puzzle – solution 52

Calendar 53



DIKELUARKAN DWIBULANAN
ISSUED BIMONTHLY

PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)

Majlis (Council) 1980/81

Pegawai-pegawai (Officers)

- Presiden
(President) : Mohd. Ayob, Petronas, P.O. Box 2444,
Kuala Lumpur.
- Naib-Presiden
(Vice-President) : Khoo Teng Tiong, Jabatan Geologi, Universiti
Malaya, Kuala Lumpur.
- Setiausaha Kehormat
(Hon. Secretary) : Wong Yoke Fah, Valdun Mining Consultants,
P.O. Box 242, Kuala Lumpur.
- Penolong Setiausaha
(Hon. Asst. Secretary) : Mohd. Ali Hasan, Jabatan Geologi, Universiti
Malaya, Kuala Lumpur.
- Bendahari
(Treasurer) : Gan Ah Sai, Jabatan Penyiasatan Kajibumi,
Bangunan Ukor, Jalan Gurney, Kuala Lumpur.
- Pengarang
(Editor) : Teh Guan Hoe, Jabatan Geologi, Universiti
Malaya, Kuala Lumpur.
- Councillors : Abdul Aziz Hussin, Jabatan Kejuruteraan Petroleum,
Universiti Teknologi Malaysia, Kuala Lumpur.
- Tan Boon Kong, Jabatan Geologi, Universiti
Kebangsaan Malaysia, Kuala Lumpur.
- S.S. Subramaniam, Killingham Hall Tin, P.O. Box 202,
Puchong, Selangor.
- Chin Lik Suan, 13 Lorong SS1/11A, Kampong Jamil
Rais, Petaling Jaya.
- Leong Khee Meng, Petronas Carigali, P.O. Box
2407, Kuala Lumpur.
- Tjia Hong Djin, Jabatan Geologi, Universiti
Kebangsaan Malaysia, Kuala Lumpur.
- Khoo Kay Khean, Jabatan Penyiasatan Kajibumi,
Bangunan Ukor, Jalan Gurney, Kuala Lumpur.

- Address of Society : Geological Society of Malaysia
c/o Dept. of Geology
University of Malaya
Kuala Lumpur 22-11, MALAYSIA.

CATITAN GEOLOGI (GEOLOGICAL NOTES)

Recumbent folds in rocks of Kenny Hill Formation indicate sense of tectonic transport.

H.D. TJIA, Dept. of Geology, Universiti Kebangsaan Malaysia, Kuala Lumpur.

Two years ago a deep roadcut was excavated to build a connection between the Bukit Pantai housing estate and Damansara road, southwest corner of the Federal Territory of Kuala Lumpur. In the roadcut are exhibited three medium-sized recumbent folds composed of sediments of the Kenny Hill Formation (Fig. 1). The rocks are well-stratified meta-arenite and phyllite with occasional slaty beds. Foliation in the metaclastics are parallel to subparallel to bedding planes. The thickness of the arenaceous layers is generally in the decimeter range, but several beds are massive and one is at least 10 m thick. The thicknesses of the finer grained clastics are in the centimeter and decimeter range. Their usual colours are dark (black, purplish, and reddish) while the arenaceous beds are distinctly lighter in colour. Small-scale folding, disrupted beds and faults occurring in restricted zones indicate penecontemporaneous deformation. These features suggest a palaeoslope inclined towards the east.

The roadcut in figure 1 is circa 22 m high and shows two synforms flanking an antiform. Their axial planes strike approximately north-south and dip easterly at circa 10 to 20 degrees. Where weaker beds are important, folds are of the similar type with slightly attenuated limbs and thickened bends. Where massive arenaceous layers predominate, concentric folding is the rule. The three large folds suggest shortening by slightly more than fifty per cent.

Facing of the metasedimentary series is indicated by graded bedding that consists of medium to coarse grained meta-arenite grading upward into black phyllite (right-hand side of the figure). The position of graded beds indicate the layers to be right-side up. This is further confirmed by cleavage planes that dip at angles smaller than those of the bedding planes (center in fig. 1; indicating overturning here), a medium-sized probable scour fill (right-hand side of the figure; indicating overturning there), and drag folds in phyllite near its boundary with meta-arenite (left-hand side of fig. 1; indicating right-side up position). By tracing the layers in the structures from right to left we see that the indicators of facing are consistent with a syncline-anticline-syncline sequence (Tjia, 1979). Apparently, the two faults parallel to the foliation did not disturb the structural sequence.

References

- Tjia, H.D., 1979. Westward tectonic transport of Kenny Hill rocks at Bukit Pantai, Kuala Lumpur. Sains Malaysiana, vol. 8(2).

MESYUARAT PERSATUAN (MEETINGS OF THE SOCIETY)

J.J. Nossin: Remote sensing systems as an information base.

On the 28th of Jan. 1980, a dozen members of the Society were present to hear a talk on "Remote sensing" by Dr. Nossin of the International Institute of Aerial Survey and Earth Sciences (I.T.C.). In his illuminating talk, Dr. Nossin first spoke of the principles of remote sensing which involved the use of various sensors to record or image features without there being any physical contact between the sensor and features to be imaged. Dr. Nossin then went on to briefly consider the various techniques presently available for "remote sensing" and showed samples of these techniques. He then spoke of the usefulness of Satellite Imagery, in particular LANDSAT I and II Imagery, to Earth Sciences and pointed out, with examples, advantages of the use of this form of imagery. In the last part of his talk, Dr. Nossin spoke of the future of remote sensing from space platforms and briefly described some of the technical advances to be expected in the field of remote sensing.

JKR

A.A. Meyerhoff: Against the Plate Tectonics Hypothesis.
1st March 1980, Dept. of Geology, University of Malaya.

At the invitation of the Society, Dr. A.A. Meyerhoff made a one day visit to Kuala Lumpur to address members of the Society. The tentative title which was "Does the concept of Plate Tectonics really work (especially on Southeastern Asia)?" was changed by the speaker to cover a more general worldwide theme. In spite of this talk being held on a Saturday afternoon, the response from members was exceedingly good. About 50 members turned up to hear the speaker challenge the generally accepted hypothesis of Plate Tectonics.

Dr. Meyerhoff began by presenting new evidence suggesting the presence of fairly thick sedimentary successions near the vicinity of the Mid-Atlantic ridge. A number of localities near this ridge were shown to have yielded pre-Triassic fossils. Further research is anticipated in the near future on this phenomenon which would challenge the generally accepted concept that the ocean floors are relatively young.

The other subjects discussed by the speaker were the paleontological, climatical and paleomagnetic evidence used in support of the Plate Tectonics Hypothesis. Correlation between faunal realms shows that paleontology lends no support to the new global tectonics. The distribution of glacials in the southern hemisphere was shown to be against the concept of a large single landmass as the centre of this landmass would be too far away from the ocean to have glacials. The present day example of the absence of glacials in the inland areas of Siberia was cited as an example. Symmetrical patterns of magnetic stripes are shown to lose much of their near perfect symmetry on detail investigation. This magnetic reversal is believed to be due to elongated ultrabasic bodies, probably of serpentinite, at depth.

Replying to questions from the audience, Dr. Meyerhoff strongly discredited the paleomagnetic evidence offered so far. His 3-year

experience working on lava flow shows that the same lava flow, sampled within a distance of a hundred metres, shows magnetic pole position within a spread of 4000 km. Other paleomagnetic results show even greater spread of 12,000 km or more. This is about 1 quarter of the circumference of the globe and the speaker believes that such work is meaningless. Replying to questions on an alternative model to explain the known large phenomenon, Dr. Meyerhoff said that he was in favour of a contracting earth. Benioff zones, island arcs, marginal basins and large scale thrusting could be explained by a contracting uppermost layer over a lower layer of no finite strain.

Much of the other topics covered are discussed in his numerous publications. One publication in which some of these arguments are presented is his joint paper on "Test of Plate Tectonics" in the AAPG 1974 publication titled "Plate Tectonics - Assessments and Reassessment".

BKT

Laporan lawatan lapang ke Pulau Terutao (Tarutao Island Fieldtrip - report)

30th Mar. - 2nd Apr. 1980

The Tarutao Island field trip, which was attended by 9 GSM members from Malaysia, proved to be a great success. Credit should be accorded to Dr. Nopadon Mantajit for the painstaking organisation and the preparation of a special geological excursion guidebook specially for GSM on the fieldtrip. He was ably assisted by Dr. S. Bunopas and members of the Geological Society of Thailand and the Department of Mineral Resources, many of whom are also GSM members.

We were also honoured by the participation of the deputy Director-General of the DMR, Mr. Sa-ngob Kaewbaidhoon on the trip (Fig. 7).

As an introduction, Dr. Mantajit enlightened the participants on geology of southern Thailand during the bus ride from Sadao via Haadyai to Ban Pak Bara.

Tarutao Island lies about 30 km off the west coast of Satun Province, in the Andaman Sea, southern Thailand. It covers an area of 150 sq. km., approximately 25 km in length and 10 km in width, with the highest peak 708 m above sea level.

The rock sequence at Tarutao Island comprises predominantly two distinct facies, namely, the clastic facies of the Tarutao Formation which can be correlated to the Machinchang Formation of Pulau Langkawi, and the limestone facies, Thung Song Formation, which can be correlated to the Setul Formation.

The following are brief stop descriptions with some details of the geology.

Stop 1: Tobu Cliff at Ao Malaca

After a good night's sleep at the National Park's hostel, the Tobu Cliff, about 100 metres away, was the first outcrop visited. Here is exposed the dark grey to black, well-bedded limestone with characteristic interbedded layers of silt and argillaceous sediments, typical of the Thung Song Limestone (Fig. 2). The thickness of the limestone beds varies from 5 to over 15 cm. Calcite veins are common.

Stop 2: Ao Malaca (or Ao Pan Te)

Crossing over to the other side of the mouth of the Malaca River, the rocks exposed are that of the uppermost part of the Tarutao Formation and comprises a sequence of fine laminated sandstone, micaceous sandstone and micaceous siltstone of reddish brown to purplish colour interbedded with reddish brown siltstone (Fig. 3 & 4). Cross-bedding and load casts are common sedimentary features.

