

## PERSATUAN GEOLOGI MALAYSIA

# WARTA GEOLOGI

## NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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DIKELUARKAN DWIBULANAN  
ISSUED BIMONTHLY

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(GEOLOGICAL SOCIETY OF MALAYSIA)**

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- Ahmad Said, Petronas, P.O. Box 2444,  
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**Address of the Society:** GEOLOGICAL SOCIETY OF MALAYSIA  
c/o Dept. of Geology  
University of Malaya  
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Tel. 03-577036

# CATITAN GEOLOGI (GEOLOGICAL NOTES)

## NATURE OF THE CONTACT OF THE SEMANGGOL AND MAHANG FORMATIONS AT THE DUBLIN RIDGE AREA, KEDAH

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

During a field visit to the Mahang area in 1979 it was found that new exposures occur at roadcuts along a new road from Kampong Selarong Panjang to Kampong Tebuan about 11 km north of Mahang (Fig. 1). The rocks exposed there have interesting ramifications as regards the nature of the contact of the Semanggol and Mahang Formations at the Dublin Ridge area about 3 km south of the new road.

The new road about 5.5 km long heads from Kg. Selarong Panjang to Kg. Tebuan in an easterly direction. At about 0.75 km from the junction at Kg. Selarong Panjang the first roadcut exposes weathered coarse-grained granite which is part of the Kulim granite as shown in the geological map of Courtier (1974). About 2 km from the first roadcut are more roadcuts exposing black mudstone often veined by quartz. The black mudstone beds dip 145/65 and there is no evidence of cleavage or contact metamorphism. The same black mudstone can still be seen at a roadcut about 2.5 km from the first exposure of the black mudstone. At the last exposure before reaching Kg. Tebuan the beds dip 150/40. From the geological map of Courtier (1974), the road mentioned should be cutting through the Semanggol Formation (Triassic) which is described by Courtier (1974) as 'predominantly arenaceous, consisting of sandstone interbedded with shale, and containing minor intercalations of siltstone and chert'. The rocks exposed at the roadcuts do not appear to resemble the lithologies described by Courtier (1974) in the Semanggol Formation of the area. Instead the rocks appear to be similar to rocks belonging to member 1b of the Mahang Formation which is dark mudstone which in places gives way to pale and/or laminated shale according to Courtier (1974). A roadcut in the Mahang Formation area about 2 km along the road north of Mahang exposes rocks similar to those in the Kg. Selarong Panjang roadcuts. Here the black mudstone (150/67) is interbedded with minor grey mudstone and is veined by quartz both parallel to and cutting across the bedding like the Kg. Selarong Panjang rocks. On account of the lithological similarity and closeness to the rocks of the Mahang Formation it is believed that the rocks exposed at the new roadcuts are part of the Mahang Formation. Also considering the south-easterly dip of the black mudstone beds and the length of the EW road, it is possible that the mudstone bed is too thick to be one of the minor beds of black micaceous shale, brown mudstone or grey shale of the Semanggol Formation in the area.

The occurrence of an inlier of Mahang Formation north of the presently known contact of the Semanggol and Mahang Formations at the Dublin Ridge (Fig. 1) at Dublin Estate will provoke questions on the nature of the contact. According to Courtier (1974), the contact at Dublin Ridge is a thrust with the Mahang Formation thrust over the Semanggol Formation at a rather low angle (Fig. 2). The Dublin Ridge is an enigmatic ridge elongated east-west and protruding from the Bintang

granite massif. On the northern slope of the ridge the straight character of the contact between the Semanggol and Mahang Formations and the disturbed nature of the beds at the contact are considered by Courtier (1974) to be evidence for a fault contact (Fig. 1). The occurrence of minor thrusts in the Mahang Formation which can be seen in the field is believed by Courtier (1974) to be subsidiary indications of the type of main faulting and so the contact was interpreted to be a thrust. What is the relation between the inlier of Mahang Formation in the Semanggol Formation and the contact at Dublin Ridge?

Various models regarding the relationship can be suggested. If thrusting is one of the main structural feature of the area, the inlier of Mahang rocks can be suggested to be a thrust slice as shown in Figure 4. However, on examining the geological map of Courtier (1974), it appears that thrusting cannot be suggested. The concavity of the contact, which should be well located on account of the rather good exposures and ground controls on the ridge, indicates that the contact is dipping towards the north and not southwards (Fig. 3). Normal faulting is, therefore, indicated. In this case the presence of the inlier of Mahang rocks can be accounted by a tilted fault block model which is preferred by the author (Fig. 5). The nature of the contact is, however, still a dilemma on account of the lack of good evidence to support either model.