Stop 3: Ao Talopo (or Ao Chak)

The southern part of the bay was visited. Here the rock sequence consists mainly of interbedded micaceous sandstone, siltstone and shale. The fine to medium grained sandstone beds varied from 5 to 60 cm in thickness and are characteristically reddish brown to purple.

Stop 4: Ao Talo Lingai (or Ao Son)

The rock sequence at this locality consists of purplish micaceous sandstone with reddish and green shale interbedded in the upper part of the sequence (Fig. 5). Cross-bedding, load casts and ripple marks are common. The lower part comprises of quartzitic sandstone and quartzite. Fossils found include trilobites, brachiopods and possibly four-stipe-like graptolites. Ilmenite laminations occurs in certain outcrops.

Stop 5: Ao Talo Dang

The second night on the island was spent at Ao Talo Dang, located at the southern end of the island and commanding a good view of the northern part of Pulau Langkawi (situated 6.5 km away).

Good exposures here show the rock sequences to strike N-S and dipping eastwards and the gradational contact between the Tarutao Formation and Thung Song Formation can be observed at this locality.

The reddish micaceous sandstone of the Tarutao Formation is commonly interbedded with quartzitic sandstone and shale, (Fig. 6). Sedimentary features, indicative of shelf environment, include load casts, ripple marks and cross-bedding. This sequence boasts of at least ten horizons of fossiliferous beds, grading upwards to calcareous facies of Thung Song Limestone.

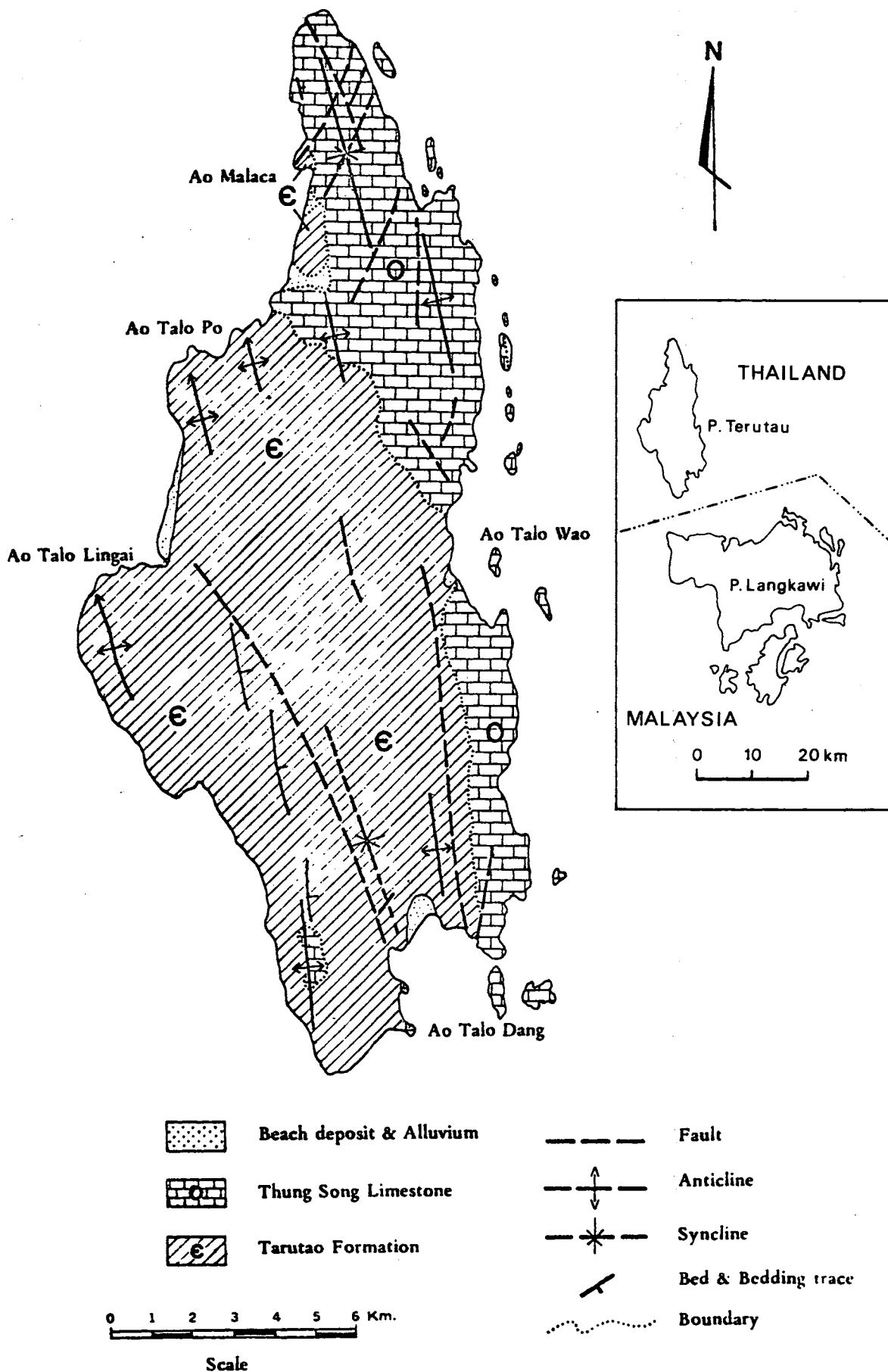
GHT

GSM INDUSTRIAL MINERALS SEMINAR

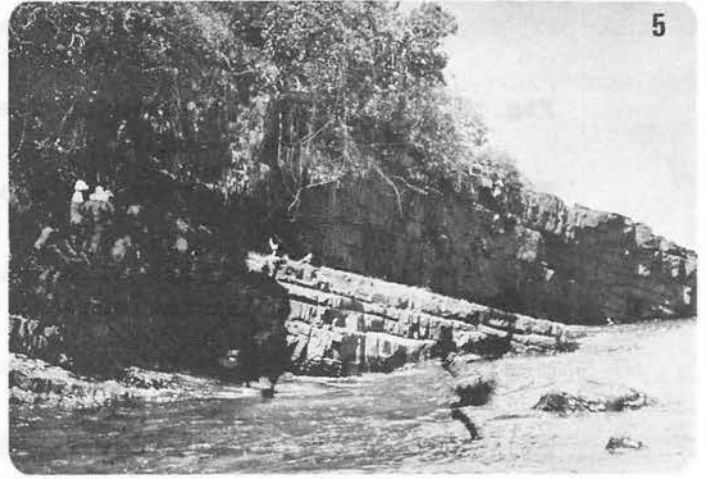
(end of July 1980)

call for papers

Figure 1. Geological map of Tarutao Island (Pulau Terutau)



TARUTAO ISLAND FIELD TRIP



Captions to photographs (Tarutao)

- Fig. 2. A closer look at the well-bedded **Thung Song Limestones, Tobu Cliff.**
- Fig. 3. **Dr. C.P. Lee enlightening the participants on the local casts in the Tarutao Formation at Ao Malaca.**
- Fig. 4. **Time for exchange of views on the eastward dipping Tarutao Formation at Ao Malaca. In the background is the Tarutao National Park and the Tobu Cliff (top left hand corner).**
- Fig. 5. **Dr. Muntajit briefing the participants on the Tarutao Formation at Ao Talo Lingai.**
- Fig. 6. **Dr. Sunopus stressing a point on the Tarutao Formation at Ao Talo Dang.**
- Fig. 7. **Group photograph of participants taken at Ao Talo Dang. Note the eastward dipping escarpments of the Tarutao Formation in the background.**

Geology of North West Peninsular Malaysia Seminar - Laporan (Report)

The Seminar, ably organised by Dr. T.T. Khoo on the day of the Society's AGM, was held at the RUMAH UNIVERSITI, University of Malaya and attended by an interested audience of 45 members.

The Seminar appeared to be most timely especially when this corner of the country has received considerable interests, not only geologically and hydrologically but more recently on enthusiasm generated on a possible consultation programme with our Thai counterparts (as a result of the Tarutao Field Trip).

A total of 10 papers were presented. In appreciation of their contributions, the authors of papers were invited to dinner at the Thai Restaurant, Petaling Jaya.

Abstracts of Papers

The terrane of the Patani Metamorphics.

T.T. Khoo, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.

A regional metamorphic terrane occurs in west and southwest Kedah covering at least 500 sq miles. The metamorphics in this terrane are named as the Patani Metamorphics after Sungai Patani, one of the larger towns in the area. At the present stage of mapping the terrane is found to include Pantai Merdeka and the islands off Gunung Jerai and Yan to the west, areas slightly south of Tikam Batu to the south, Bukit Raya to the north, and the line joining Kampung Padang Pusing to Bukit Selambau forms the approximate eastern boundary.

The rocks in this terrane are quartzite, marble and red, green, black and grey slates and phyllites which are metamorphosed rocks of the Patani Formation of Bradford (1972) and schists, calc-silicate rocks, marble and quartzite which are metamorphosed rocks of the Jerai Formation. Preliminary studies indicate that most of the area is underlain by rocks of low to very low grades, though higher grade rocks, biotite to garnet grade probably, appear to occur in an elongate zone at the central part of the terrane trending parallel to the northwest elongation of the terrane. The slates and phyllites are characterised by the possession of

one or more sets of cleavages or schistositities which generally become more prominent towards the higher grade parts. The lower grade rocks are sometimes porphyroblastic with chloritoid, pyrite or magnetite. Among the higher grade rocks, metapelites and quartzites are biotite-bearing and the calc-silicates contain garnet, amphibole, epidote and diopside.

The terrane extends into the Straits of Melaka and may resurface in Langkawi, e.g. as the area of cleaved rocks described by Koopmans (1965). The terrane does not appear to extend further south-southeast into the Kulim-Mahang area of south Kedah. Towards the north, the pelitic rocks of Gunung Hutun Haji in Perlis which show prominent low angle cleavages, may be part of the Patani Metamorphics.