If the tilted fault block model is right, then further speculations can be made regarding the nature of the basin into which sediments of the Semanggol Formation were deposited. The fault contact between the Semanggol and Mahang Formations at Dublin Ridge is truncated at the contact with the Kulim granite on the west and the Bintang granite on the east. The fault appears to be older than the granites. Bignell and Snelling (1977, p. 42) found that several specimens from the Bintang and Kulim granites appear to fit the isochron of 286 Ma (uppermost Carboniferous) and also there is evidence of late Triassic magmatism. It is possible that the faulting occurred in the Triassic but earlier than late Triassic and a fault trough developed into which the Triassic Semanggol sediments were deposited. For a fault trough floored by the Mahang Formation to be present it is necessary that the Mahang Formation should not be overlain by other rock formations and ideally should be near surface or even a positive area at the time the fault trough developed. The Mahang Formation which contains fossils ranging from Silurian to Lower Devonian and possibly also the Middle Devonian (Jones, 1973) could be uplifted during the Middle - Late Carboniferous coeval with the uplift of the Patani Metamorphics further north (Khoo, 1980). The occurrence of late Carboniferous granites in the Kulim and Bintang massifs is in line with this interpretation. A rather deep fault trough could also be suitable for the deposition of arenaceous rocks with turbidite characteristics in the Semanggol Formation in the area.

#### Acknowledgements

The author thanks Encik Roslin Ismail and Encik Y.H. Ching for drafting and Miss Fan Ah Kwai for typing.

#### References

- Bignell, J.D. and Snelling, N.J., 1977. Geochronology of Malayan granites. Overseas Geology and Mineral Resources, Institute of Geological Sciences, No. 47, HMSO, 72 p.