The termination of metamorphism probably predates the intrusion of the Jerai Granite which gives an Upper Carboniferous age according to Bignell and Snelling (1977). The granite is not metamorphosed and is interpreted here to be post-orogenic. The granite introduced a late boron-metasomatic tourmaline imprint on the regional metamorphics. The Patani Metamorphics include rocks at Kampong Paya Mak Isun which contain Posidonia dated to be uppermost Devonian or lowermost Carboniferous (Jones, Gobbett and Kobayashi, 1966). From these considerations, it appears that metamorphism, which was accompanied by at least one phase of deformation, came to an end with uplift probably in the Middle-Upper Carboniferous. Significantly Middle and Upper Carboniferous sediments have yet to be proven in Kedah/Perlis (Chung & Yin, 1975).

Caution should be exercised when structural and other evidences from the Patani Metamorphics terrane are being used for rocks outside the terrane to prevent erroneous and confusing interpretations.

Late Permian and Early Triassic conodonts from the Kodiang Limestone Formation, Kedah, Peninsular Malaysia.

S.S. Yii and I. Metcalfe, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.

The Kodiang Limestone of Bukit Hantu, near Kodiang, Kedah, has yielded conodont elements characteristic of the Late Permian (Capitanian) *Neogondolella rosenkrantzii* - *Neospathodus divergens* Zone and Early Triassic (Scythian) *Neospathodus conservativus* and *Neogondolella milleri* Zones. The known age range of the Kodiang Limestone Formation is thus extended down into the Late Permian. This necessitates a re-examination of the relationship between the Triassic Kodiang Limestone and the Permian Chuping Limestone Formations which are here considered to probably form a continuous sequence.

Stratigraphy and structure of the islands off Gunung Jerai and Pantai Merdeka, Kedah.

**W.Y. Foo, Petronas, P.O. Box 2444, Kuala Lumpur and
T.T. Khoo, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.**

The area is underlain by three units. They are, namely, a) Terundak mudstone (not metamorphosed), b) Patani Formation (metamorphosed) and c) Bunting Metamorphics.

The Bunting Metamorphics consists of a metamorphosed quartz porphyry intrusion and metasediments such as quartzite, schists, hornfelsic and gneissic rocks. They occur only in Pulau Bunting. The Patani Formation rocks occur in most of the area studied. Here they have been regionally metamorphosed to slates and phyllites and also marble. The metapelites show one or more sets of cleavages and are black, grey, green or red. The marble is dark coloured. The Temundak mudstone is a dark pebbly mudstone occurring only at Tukum Temundak. The pebbles are quartzite and limestone.

The unmetamorphosed nature of the Temundak mudstone indicates that it is the youngest unit. Lithologically, it appears to be similar to rocks of the Carboniferous Singa Formation. The Bunting metasediments appear to have lithological similarities to the rocks of the nearby Jerai Formation (Cambrian?) and may be the oldest of the three units. The Patani Formation rocks here which are sometimes fossiliferous are Ordovician-Silurian. It is uncertain whether the Devonian is also represented in the Patani Formation rocks and whether the contact of the Temundak mudstone with the metamorphosed rocks is faulted, unconformable or other nature.

The early foldings associated with metamorphism appear to be very complex. The possible occurrence of slumping made interpretation of the structures more difficult. More than one phase of folding is likely.

The Machinchang - Setul Transition in Langkawi and Tarutao.

C.P. Lee, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.

The sedimentary contact between the Machinchang Formation (Tarutao Formation in Thailand) clastics and the overlying Setul Formation (Thung Song Formation in Thailand) carbonates is not well exposed in northwestern Pulau Langkawi. However, there are several localities in Pulau Terutao, the large Thai island about 6.5 km north of Pulau Langkawi, where the transition zone sediments are exposed.

A study of the transition zone outcrops from Pulau Terutao and Pulau Langkawi has revealed that the sedimentary contact between these two Lower Paleozoic formations to be a gradational one. There is a distinct trend of increasing density and thickness of carbonate intercalations gradually replacing fine clastics as we trace the sequence upsection from the Upper Cambrian Machinchang Formation sandstones, siltstones, mudstones, shales and tuffs into the Ordovician Setul Formation argillaceous limestones.

The transition zone sediments are largely shallow marine because of the presence of typical shallow water markers such as *kinneyia* (a small scale ripple-like pseudotrache-fossil), storm deposits with oscillation ripple marks and marine because of trilobite and brachiopod fossils in the sediments.

Some aspects of the stratigraphy and structure of the upper part of Machinchang Formation and the lower part of Setul Formation.

Y.H. Ong & P.C. Aw, Jabatan Penyasatan Kajibumi, Ipoh, Perak.

Recent work to the east of Kuala Kubang Badak in north Pulau Langkawi shows that the stratigraphy and structure of the basal limestone

of the Setul Formation are significantly different from what is presently known. Overlying the Machinchang Formation conformably are at least two marble units which are interbedded with two units of non-carbonate meta-sediments with a total minimum thickness of 700 metres. The units strike NNE and dip consistently in a ENE direction. Granite is in intrusive contact with the upper marble and non-carbonate metasediments units, but the imprint of contact metamorphism is apparent throughout the units.

The geology is similar to the underlying passage beds of the Machinchang Formation. In consequence, the writers propose that the lower limit of the Setul Formation be lowered to include the thin limestone unit of the passage beds.

The Singa Formation: is it a glacial deposit?

Peter H. Stauffer, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.

The Singa Fm. in Langkawi forms most of the clastic interval between conspicuous Lower Paleozoic (Setul Fm.) and Permian (Chuping/Jong Fm.) carbonate sequences. It has intrigued many geologists because it is almost totally barren of body fossils, despite its generally fine-grained and carbonaceous nature, and especially because it contains numerous scattered megaclasts, mostly pebbles but also up to boulder size. "Ice-rafting" and "slumping" have been considered to explain these megaclasts, and previous workers, after considering the former, have opted for the latter (e.g. Gobbett, 1973; Ahmad Jantan, 1973).

However, recent compilation of the features of the Singa Fm. and its equivalents in Thailand and Burma (Stauffer and Mantajit, in press) has brought out a pattern of characteristics more consistent with a glacial origin. These characteristics include:

1. Great lateral extent of the pebbly carbonaceous mudstone facies (nearly 2000 km) implies relation to widespread rather than local conditions.
2. Grain size distribution is commonly seriate, unlike the bimodal or polymodal curves typical for resedimented ("slumped") sediments.
3. Abundant fresh feldspar grains, unweathered megaclasts of granitic rocks, and pebbles and cobbles of limestone suggest rapid erosion in a cold climate.
4. Clasts of plutonic rock (including boulders up to 1 m diameter) are exotic, as no pre-Carboniferous acid plutons are as yet known in Malaya, south Thailand or Sumatra.
5. The general lack of body fossils and the low diversity in the rare faunas found within the pebbly mudstones are consistent with a cold climate.
6. Trace fossils in the Singa Fm. include long (over 1 m) vertical burrows strongly suggestive of deposition in very shallow water. These burrows transect intense "slump" folds, making it difficult to suppose the folds related to a major slope; it is possible that they were caused by movement of grounded ice masses.

If the pebbly mudstones of the Singa Fm. are glaciogenic sediments, implications for paleogeography and continental drift history are obviously far-reaching. Major changes of climate (from tropical to cold temperate to tropical again) and probable large concomitant changes of latitude are implied for at least part of Southeast Asia during the interval Silurian to Permian. One problem, however, would be solved: the evidence for the

anomalous paleogeographic interpretation (deep ocean to the west) of Garson, et al. (1975) would be removed if the Phuket diamictites are not deeper water "slumped" sediments.

Where could the ice sheets that fed debris to these sediments have been? From the size of area involved, they were most likely part of the Gondwana glaciation. Maps of Gondwanaland show that glaciation reached the known margin of the landmass in three areas. For two of these, attachment of the Yunnan-Malaya belt would involve unreasonable drift paths. The third, the section Arabia-India, is a possible source area.

The Kisap Thrust in Langkawi Island - Reappraisal of the evidence.

B.K. Tan, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.

The Kisap Thrust in Langkawi is the only large thrust fault described in Peninsular Malaysia. It has since been accepted as a major structure by several authors and frequently cited as evidence in support of plate collision hypothesis. A reappraisal of the evidence shows that there are many features which are against the presence of a single large thrust in Langkawi. The localities where this supposed thrust fault is exposed totalled only 4 and are very widely scattered over the proposed length of about 40 km. The orientations and dip directions of the fault planes in these localities also show marked differences. The fault trace proposed by Koopmans (1965) and Jones (1966) are not identical and the evidence available support opposite directions of thrusting instead of a single large thrust. The relatively high angle of the fault plane reaching up to 50° is also against this thrust plane being the product of large scale horizontal displacement as proposed in some plate tectonic models.

A gravity profile across Peninsular Malaysia.

Patrick J.C. Ryall, School of Physics, Universiti Sains Malaysia, Penang. (Present address: Dept. of Geology, Dalhousie University, Halifax, N.S., Canada B3H 3J5).

A gravity survey was run along the roads between Kuantan and Kuala Selangor passing through the Gap and Rawang. Stations were situated approximately every two miles along the road. Bouguer gravity has been corrected for terrain out to Hammer (1939) zone L and projected onto a line perpendicular to the geological strike of the peninsula.

The main features of the gravity profile and their possible significance can be summarized as follows:

- 1) *almost identical gravity on each coast suggesting similar structure on each coast.*
- 2) *a gravity minimum associated with the Main Range.*
- 3) *a gravity maximum in the vicinity of Kampong Awah possibly caused by denser rocks near the surface.*
- 4) *the features of the profile are all sharp indicating sources near the surface; some can be readily correlated with obvious geological features such as the Lebir Fault.*

Several models have been tested against the observed profile.

Interpretation is complicated by the lack of density information for many of the major rock units. All interpretations require the thickest granite under the Main Range and relatively thin granite under the Mesozoic sediments in the central part of the peninsula.

The structural information revealed or hinted at by this survey emphasizes the need for further gravity surveys in the country.

Hydrochemistry of Kedah/Perlis Aquifer - a preliminary interpretation.

Ismail M. Noor and Tan Boon Kong, Jabatan Geologi, Universiti Kebangsaan Malaysia, Kuala Lumpur.