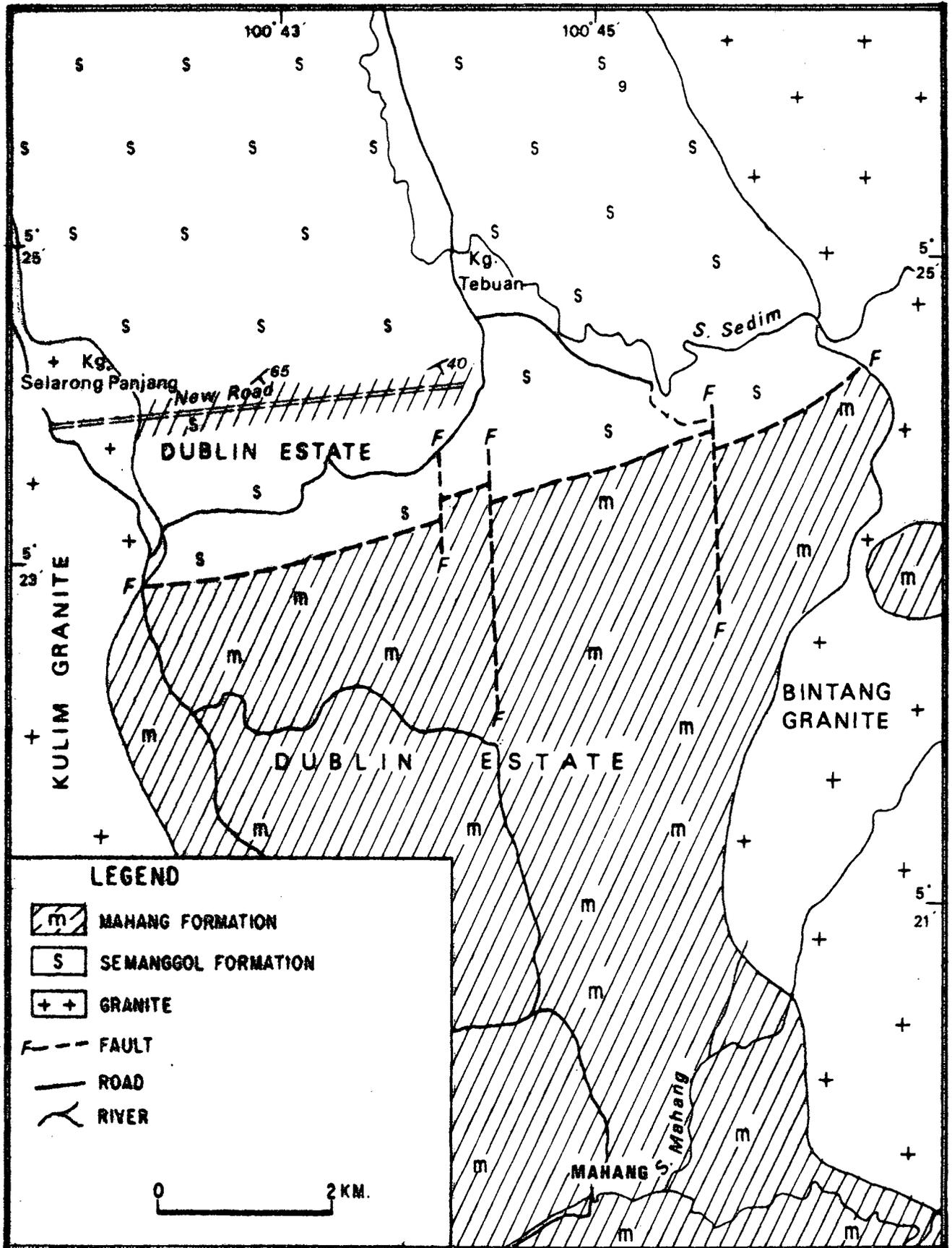


Fig. 1: Sketch map showing approximate position of new road from Kampong Selarong Panjang. Geological boundaries after Courtier (1974).

## Diagrammatic cross-section through Dublin Ridge

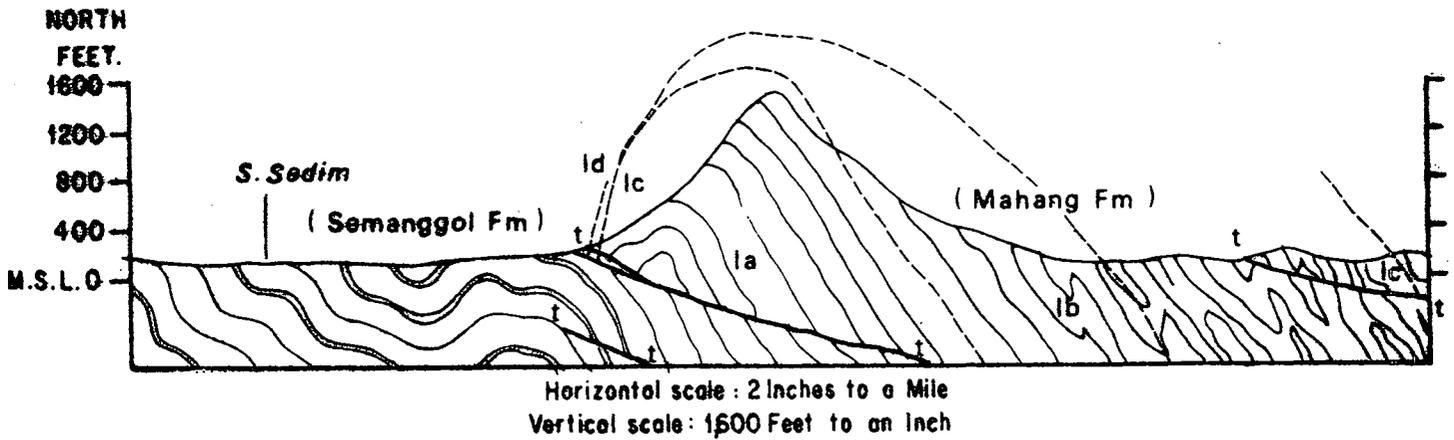


Fig. 2: Structure of contact area between Semanggol and Mahang Formations at Dublin Ridge. (From Courtier, 1974).

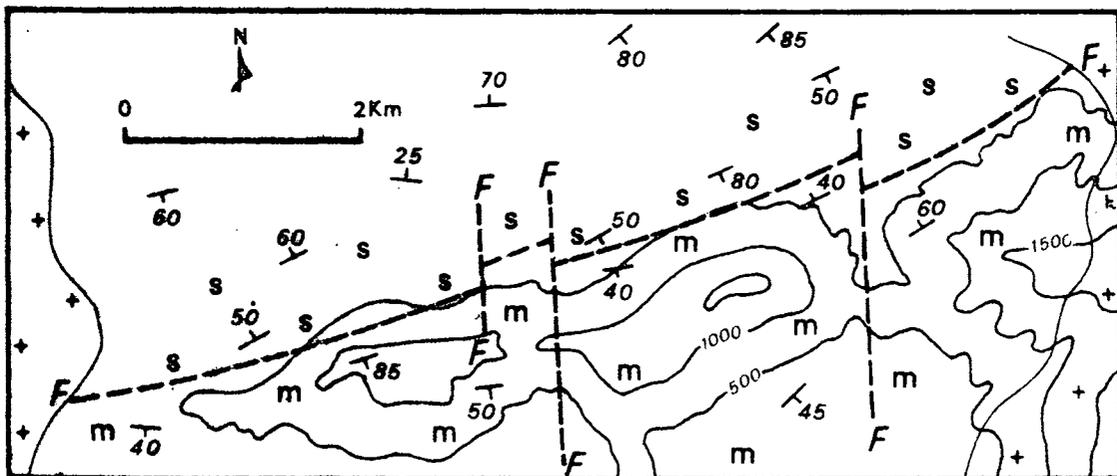


Fig. 3: The Dublin Ridge showing contours (ft.) and location of faults (F). (From Courtier, 1974). s - Semanggol Fm., m - Mahang Fm., + - granite.

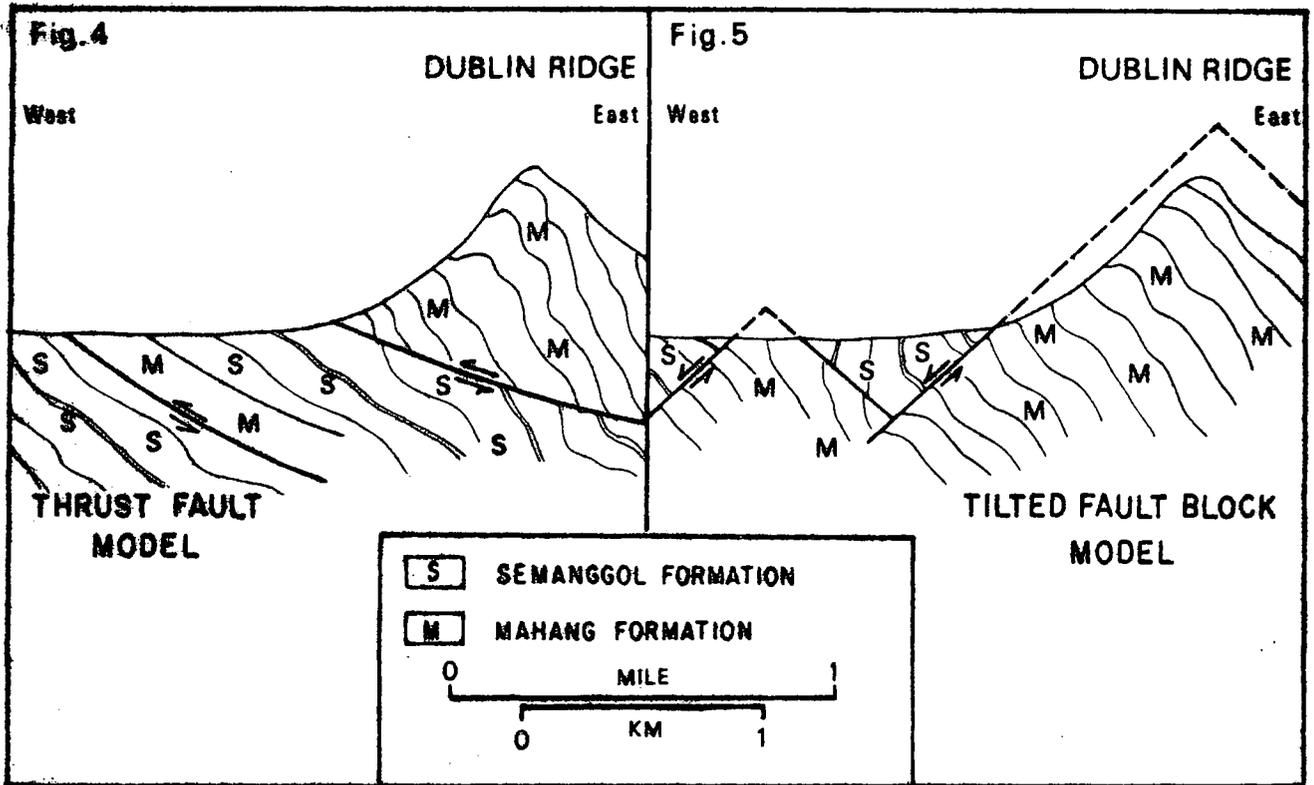


Fig. 4: Nature of contact between Semanggol and Mahang Formations according to thrust fault model.