The groundwater in Kedah/Perlis can be grouped into several water types according to their chemistry. The most dominant water type is the bicarbonate water. The change in the water chemistry is reflected by the changes in several major cations and anions as the water flows from the interior towards the coast. With the exception of a few areas, the quality of groundwater is suitable for both domestic and agricultural uses.

Some qualitative analyses of ground magnetic survey in the Rest House area, Kedah Peak, Kedah.

B.K. Lim, Geomex Survey, Bangunan Angkasa Raya, Kuala Lumpur.

Qualitative analysis from the ground magnetic survey shows that the intense, strong anomalies occurring in the Kedah Peak Rest House area are due to magnetite veins in addition to other anomalous sources at depths. These deeper anomalous sources are thought to be magnetite concentrations within the quartz porphyry itself or at the contacts between the quartz porphyry and the metasediments of the Jerai Formation.

Correlation between the magnetic data and geological evidence points to an intrusive origin for the quartz porphyry rather than sedimentary or volcanic origins as thought of by previous workers.

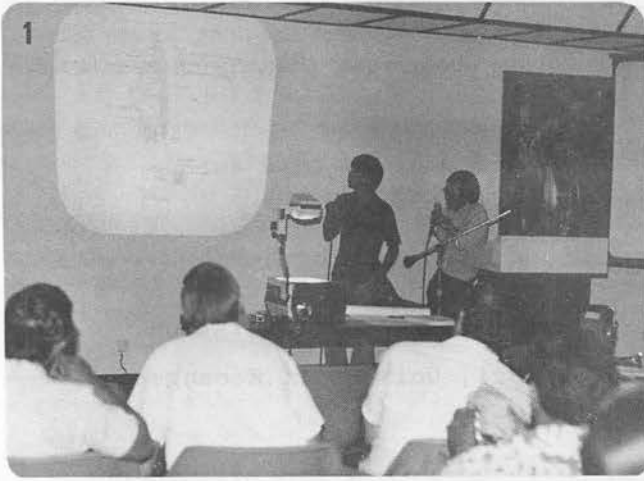
Ucapan Presiden (Presidential Address)

After the Seminar on the geology of NW Peninsular Malaysia, the outgoing GSM President, Dr. B.K. Tan, presented his Presidential Address titled "Structures in Peninsular Malaysia and their interpretations". Dr. Tan served as President of the 1977/78, 1978/79 and 1979/80 Councils.

It was indeed refreshing to listen to such an address after a lapse of over 7 years. The last formal Presidential Address, incidentally, was given by Dr. P.H. Stauffer, President of the 1972/73 Council, on 16 Feb. 1973.

The contents of Dr. Tan's Presidential Address will be published in one of the Society's Bulletins.

GHT



**NW PENINSULAR MALAYSIA SEMINAR
&
PRESIDENTIAL ADDRESS**

The NW Peninsular Malaysia Seminar and Presidential Address was held at the...
The seminar was held at the...
The Presidential Address was given by...
The seminar was held at the...
The Presidential Address was given by...

Captions for NW Seminar and Presidential Address

- Fig. 1. Mr. C.P. Lee and Mr. Y.H. Ong ably handling discussions on Pulau Terutau and Pulau Langkawi.
- Fig. 2. An attentive section of the audience at the Seminar.
- Fig. 3. Prof. P.H. Stauffer answering queries on his paper, "Singa Formation - a glacial deposit?"
- Fig. 4. "Gosh I must have one of those hot stuff after all that glaciation".
- Fig. 5. Outgoing President, Dr. B.K. Tan, delivering his Presidential Address.

Annual General Meeting

The Annual General Meeting of the Society for 1980 was held at Rumah Universiti, University of Malaya, on April 25 1980. The meeting, which was attended by 32 members, was called to order by the President at 5.04 p.m.

In his report, the President mentioned the increase in the Society's range of activities to cater for the needs of a growing membership. Besides the Annual Petroleum Seminar, new programmes implemented included the Geotechnical Engineering Seminar, the NW Peninsular Malaysia Seminar and an AAPG course for petroleum geologists. At the same time the Society will continue to safeguard the interests of members in any proposed future legislation of the National Mineral Development Policy, however the meeting was told this will take sometime. A successful field excursion was made to Pulau Terutau with the full cooperation of the Geological Society of Thailand and the Department of Mineral Resources.

With regard to the Regional Conference on the Geology and Mineral Resources of Southeast Asia to be held in the Philippines, it was suggested that we bid for it if our Philippines counterpart are unable to hold it.

The Hon. Secretary's Report and Assistant Honorary Secretary's Report were next passed. The new Editor reported that delayed issues of the WARTA GEOLOGI have now been brought up to date. To a question on getting people in other parts of this region to solicit for articles for our publications, the Editor indicated that an Editorial Advisory Board will be set up and one of its functions is to look into that.

Except for minor enquiries, which were basically book-keeping/ auditing procedures, the Treasurer's Report, which showed a financially successful year for the Society, was passed.

Next, a letter from Prof. C.S. Hutchison concerning ensuring a regular publication of the Society's newsletter was brought up for discussion.

The new President then took over the chair, thanked the last Council for their good work and announced the Council Members for 1980/81.

There being no other business, the meeting was adjourned at 6.10 p.m.

GHT

BERITA PERSATUAN (NEWS OF THE SOCIETY)

Resignation of the Editor

The Hon. Editor, Dr. Ahmad Jantan, tendered in his resignation owing to his increased work load.

At an Extraordinary Council Meeting on 1.3.80, the Council regretfully accepted his resignation.

Appointment of new Editor

The Council, at an Extraordinary Council Meeting on 1.3.80, appointed Dr. Teh Guan Hoe, as the new Editor. Dr. Teh, who is Editor in the 1980/81 Council, is given the added task of bringing out Vol. 5, no. 5 and Vol. 5, no. 6 of the WARTA GEOLOGI and BULLETIN 12.

Appointment of Acting Hon. Asst. Secretary

Since the Asst. Hon. Secretary, En. Khoo Kay Khean, is away in Australia, the Council at its Council Meeting on 14 March 1980, appointed En. Mohd. Ali Hassan as Acting Hon. Asst. Secretary.

En. Mohd. Ali Hassan is, incidentally, Hon. Asst. Secretary in the Council 1980/81. He is at the moment also looking after the affairs of the Hon. Secretary (En. Wong Yoke Fah). En. Wong is at the moment away in Swaziland.

New Library Additions

The following publications were added to the Society's collection:

1. The University of Kansas Paleontology Contributions, paper 96 & 97, 1979.
2. Berita Geologi, vol. 12, no. 1, 1980.
3. Scripta Geologica, no. 52, 1979.
4. IMM Transactions -/section A, vol. 89, 1980.
5. The Geological Survey of Pakistan, Memoirs, vol. 12, 1977 and vol. 13, 1979.
6. The Geological Survey of Pakistan, Records, vol. 35, 1976; vol. 36, 1978; vol. 37, 1976 and vol. 42, 1977.
7. AGID News, no. 23, 1980.
8. IMM Bulletin no. 880 and 881, 1980.
9. Contributions to the international geodynamics report in the GDR (Progress-Report 1975/77).
10. SEATRAD Bulletin, vol. 1(1), 1980.
11. Acta Stratigraphica sinica, vol. 3, no. 4, 1979.
12. Acta palaeontologica sinica, vol. 19, no. 1, 1980.
13. Palaeontologica sinica, no. 157, 1979.
14. Geological literature of USSR, bibliographical yearbook for 1966 year, vols. I and II, 1979.
15. Books about Singapore, 1979.
16. National Library, Singapore, adult reference collection, accessions list, Feb & March 1980.

17. Oklahoma Geological Survey, Bulletin 128, 1979.
18. Oklahoma Geology Notes, vol. 39, nos. 4-6, 1979.

Membership

The following people have joined the Society:

Full Membership

Mohd. Azmer Ashari, P.O. Box 1015, Ipoh, Perak.
 Jasbir Singh Gill, School of Humanities, USM, Penang.
 James R. McCreight, P.O. Box 857, K.L.
 Ng Chak Ngoon, 1 Rd 4/48F, P.J.
 John F. Moore, P.O. Box 857, K.L.
 Mohd. Hatta bin Mohd. Ali, P.O. Box 2444, K.L.
 Alexander H. Nutter, Cut Mutiah Mining Co., 9th Floor, Wisma Metropolitan,
 Jl. Jenderal Sudirman, KAV 29, Jakarta, Indonesia.
 C.A. Foss, Dept. of Geology, University of Malaya, K.L.
 J.B. Brami, P.O. Box 857, K.L.
 Loh Thiam Hock, P.O. Box 1015, Ipoh, Perak.
 Ibrahim Yahya, Pertamina, Unit EP-1, Exploration Dept., P. Bradan,
 Indonesia.
 Ernest P. Du Bois, CCOP Project Office, 41 Sukhumvit 4, White Inn,
 Bangkok II, Thailand.
 Nopadon Muangnoicharoen, Dept. of Geology, Faculty of Science, Chula-
 longkorn University, Bangkok 5, Thailand.
 George R. Meadows, Dept. of Geology, UKM/Sabah, Locked Bag 62, Pejabat
 Pos Besar, Kota Kinabalu, Sabah.
 Shun-Ichi Sano, ESCAP Regional Mineral Resources Development Centre,
 Jalan Jenderal Sudiram 623, Bandung, Indonesia.
 Mangatas Situmorang, Geology Dept., Otago University, Box 56, Dunedin,
 New Zealand.
 Ubayaratna Wadu Arachy Sirisen, Makmal Penyiasatan Kajibumi, P.O. Box
 1015, Ipoh, Perak.
 Michael Liew Yuk Choi, Ground Engineering Sdn. Bhd., P.O. Box 255, Kota
 Kinabalu, Sabah.

Associate Membership

Ho Kok Kett, P.O. Box 202, Dengkil, Kajang.

Student Membership

Romanus Feby Rocky, 590 Seremban Gardens, Seremban, N. Sembilan.

Institutional Membership

Department of Geology, Faculty of Science, Khon Kaen University, Khon
 Kaen, Thailand (Attn: Mr. Montree Boonsener).

Change of address

The following members have informed the Society of new addresses
 as indicated:

1. M.T. Jones, 36 Rosenworthy Crescent, Farrer, ACT 2607, Australia.
2. Abdul Aziz Sidik, Malaysia Mining Corporation, P.O. Box 300, K.L.

3. R.B. Tate, c/o UNDP, Box 5, Kabul, Afghanistan.
4. Wan Zakaria Wan Taib, 7, Jalan Raja Muda Musa, Kampong Bharu, K.L.
5. C.K. Burton, c/o Philipinas Shell, P.O. Box 441, 1330 Roxas Boulevard, Manila, Philippines.
6. Hiroaki Todo, Kiso-Jiban Consultants Co. Ltd., Overseas Division, Harajima Building, 6, Sanei-cho, Shinjuku-ku, Tokyo 160, Japan.

BERITA-BERITA LAIN (OTHER NEWS)

Schlumberger Interpretation Seminar - Quantitative Reservoir Evaluation and Monitoring

Equatorial Hotel, Kuala Lumpur - 24th June to 27th June 1980.

The Seminar will cover in detail wireline techniques and interpretation methods which are required in the quantitative evaluation and monitoring of hydrocarbon reservoirs.

10 participants are invited from GSM. Members who would like to attend should write to the Hon. Secretary, GSM before 13th June 1980 for registration purposes. (Tel. 775466 - 203).

ProgrammeTuesday 24th June

0900 - 0930	Registration and welcome
0930 - 1030	Reservoir description
1030 - 1045	Coffee Break
1045 - 1230	Saraband - Coriband
1400 - 1515	CPI - Geodescription log
1515 - 1530	Coffee Break
1530 - 1630	Reservoir monitoring - TDT time lapse

Wednesday 25th June

0900 - 1030	Thermal decay time - wellsite data processing
1030 - 1045	Coffee Break
1045 - 1230	Repeat formation tester Lunch with Schlumberger
1400 - 1515	Pressure measurement and interpretation
1515 - 1530	Coffee Break
1530 - 1630	Pressure measurement and interpretation

Thursday 26th June

0900 - 1030	Introduction to production logging tools
1030 - 1045	Coffee Break
1045 - 1230	Production logging - monophasic flow
1400 - 1515	Production logging - diphasic flow
1515 - 1530	Coffee Break
1530 - 1630	Production logging - well model

Friday 27th June

0900 - 1030	New developments in perforating and safety
1030 - 1045	Coffee Break
1045 - 1230	Reservoir description services
1400 - 1515	Reservoir description services

1515 - 1530 *Coffee Break*
 1530 - 1630 *Reservoir description services*
 1700 *Buffet - cocktail.*

SGS-Redwood Training Courses 1980 in Singapore

<u>Dates</u>	<u>Place</u>	<u>Code</u>	<u>Title</u>
June 23-25	Singapore	CGP	Off-shore crude oil and gas measurement
June 26-27	Singapore	LGM	Liquefied gas measurement and control
June 26-27	Singapore	ALA	Risk, asset and loss evaluation

More information and enrollment through:

SGS (Malaysia) Sdn. Bhd.
 9th Floor, Oriental Plaza Building
 P.O. Box 2623
 Jalan Parry, Kuala Lumpur.

Unesco-sponsored post-graduate training course in the field of Earth Sciences - preliminary announcement

1. Fundamental and Applied Quaternary Geology (Brussels, Belgium)

Organized by the Vrije Universiteit Brussel under the sponsorship of Unesco, the Belgian National Funds for Scientific Research (NFWO-FNRS) and the Belgian Unesco Committee, in collaboration with members of the teaching staff of the Universities of Liege, Antwerp, Gembloux and Brussels, the National Higher Institute for Architecture and Townplanning of Antwerp, the Belgian Geological Survey and the Centre for Quaternary Stratigraphy.

Duration: January to November (yearly)
 Deadline for application: 25 August
 Language of the course: English.
 Information and application: Permanent Delegation of Belgium (Attn: Mr. Steel), 4 Villa de Saxe 75007, Paris, France.

2. Remote sensing application (Enschede, The Netherlands)

Organized by the International Institute for Aerial Survey and Earth Sciences (ITC), Enschede, The Netherlands under the sponsorship of Unesco.

Duration: January to March (yearly)
 Deadline for application: 1 November
 Language of the course: English
 Information and application: ITC Student Affairs Office, P.O. Box 6, 7500 AA Enschede, The Netherlands.

3. Geothermics (Pisa, Italy)

Organized by the Istituto internazionale per le ricerche geotermiche, under the sponsorship of the Consiglio Nazionale delle Ricerche (C.N.R.), Rome, the Italian Ministry of Foreign Affairs, the United Nations Development Programme, New York, the Istituto Italo Latino-Americano, Rome and Unesco.

Duration: 15 February - 15 December (yearly)
 Deadline for application: 30 July
 Language of the course: alternatively English and Spanish (1979 Spanish - 1980 English)
 Information: Istituto internazionale per le ricerche geotermiche, 1 Via Buongusto, 56100 Pisa, Italy.

4. Mineral Exploration (Leoben, Austria)

Organized by the University of Mining and Metallurgy in Leoben under the sponsorship of Unesco.

Duration: 1 February - 30 June (yearly)
 Deadline for application: 31 October
 Language of the course: English
 Information: The Austrian diplomatic mission via the appropriate Government Authority in the participant's country.

5. Principles and methods of Engineering Geology (Budapest, Hungary)

Organized by the Hungarian geological institute (MAFI), in cooperation with the Hungarian National Commission for Unesco, under the auspices of the Central Office of Geology in Hungary (KFH) and under the sponsorship of Unesco.

Duration: 1 June to 31 August (every second year)
 Deadline for application: 1 September
 Language of the course: English
 Information and application: Hungarian Geological Institute, Nespstadion ut 14, P.O. Box 106 H 1142 Budapest, Hungary.

6. Geochemical prospecting methods (Prague, Czechoslovakia)

Organized by the Geological Survey of Prague, under the sponsorship of the Czech Geological Office, Prague, Unesco, Paris and the International Association of Geochemistry and Cosmochemistry (IACG).

Duration: August to October (every two-next session 1981)
 Deadline for application: 30 March
 Language of the course: English
 Information and application: GEOCHIM CSSR UNESCO, Geological Survey Malostranske nam. 19, 118 21 Prague, Czechoslovakia.

7. Mining exploration and exploration geophysics (Delft, The Netherlands)

Organized by the International Institute for Aerial Survey and Earth Sciences (ITC) in co-operation with the Mining Department of the Delft University of Technology, under the sponsorship of Unesco.

Duration: 12 months (starting September) for standard courses, 12-16 additional months for advanced courses in mining exploration (yearly);
 Deadline for application: 1 May
 Language of the course: English.

8. Summer Course on Earth Sciences: Crystallography, Mineralogy, Metallogeny (Madrid, Spain)

Organized by the Department of Geology and Geochemistry of the Universidad Autonoma de Madrid and the Department of Structural Crystallography of the Instituto "Roca solano" of the Consejo Superior de Investigaciones Cientificas, Madrid, in cooperation with the Ministry of Foreign

Affairs of Spain and under sponsorship of Unesco.

Duration: July - August (yearly)

Deadline for application: 1 May

Language of the course: Spanish

Information and application: Departamento de geologia y geoquímica, Facultad de ciencias, Universidad Autónoma de Madrid, Canto Blanco, Madrid 34, Spain.

9. Methods and techniques in Exploration Geophysics (Hyderabad, India)

Organized by the National Geophysical Research Institute of the Council of Scientific and Industrial Research and the Centre of Exploration Geophysics of the Osmania University, Hyderabad, India, under the sponsorship of the Government of India and of Unesco.

Duration: December - January (yearly)

Deadline for application: 15 September

Language of the course: English

Information and application: The Director, Regional Training Course on methods and techniques in geophysical exploration, Centre of exploration geophysics, Osmania University Hyderabad, India with one copy to: Unesco Regional Office for Science and Technology 17 Jorbagh New Delhi 110003, India.

10. Geothermal energy (Kyushu, Japan)

Organized by the Government of Japan as part of its Technical Cooperation Programmes for developing countries, in cooperation with Unesco.

Duration: September - October (last session: 1970)

Deadline for application: 15 July

Language of the course: English.

11. Mineral exploration (Paris, France)

The main objectives of the course are to provide a theoretical and practical knowledge of the variety, relative importance and interdependence of the numerous factors which influence decision-making in mineral research; towards practical ends bearing in mind economical and technical constraints; to instruct them in the interpretation, correlation, representation and utilization of a mass of different data; to give the trainees the opportunity to take numerous decisions, which must be justified and which are then confirmed by experience.

Through a method of simulation, assisted by computer, the trainees are able to live realistically a concrete experiment of complex mineral research; first they receive more or less complete geological, technical and socioeconomical data from which they can elaborate a research strategy depending upon a budget; next they undertake research (geochemical prospection at different levels, prospection by boring with various tools) for which the results and the cost are supplied by the computer. Throughout the course of the operations, they must interpret the results and adjust their handling thereof as in reality. The simulation of time and costs, the multiplication and diversification of experiments and the provision, at the close of the course, of a correct representation of the environment studied, this never being the case in reality.

Information and application: Professor H. Pelissonnier, Ecole des Mines, 60 Bd. Saint Michel, 75272 Paris, Cedex 06.

12. Training Course on Seismology and Geophysics (Potsdam, German Democratic Republic)

Organized by the Academy of Sciences of the German Democratic Republic in collaboration with Unesco.

Duration: Two weeks in October/November (yearly-tentatively)

Deadline for application: 15 May

Language of the course: English

Information and applications: Prof. Dr. H. Kautzleben, Director, Central Earth's Physics Institute Academy of Sciences of the German Democratic Republic Telegraphenberg, DDR 15 Potsdam, German Democratic Republic.