Fig. 5: Nature of contact between Semanggol and Mahang Formations according to tilted fault block model.

Courtier, D.B., 1974. Geology and mineral resources of the neighbourhood of Kulim, Kedah. Geol. Survey Malaysia Map Bull. 3, 50 p.

Jones, C.R., 1973. Lower Paleozoic. In Gobbett, D.J. and Hutchison, C.S. (eds.). Geology of the Malay Peninsula, Chap 3, 25-60, Wiley Interscience.

Khoo, T.T., 1980. The terrane of the Patani Metamorphics (Abs). Warta Geologi, 6, 30-31.

# A LATE WOLFCAMPIAN (EARLY PERMIAN) CONODONT FAUNA FROM PERAK, PENINSULAR MALAYSIA

I. METCALFE, Dept. of Geology, University of Malaya, Kuala Lumpur.

## Abstract

Permian conodonts are recorded for the first time from Malaysia. A conodont fauna containing elements characteristic of the late Wolfcampian *Neogondolella bisselli* - *Sweetognathus whitei* Zone is recorded from limestones of Gunung Kanthan, Perak. The known range of ages represented at Gunung Kanthan is now late Early Devonian to Early Permian.

## Introduction

The first conodonts to be reported from Malaysia were Late Devonian forms collected from the JKR Quarry at Gunung Kanthan, Perak (Alexander and Müller, 1963). Subsequent work at Gunung Kanthan has proved the presence of late Early Devonian to early Late Devonian (Müller, 1968; Lane *et al.*, 1979) and Late Carboniferous (Lane *et al.*, 1979; Metcalfe, 1979). Recent unpublished work by the author also shows the presence of Dinantian (Late Tournaisian and Viséan) sediments at Gunung Kanthan. The limestones of Gunung Kanthan form part of the Kanthan Limestone which crops out in the Chemor area and is exposed in tin mines and as two limestone hills, Gunung Kanthan and Gunung Kuang. The lower part of the Kanthan Limestone is dated as Silurian based on corals (Jones *et al.*, 1966) and probably extends down into the Ordovician. The lower Palaeozoic part of the Kanthan limestone is exposed in tin mines to the west of Chemor. A black shale member within limestones has also yielded lower Silurian graptolites.

The fauna reported in this paper was obtained from limestones exposed in the Pan Malaysia Cement Quarry (G.R. 934937) at the northern end of Gunung Kanthan (see Fig. 1). The limestones of Gunung Kanthan are folded, fractured and faulted and the beds yielding the Permian conodont fauna are in fault contact with Carboniferous limestones.

## Conodont fauna and age

A single sample (No. 840) of black bedded limestone yielded the following fauna:-

<i>Anchignathodus minutus</i> (Ellison)	3
<i>Neogondolella bisselli</i> (Clark and Behnken)	20
<i>Spathognathodus</i> ? sp.	1
Gen. indet.	3
Total	27

*Anchignathodus minutus* (Ellison) has a known age range of latest Mississippian (late Chesterian) to Early Permian (Wolfcampian). *Neogondolella bisselli* (Clark and Behnken) is characteristic of the late Wolfcampian *Neogondolella bisselli* - *Sweetognathus whitei* Zone (Clark and Behnken, 1971; Behnken, 1975) and is restricted to the late Wolfcampian. The above conodont fauna must therefore be of late Wolfcampian age. The range of ages represented by the limestones of Gunung Kanthan is thus extended and now covers late Early Devonian to Early Permian. The age range of the whole Kanthan Limestone formation is now known to cover the interval from Lower Silurian to Early Permian.

The strata of Gunung Kanthan, representing the late Early Devonian to Early Permian are thin, with a maximum thickness of around 200 metres. The Kanthan Limestone is thus a condensed sequence. There is evidence of a non-sequence or unconformity at the Devonian-Carboniferous boundary in the Kanthan Limestone (work in progress by the author) and other breaks in the succession may well be present.