Workshop on age dating, 6-13 October 1980, Seoul, Korea

Organized by the Unesco Geosciences Network the workshop on age-dating will be held in Seoul, Korea from October 6 to 13, 1980 in cooperation with the Seoul National University (SNU) and the Korean Research Institute of Geosciences and Mineral Resources (KIGAM).

Among the topics to be dealt with are:

Lectures and demonstration on fission track method (Prof. J.F. Lovering)

Lectures and demonstration on Rb/Sr method (Prof. I. Wendt)

Lectures and demonstration on K/Ar method (Prof. Y.J. Lee)

Lectures and demonstration on C-14 method (Dr. K.R. Yang).

Particular attention will be paid to the fission track dating method. In addition field trips also are planned to Ogcheon fold belt near Cheongju.

4 Unesco-sponsored participants will come from Southeast Asian countries and about 40 others from Korea and other countries. Airfares to Korea and per diem for 4 Unesco-sponsored participants from abroad will be paid through the local organizing committee. Application for Unesco-sponsored participation should be made through Unesco Regional Office for Science and Technology for Southeast Asia (Jl. Tharmin 14 Jakarta, Indonesia).

The workshop on age-dating will be attended by small group of field- and laboratory-oriented geologists who are interested in dating methods and the results thus found. The paper for the presentation in the paper session should be a working-type or discussion-type suitable for about 20 minutes of oral presentation and 5 minutes discussion.

The title and an abstract or outline of the paper should be submitted by August 31, 1980.

For further details, please contact

Prof. B.K. Kim
Executive Secretary
Geosciences Headquarters
Dept. of Geology
Seoul National University
Seoul 151, Korea.

Unesco - An international symposium on metallogeny of mafic and ultramafic complexes: The Eastern Mediterranean-Western Asia area, and its comparison with similar metallogenic environments in the world.
October 9-11, 1980, Athens, Greece.

This symposium is being organised by the National Technical University of Athens and UNESCO (IGCP project no. 169) under the auspices of the Ministry of Culture and Sciences of Greece and is sponsored by the International Union of Geological Sciences. It will take place as part of the International Geological Correlation programme (IGCP Project no. 169) and it will include subjects related to the Eastern Mediterranean-Western Asia areas and will be concerned with the following topics:

- a) The genesis and correlation of Cr, Ni, Pt and Cu deposits with mafic and ultramafic complexes
- b) The origin and genetic correlation of magnesite deposits with basic and ultrabasic complexes
- c) Ni-Fe laterite deposits, alteration derivatives of mafic and ultramafic rocks.
- d) Also a parallel meeting will take place of the subgroup for the metallogenic map of the ophiolite belts of the world, IGCP project "Ophiolites" no. 39.

Scientific papers/reports on all subjects of the Symposium will be presented in Athens from October 9-11th, 1980. The summaries of the announcements (Abstracts) should be submitted to the Athens office of the Symposium not later than July 30th 1980 and the complete text not later than September 30th 1980. You are kindly requested to address all correspondence concerning the Symposium to:

Prof. S.S. Augustithis
 Unesco International Symposium-Project no. 169
 National Technical University
 Department of Mineralogy-Petrography-Geology
 P.O. Box 1482
 Athens, Greece.

The texts of the announcements should be written in English and should be no more than fifteen (15) single-spaced typewritten sheets, including all graphs, figures, photographs and bibliography.

Field trips to the most important chromite, nicket and magnesite mining areas as well as visits to the most important ophiolite complexes of Greece will be organised at special reduced prices for the participants of the Symposium.

Accepted papers must be presented in English. Each speaker will have twenty minutes in which to present his paper. The visual aid will be slides of 2.4 x 3.6 cm in a 5 x 5 cm frame.

Eurotunnel '80, 16-19 September 1980, Basle, Switzerland

The theme of the Eurotunnel '80 conference, which is being held on the occasion of the Eurotunnel '80 exhibition, at the Swiss Industries Fair Congress Centre in Basle, Switzerland, from 16 to 19 September, 1980, is *Tunnelling in Europe*. The conference, to be organized by the Institution of Mining and Metallurgy, will feature papers on current major European tunnelling projects and developments.

The papers listed below, their countries of origin being given in paranthesis, are among those expected to be considered for presentation at the conference. All papers will be published (in English with French

and German summaries) in the preprinted volume Eurotunnel '80, which will be distributed to registrants in August 1980.

- R. Amberg: Application of wire-reinforced concrete and rockbolts for temporary and permanent support in the Furka tunnel (Switzerland).
- S. Babendererde: Application of the new Austrian tunnelling method in German metro construction schemes (Germany).
- B. Barchanski: Construction of large underground chambers in difficult hydrogeological conditions (Poland).
- S. Bjurstrom: Heat storage in rock chambers - demands on design and construction (Sweden).
- J.F. Bougard: Adaptation of tunnel construction methods to geological and environmental conditions (France).
- H. Duddeck: Review of design methods for tunnels in soft ground (Germany).
- I.W. Farmer and A.M. Price: Design of tunnels in coal measure rocks (United Kingdom).
- D.F. Fawcett: Northern tunnels of the Kielder Water Scheme - a case history from conception to completion (United Kingdom).
- G. Fogarasi: Precast concrete tunnel liners in the construction of the Budapest and Prague metro and Belgrade railway tunnels (Hungary).
- P. Gesta: Frejus motoway tunnel - French side (France).
- L. Gustavsson: Construction of large tunnels in the development of water power resources in Sweden (Sweden).
- A.M. Heltzen: Railroad tunnelling under the centre of Oslo (Norway).
- R.J. Hemming and E.J. Clague: Allerton Bywater surface drift mine (United Kingdom).
- G.R. Hoste: Metro works in Antwerp (Belgium).
- T.I. King: Tunnelling in British coal mining (United Kingdom).
- J. Le Gac: Gare de Lyon, Paris, project (France).
- B. Maidl: Tunnelling support methods and their possible application to machine rock face excavation in coal mining (Germany).
- H. Mueller and P. Dodd: Driving of the Rosenberg tunnel by an 11.4-m diameter mechanized shield (United Kingdom).
- O. Nummedal: Construction of Eidfjord power project, western Norway (Norway).
- H. Unterberg and C. Becker: Development of tunnel lining for shield-driven tunnels (Germany).
- H. Wind: Tunnelling in very difficult ground (Germany).

Technical tours arranged from Wednesday, 10 September to Tuesday, 16 September 1980, include Gubrist tunnel, Zurich; Rosenberg tunnel, St. Gallen; Kerenzer tunnel; Hagerbach experimental tunnel near Sargans; Isla Bella road tunnel; Munich metro; Stuttgart metro and measuring sites in anhydrite.

Exhibition - the industrial art of tunnelling - the planning, excavating, construction, maintenance and management associated with either mining or civil engineering projects - sums up the scope and content for Eurotunnel '80, the second European exhibition and conference for the tunnelling industries.

The Eurotunnel '80 exhibition will again focus worldwide attention on the plant, products and services of manufacturers and contractors specializing in rock drilling or soft ground excavating, tunnel lining, blasting, muck shifting and all associated equipment, together with roof-support systems, ventilation, lighting, underground communications and safety.

Full details of the exhibition are available from Access Exhibitions, Ltd., 62/64 Victoria Street, St. Albans, Herts, England AL1 3XT.

All enquiries in connection with Eurotunnel '80 should be addressed to the Meetings Secretary, The Institution of Mining and Metallurgy, 44, Portland Place, London W1N 4BR, England.

Second International Tinplate Conference

The International Tin Research Institute is organising the Second International Tinplate Conference. It will be held in London, England, from 6th to 10th October 1980, in the Europa Hotel, Duke Street, London.

This Conference in 1980 is the second in a series aimed at bringing together experts in all fields of tinplate technology for detailed discussions and the interchange of information on the latest developments.

During the course of the Conference approximately 45 technical papers will be presented by authors from the world's tinplate industry. Topics to be covered will include tinplate production, container manufacture, aspects of can performance and usage, new types of tinplate containers and closures, lacquering and printing of tinplate, engineering uses of tinplate, quality control techniques, standardisation, marketing, future prospects, etc. All papers will be presented in English.

Preprints of the papers will be received by all those who register for the meeting. In addition, bound copies of the Conference Proceedings will be published after the meeting. The costs of preprints and of the bound volume are included in the registration fee of £116. The fee also includes lunch and tea/coffee during the course of the Conference, but does not include hotel accommodation.

Those interested in attending the Conference should write for a registration form to: Conference Secretariat
International Tin Research Institute,
Fraser Road, Perivale
Greenford, Middlesex UB6 7AQ, England.

New publications for exploration geologists

During Fall 1980, CEPCO (Continuing Education Publications) Division of Burgess Publishing Company, will be announcing a group of new publications which should be of interest to members. These will include:

Thomas Thompson: Tectonic guidelines to oil and gas exploration.
Douglas Waples: Organic geochemistry for exploration geologists.
Edward H. Owens: Coastal processes, shoreline types and the cleanup of oil spills.

and second editions of

George deVries Klein: Sandstone depositional models for exploration for fossil fuels.

James M. Coleman: Deltas: processes for deposition and models for exploration.

Further information can be obtained from:

Judith C. Goodrich
CEPCO Division, Burgess Publishing Co.
7108 Ohms Lane
Minneapolis, Minn. 55435, USA.

Ulasan buku (Book Reviews)

Warren Hamilton, 1979. TECTONICS OF THE INDONESIAN REGION. Geological Survey Professional Paper 1078, 345 pages (29 x 23 cm) with folded tectonic map of the Indonesian region, scale 1:5,000,000. Obtainable from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, USA (stock number 024-001-03207-4), US\$9.00.

Here it is at last! Those of us working in the region have been aware from his numerous progress summaries given at regional meetings that Warren Hamilton has been working on this magnum opus for the past eight years. It is well worth waiting for and it is a must for every geologist, academic or commercial interested in Southeast Asia. This book should also be compulsory reading for all students of geology for an understanding of Southeast Asia can allow us to understand a major orogeny and its sedimentation history yet in progress.