#### Acknowledgement

The receipt of a University of Malaya Research Grant No. F142/77 is gratefully acknowledged.

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- Müller, K.J., 1968. Devonian of Malaya and Burma: in Oswald, D.H. (ed), International Symposium on the Devonian System 1, 565-568, Calgary.

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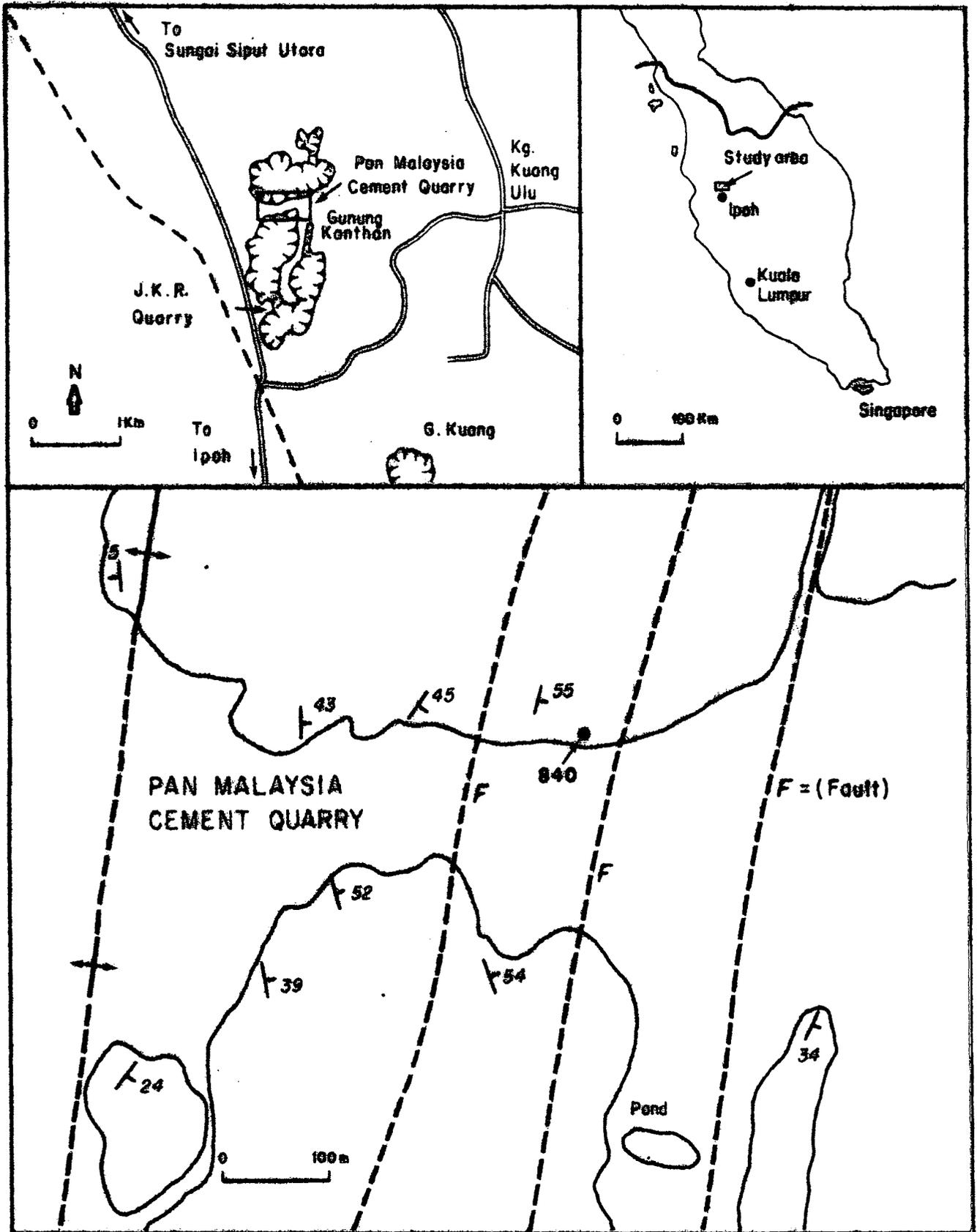
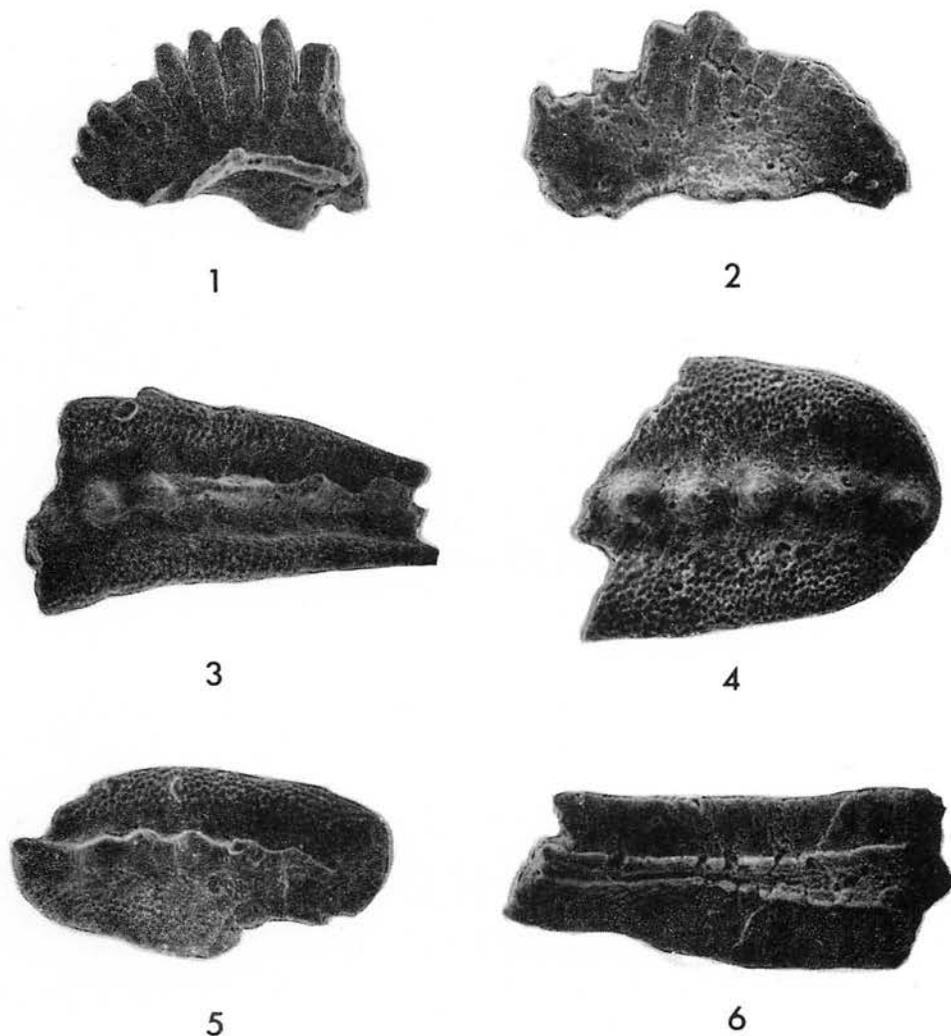