"The complex interactions between lithospheric plates, which (are) the dominant topic of this (book), are details superimposed on the broad convergence of mega plates. Australia continues to approach Asia at a velocity of something like 10 cm/yr, or 100 km/m.y.. Projection of this convergence forward in time indicates that, barring a major reorganization of plate motions, the likely fate of Indonesian, Philippine, and western Melanesian complexes is to be squashed between Australia and Asia." "This (book), concerned primarily with a mere 100 million years of the history of one sector of a convergent zone, gives some notion of the complexities yet to be comprehended in the terrains now squashed between continental masses in composite continents". This is the case for the academic geologist to read this exciting book. The case for the commercial geologist is also obvious. The oil basins of Sumatra, Java, the South China Sea and the Australian Shelf are put into their tectonic setting. The tin fields of the Malay Peninsula are correlated with those of Australia. The porphyry copper deposits of the Philippines and Sabah are related to arc-trench systems and underlying Benioff Zones and the nature of the crust involved in the magmatism. The nickel laterites of Sulawesi and the Philippines are related to ophiolite-bearing mega-melange belts.

An outstanding feature of this book is the inclusion of high quality seismic profiles supplied by oil companies. These are not normally available to geologists outside of a particular company. Figure 9, for example, shows remarkable deep-penetration reflection profiles across the Java Trench which clearly show oceanic crust dipping at 7° northwards beneath a melange wedge. Such excellent seismic profiles seem to be definite proof of subduction if proof is needed. What is the subduction mechanism - is it an active underthrusting of oceanic lithosphere downwards beneath a Benioff Zone? "The geometry of Indonesian subduction systems leads me to conclude that subducting slabs are primarily sinking vertically beneath advancing, overriding plates. The spoon-shaped Benioff zone of

the Banda Arc is easily explained in these terms, whereas it defies explanation in terms of slab injection with a sizable horizontal component of motion."

The identification of subductinn melanges in the Indonesian region in the voluminous literature "consisted in considerable part of looking for descriptions permitting a Franciscan (Californian) analogy." Subduction melange wedges should have calc-alkaline magmatic belts related systematically to them and of comparable age. With these and other simple plate tectonic rules, Warren Hamilton has carefully gone through the region, re-interpreting the literature, and visiting selected outcrops as widely separated as the Bentong melange of Malaysia, Mount Kinabalu of Sabah, eastern Sulawesi, Timor, and New Guinea.

The extra-Indonesian parts of the region included in this study are the Malay Peninsula and the Indian Ocean, the Philippines, Papua New Guinea and northern Australia.

Although predominantly concerned with oceanic tectonic features and seismic profiles, a serious attempt has been made to integrate the on-land geology, gleaned from published reports, into the plate-tectonic framework largely developed from the oceanic and submarine details. Whereas many oceanographers, including those who have set the basic framework for plate tectonics, are less at home on land than at sea, Warren Hamilton has successfully bridged the gap between land geology and the offshore tectonic elements.

Such a compilation by a single geologist cannot avoid personal bias. Indeed all written geology is a personal view. To give but two examples of his obvious bias, Warren Hamilton is critical to the point of rejection of the older than Mesozoic ages of granites of the Main Range of the Malay Peninsula. Also he is critical to the point of rejection of some palaeo-magnetic data for he has a preconception that the Malay Peninsula was formerly attached to Australia.

The book is liberally illustrated with seismic profiles, outline tectonic sketch-maps, Landsat space photographs, and excellent photographs of selected outcrops. The references are adequate though understandably incomplete, but they occupy 28 pages of text.

Geologists who have a personal knowledge of parts of this large region will obviously have some disagreements with Warren Hamilton, especially with some of the bold lines on the coloured map (Plate 1). But it is a bold synthesis of the region and boldness and decision are characteristics necessary for an author to succeed in such a major undertaking as to summarize in 345 pages the "tectonics of the Indonesian region". Warren Hamilton has succeeded better than any geologist known to me could have. If you are involved in any way in the Southeast Asian region, you cannot afford to be without a copy of this most significant tectonic synthesis since Van Bemmelen's "Geology of Indonesia". If you are not now involved in the region, but want an up-to-date introduction, this book is also for you. If you teach a University tectonics course, then you will welcome a library copy for you and your students to frequently refer to. It is unfortunate that this Professional Paper comes in the usual thin paper covers. It will quickly need to be re-bound in hard covers for the frequent use it deserves when it gets into your hands.

C.S. Hutchison

Jensen, M.L. and Bateman, A.M., 1979. ECONOMIC MINERAL DEPOSITS. Third edition. John Wiley & Sons, New York, 593 pages (28 x 22 cms), US\$23.95.

This is the third edition of the well known textbook by Alan Bateman. Shortly before his death on May 11, 1971, he asked Mead L. Jensen of the University of Utah if he would prepare a third edition. This almost completely re-written book is the outcome. The large page format is also new.

The major omissions from the Alan Bateman second edition are specific chapters pertaining to structural geology, geophysical techniques, extractive metallurgical processes, groundwater supplies and some others. Gone are the days when an economic geology textbook can hope to cover the whole spectrum of geology.

The list of contents is:

1. Mineral economics and exploration (29 pages).
2. Brief history of the use of minerals and the development of economic geology (9 pages).
3. Materials of mineral deposits and their formation (19 pages).
4. Petrology of mineral deposits: magmas, solutions and sediments (16 pages).
5. Magmatic concentration (13 pages).
6. Sublimation (1 page).
7. Contact metasomatism (10 pages).
8. Hydrothermal (46 pages).
9. Sedimentation (18 pages).
10. Bacteriogenic (10 pages).
11. Submarine exhalative and volcanogenic (20 pages).
12. Evaporation (14 pages).
13. Residual and mechanical concentration (26 pages).
14. Oxidation and supergene enrichment (12 pages).
15. Metamorphism (7 pages).
16. Summary of origin of mineral deposits (3 pages).
17. Classification of mineral deposits (8 pages).
18. The precious metals (41 pages).
19. The non-ferrous metals (74 pages).
20. Iron and the ferro-alloy metals (57 pages).
21. Minor metals and related non-metals (18 pages).
22. Energy and coal (18 pages).
23. Petroleum geology (13 pages).
24. Ceramic materials (10 pages).
25. Structural and building materials (19 pages).
26. Metallurgical and refractory materials (18 pages).
27. Industrial and non-refractory materials (17 pages).
28. Chemical materials (18 pages).
29. Abrasives and abrasion materials (8 pages).
- General references on economic geology (2 pages).
- Index (13 pages).

Several chapters are entirely new. Chapter 1, mineral economics and exploration, is a not entirely successful inclusion. Mineral economics is a subject generally boring to geologists and perhaps also to economists. In my opinion this chapter is anomalous. It consists of a strange conglomeration of topics which have been badly selected. For example a whole page (table 1-3) on geothermal power installations, giving average drillhole depth, may be useful for general knowledge quiz shows, but one can hardly imagine a geology student benefiting from such data. The choice of illustrations is also hard to appreciate.

A whole page for Figure 1-1 on the over simplified general geology of western Utah serves no purpose whatsoever. Two pages given to ERTS photographs of Nevada, one snow covered, and one in summer, simply serve to teach us that snow falls in Nevada in winter. The few lines devoted to new geophysical exploration techniques are inadequate and would best have been left out.

The establishment of a category of deposit called Bacteriogenic (chapter 10) is less than satisfactory. The Mount Isa deposit of Queensland is given as a good example, but surely this is a well known stratiform deposit and is much more than bacteriogenic. It is probably submarine exhalative. The fact that bacteria may play a role in the metal deposition, hardly warrants the deposits being classified as bacteriogenic.

The new chapter on submarine exhalative and volcanogenic processes is a necessary and welcome addition, and indeed this is now accepted as the foremost mechanism for concentrating ore deposits, from the Archean greenstone belts to the present day lakes and seas adjacent to volcanic centres.

The format of the earlier editions is followed by describing well known mines under the headings of the major economic metal. This is traditional for textbooks on economic geology. However it does lead to an arbitrary separation of related topics. For example the precious metals of the Bushveld are separated from their co-genetic magnetite and chromite.

Tin is traditionally weak and the brief section falls short of the truth. To quote page 375 "The tinstone contained in stockworks and veins resisted weathering and so accumulated in the residual soils. The soils were washed into the valley, leaving the heavy resistant tinstone to accumulate on the pinnacled bedrock, particularly near valley sides." This can hardly be regarded as a proper characterization of the Malaysian tin deposits. The book tells us that the Malaysian and Indonesian tinstone is smelted in Singapore. No useful information will be found on the tin deposits of Thailand, Malaysia and Indonesia. In contrast the Bolivian deposits are overdone. No serious attempt has been made to update the information available in the earlier editions, which were based on Ferguson and Bateman (1912) (Econ. Geol., volume 7, pages 209-262). Can one seriously imagine a summary of tin deposition without a single reference to Ken Hosking? This book does it. Tungsten is also rather weak and avoids reference to Southeast Asia.

There are some rather surprising omissions from the otherwise balanced book. The only mention of Cyprus is in a table taken from R.W. Hutchinson (page 180) and listed in selected references (page 198). Yet the text nowhere mentions the Cyprus sulphide deposits, which have come to be the type deposit of massive sulphide deposition on ocean floor, associated with ophiolite. Likewise the Besshi deposit of Japan is listed only in a table of mine production in the Japanese islands, but never described in the text. Yet Besshi type deposits are recognized elsewhere in the world as an unusual though important type of deposit.

A most serious criticism of this otherwise useful book is the woeful lack of editorial attention to the references. They are usually given annoyingly incomplete or incorrect. For example: (From Smith, 1969, Garcon-Sales Vol., page 888), (Broderick, 16th Internat. Geol. Congr.), (from Bull. Can. Int. Mining and Metall.), (Cyprus sulfide deposits, 1973, B.N. Fredericton. Econ. Geol. Vol. 68, p. 843-858). The latter, well known paper, is actually authored by G. Constantinou and G.J.S. Govett. The reader hopes to find more details of the incomplete references under the short Selected References, at the end of each section, or under the short General References at the end of the book. Alas, he will be

disappointed. It is hard to understand how the Wiley editor has allowed such careless editing. I would estimate that at least 80% of the references are not tabulated. It is to be hoped that the next edition will rectify the question of references. Some careless editing has crept into the captions of the figures also. For example Fig. 19.30 is a drawing of the Philippine islands showing the location of its mines. Its caption says it represents the production from the Viburnum Trend of Missouri.