Fig. 1. Sketch map showing the location of sample 840 in the Pan Malaysia Cement Quarry, G. Kanthan, Perak.



- Plate 1,2. *Anchiognathodus minutus* (Ellison)  
 1. lateral view of A560, sample 840, x 100.  
 2. lateral view of A561, sample 840, x 100.
- Plate 3-6. *Neogondolella bisselli* (Clark and Behnken)  
 3. Oral view of A562, sample 840, x 100.  
 4. Oral view of A563, sample 840, x 100.  
 5. Oral view of A564, sample 840, x 100.  
 6. Aboral view of A565, sample 840, x 100.

## LETTER TO THE EDITOR

c/o Robertson Research  
International Ltd.  
'Ty'n-y-Coed', Llanrhos,  
Llandudno, Gwynedd,  
North Wales LL30 1SA

June 10th 1981

The Editor  
Warta Geologi  
c/o Department of Geology  
University of Malaya  
Kuala Lumpur, Malaysia.

Dear Sir

In his interesting description of metamorphosed pumice-breccia from Pulau Tioman (Warta Geologi, 7, 1, 1-4) Professor Tjia suggests that pumiceous clasts are collapsed fragments flattened through ductile deformation, and implies that this would be easy to explain if the clasts were still hot when the deposit was formed (i.e. if the rock is an ignimbrite). However, he considers that evidence that the sequence was deposited in water, if accepted, rules out this explanation.