Despite these major criticisms, the book is a welcome addition to the small number of economic geology textbooks. It is the only book on this subject which attempts a modern approach and no doubt will achieve the wide use it deserves.

C.S. Hutchison

Pengulas buku (Book reviewer)

Prof. C.S. Hutchison is Professor of Applied Geology and Head of Department of Geology, University of Malaya, Kuala Lumpur, Malaysia.

Mineralogy Word Puzzle - solution

V	O	R	A	V	U	C	D	P	E
S	V	P	A	K	U	K	N	P	
R	H	Y	N	F	U	E	I	Y	S
E	E	M	R	S	Y	L	X	Z	O
H	N	O	S	O	A	X	I	N	M
T	A	Q	T	M	M	R	R	O	C
I	C	J	R	R	Q	O	Q	B	L
W	V	L	O	Z	N	O	R	B	B
S	O	B	W	E	J	L	L	P	D
T	T	I	V	M	C	R	Y	T	H

1. The Kung-fu fighter (4 + ite) - Brucite.
2. The 'kapak' hit man from Kelantan (4 + ite) - Axinite.
3. The aged counsellor of the Carbonate Mafia (6 + ite) - Witherite.
4. The fair lady of the Feldspathoid Family (4 + ite) - Leucite.
5. The Greek deceiver (8 + ite) - Phenacite.
6. The horse-racing punter (5 + ite) - Epsomite.
7. The Leader in fiery form (9 + ite) - Pyromorphite (phosphate of lead).
8. Member of the Pyroxene Family who won a Games medal (5 + ite) Bronzite.
9. The Russian noble in the pomegranate orchard (6 + ite) - Uvarovite.
10. Turamali, the Ceylonese Rolling Stone - Tourmaline.

Calendar

A bracketed date (Mar-Apr 1979) denotes entry in that issue carried additional information.

1980

- May 12 - 14 : Conference on Soil Science and Agricultural Development in Malaysia. Secretary, Executive Committee, Conference on Soil Science and Agricultural Development, P.O. Box 2644, Kuala Lumpur, Malaysia. (Jul-Aug 1979).
- May 12 - 16 : International Archaean Symposium, Perth, Australia. Sponsored by IGCP Archaean Geochemistry project and Geological Society of Australia. (J.A. Hallberg, Archaean Symposium, CSIRO, Division of Mineralogy, Private Bag, Wembly, Australia 6014).
- May 27 - 28 : Ninth Annual Convention of the Indonesian Petroleum Association. Indonesia Petroleum Association, Lecture Committee, Jalan Menteng Raya 3, Jakarta, Indonesia. (Sep-Oct 1979).
- May 27 - 30 : National and International Management of Mineral Resources. The Secretary, Institute of Mining and Metallurgy, 44 Portland Place, London, W1N 4BR, U.K. (Mar-Apr 1979).
- May 28 - 30 : 4th Industrial Minerals International Congress, Atlanta, U.S. Details from Metal Bulletin Congresses Ltd., Park House, Park Terrace, Worcester Park, Surrey KT4 7HY, U.K. (Jan-Feb 1980).
- Jun 2 - 4 : Conference on application of rock mechanics to cut and fill mining. Prof. Ove Stephansson, Dept. of Rock Mechanics, University of Lulea, S-951 87 Lulea, Sweden. (Nov-Dec 1979).
- Jun 3 - 5 : IVth International Precious Metals Conference, Toronto. Details from International Precious Metals Institute, Polytechnic Institute of New York, 333 Jay Street, Brooklyn, NY 11201, USA.
- Jun 24 - 26 : International Conference on Applied Mineralogy in the Mineral Industry, Johannesburg, S. Africa. The Conference Manager, ICAM 81, National Institute for Metallurgy, Private Bag X3015, Randburg, 2125, South Africa.
- Jun 25 - 27 : Fore-Arc Sedimentation and Tectonics in Modern and Ancient Subduction Zones, London, U.K. J.K. Leggett, Dept. of Geology, Imperial College, Prince Consort Road, London, SW7 2AZ, U.K.
- Jun 29 - : Fifth International Palynological Conference, Cambridge, England, U.K. Conference with field excursions. (Mrs. G.E. Drewry, Dept. of Geology, Sedgwick Museum, Downing Street, Cambridge, CB2 3EQ, England).
- Jul 4 - 7 : General meeting of the International Mineralogical Association (IMA), Orleans, France. Scientific and poster sessions, field excursions. (Secretariat de la 12eme Assemblee Generale de l'IMA, B.R.G.M., BP 6009, 45018, Orleans, Cedex, France).
- Jul 7 - 17 : 26th International Geological Congress, Paris, France. Paul Sangnier, Secretaire General du 26eme C.G.I., Maison de la Geologie, 77-79 rue Claude-Bernard, 75005, France. (Nov-Dec 1977).

- Jul 14 - 24 : International Symposium on water-rock interaction, Edmonton, Alberta, Canada. Sponsored by IAGC and the Alberta Research Council. (B. Hitchon, Alberta Research Council, 11315, 87th Avenue, Edmonton, Alberta, Canada T6G 2C2).
- Jul 29 - : Second European Conodont Symposium (ECOS II), Austria and
Aug 10 : Czechoslovakia. Symposium with pre- and post-symposium field trips co-sponsored by the Geological Survey of Austria and Geological Survey of Czechoslovakia. (ECOS II, Geological Survey of Austria, P.O. Box 154, Rasumofskygasse 23, A-1031, Vienna, Austria).
- Sep 6 : Congress on Science and Technology in Resource Development. Secretary, Jubilee Science Congress, c/o Malaysian Scientific Association, P.O. Box 911, Kuala Lumpur. (Nov-Dec 1979).
- Sep 8 - 13 : World Conference on Earthquake Engineering, Istanbul, Turkey, A. Gurpinar, Secretary, 7 WCEE, Yuksel Caddesi 7/B, Ankara, Turkey.
- Sep 10 - 26 : International Course on Applied Mineral Economics for Developing Countries. Sponsored by AGID in cooperation with the Govt. of State of Braiba and CPRM. Dr. Elisen D'Angelo Visconti Neto, CPRM/DAF, President of Organizing Committee, Ave. Pasteur no. 404 - Rio de Janeiro, 22.292, Rio de Janeiro, Brazil.
- Sep 17 - 19 : Eurotunnel '80, Basle, Switzerland. Conference on Tunneling in Europe. (Secretary, Institute of Mining and Metallurgy, 44 Portland Place, London, W1N 4BR, U.K.).
- Oct 5 - 8 : Complex sulphide ores, Rome, Italy, Organized by IMM in association with Consiglio Nazionale delle Ricerche (Laboratorio per il Trattamento del Minerals). The Secretary, IMM, 44 Portland Place, London W1N 1BR, U.K.
- Oct 6 - 13 : Workshop on Age Dating by the Unesco Geosciences Network. Prof. B.K. Kim, Executive Secretary, Geosciences Network, Seoul National University, Seoul, South Korea.
- Oct 13 - 17 : Second International Conference of Scientific Editors, Amsterdam, Holland. (J.L. Heller, U.S. Geological Survey, MS 303, Box 25046, Federal Center, Denver, Co. 80225, USA).

1981

- Mar 29 - : International Conference on Arid Soils-Properties,
Apr 4 : Genesis and Management, Jerusalem, Israel. International Conference on Arid Soils - Properties, Genesis and Management, P.O. Box 3054, 122 Hayarkon St., Tel Aviv, Israel. (May-Jun 1979).
- Aug 7 - 16 : 4th International Conference on basement tectonics. (Conference with field excursions), Oslo, Norway. Major theme: Origin, propagation and significance of basement fractures. (I.B. Ramberg, Dept. of Geology, University of Oslo, Box 1047, Blindern, Oslo, 3, Norway).
- Sep 1 - 6 : Second International Conference, Graptolite working group of the International Palaeontological Association, (Conference and field exursions), Cambridge, U.K. (P.R. Crowther, Dept. of Geology, University of Cambridge, Sedgewick Museum, Downing Street, Cambridge CB2 3EQ, U.K.).

Oct 7 - 9 : Association of Southeast Asian Nations Council on Petroleum (Meeting), Manila, Philippines. (ASCOPE '81 Organizing Secretariat, Philippine National Oil Co., 7901 Makati Ave., Makati, Metro Manila, Philippines, Telex: 63667 PNOG PM).

1982

Aug 22 - 28 : Circum-Pacific Energy and Mineral Resources Conference, Honolulu, Hawaii, USA. (M.T. Halbouty, 5100 Westheimer Road, Houston, Texas 77056, USA).

PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)

Tujuan Persatuan Geologi Malaysia adalah untuk memajukan sains bumi, terutama sekali di Malaysia dan negaranejara jiran. Barang siapa yang ingin menjadi ahli Persatuan adalah dipersilakan mendapatkan borang-borang daripada Setiausaha Kehormat.

The aim of the Geological Society of Malaysia is to promote the advancement of geological sciences particularly in Malaysia and the neighbouring countries. Anyone interested in becoming a member of the Society should obtain the necessary forms from the Hon. Secretary.

Yuran Tahunan (Annual Dues)

Yuran tahunan bagi Ahli Penuh dan Ahli Bersekutu ia-lah M\$15.00 pada tahun berkenaan. Yuran masuk sebanyak M\$5.00, hendaklah dibayar bila dipilih menjadi ahli.

The annual dues of Full Members and Associated Members shall be M\$15.00 for each calendar year. An entrance fee of M\$5.00 shall be payable on election.

Some Bahasa Malaysia (Malay) geographical terms

Bukit (Bt)	-	hill	Kuala (K)	-	river mouth
Genting (Gtg)	-	pass	Pulau (P)	-	island
Gunung (G)	-	mountain	Sungai (S)	-	river
Jalan (Jln)	-	road, street	Tanjung (Tg)	-	cape
Kampung (Kg)	-	village	Teluk (T)	-	bay