On a recent field excursion with the Geologists Association of London, I was able to examine some of the Ordovician tuffs in Snowdonia, North Wales, which include many welded tuffs interpreted as ignimbrites within marine sequences. Volcanologists leading the excursion consider that hot ash flows (nuées ardentes or glowing-cloud eruptions) can continue flowing under water, and in many cases the clasts remain hot and ductile, so the deposit produced is a subaqueous welded tuff or ignimbrite, with flattened shards and clasts\*. This was a new idea to me, but it seems reasonable provided the ash flow is denser than water.

Perhaps this is the way in which the Tioman pumice-breccia formed?

Yours sincerely

(Signed)  
N.S. Haile

\* See Francis, E.H. and Howells, M.F., 1973. Transgressive welded ash-flow tuffs among the Ordovician sediments of N.E. Snowdonia. J. Geol. Soc., London, 129, 621-641.

Howells, M.F., Francis, E.H., Leveridge, B.E. and Evans, C.D.R., 1978. Capel Curig and Betws-y-Coed: description of 1:25,000 sheet SH 75. Classical areas of British geology, Institute of Geological Sciences, London, Her Majesty's Stationery Office.

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## MESYUARAT PERSATUAN (MEETINGS OF THE SOCIETY)

**H. SCHMIDT:** Supposed active wrench faulting in NE-Sicily (Southern Italy) and some of its regional geodynamic implications

On 22nd May 1981, Dr. Hartmut Schmidt gave a talk on the "Supposed active wrench faulting in NE-sicily (Southern Italy) and some of its regional geodynamic implications" to about 15 members of the Society at the Geology Dept., University Malaya. Dr. Schmidt, who obtained his Doctorate from the Universitat Tübingen, West Germany, is now with Universiti Kebangsaan Malaysia Sabah - Unit Geologi.

The Calabro-Peloritanian Arch changes the north-western trend of the Appennine Chains to the western trend of the Sicilian-Maghrebinian Chains. The convex side of the Calabro-Peloritanian Arch points roughly south. This arch is probably an example for recent orogenetic activity in the Central Mediterranean. In the Ionian Sea off the Southern Calabrian Coast the arch dips away  $60^{\circ}$  NW with a huge shear plane from a buried submarine trench and in the Tyrrhenian Sea ("back arch basin") lies the volcanic arch of the Eolian Islands.

The crystalline core of the Calabro-Peloritanian Arch is divided by the Straits of Messina into a Calabrian (S-Italian) and a Peloritanian (NE-Sicilian) Segment. The channel and the north-eastern coastline of Sicily delineate part of the NE trending Comiso-Messina Fracture Zone. Other important fracture zones recognizable on satellite imagery and in the field are the WNW trending Trapani-Taormina Fracture Zone and several NW trending fractures traversing the Peloritani Mountains. It had been under discussion earlier whether these fractures show lateral dislocation of wider regional importance. First proof came from seismotectonic interpretation of earthquakes occurring along these fracture zones.

Field investigation in the area north of Mt. Etna showed the existence of a fracture pattern which could be correlated as well with a NE trending left-lateral wrench fault - the Comiso-Messina Fracture Zone, as with a right-lateral wrench fault with WNW trend - the Trapani-Taormina Fracture Zone. The fracture pattern consists of main wrench zone, of conjugated shear fractures (synthetic low angle fractures and antithetic high angle fractures) and of normal tension fractures.

Striae on bedding planes and striae dipping less than  $45^{\circ}$  on fault planes are common in the investigated area. The sense of movements taken from the latter corresponds with the compressional direction from NW. Steeply dipping striae are connected with the still active isostatic uplift of the crystalline core of the Calabro-Pelorithanian Arch (uplifted marine terraces!).

A set of fold axes is trending in a western direction as to be expected for an echelon folds. Their direction differs only little (ca.  $10^{\circ}$ ) from the axial trend generated by alpidic nappe movements in the area. Deformed cephalopods show the same compressional direction as the latter set. But conical synclines steeply dipping towards the Comiso-Messina Fracture Zone indicate a left-lateral drag along this fracture zone again.

From the data mentioned it may be derived that in NE-Sicily there exists a conjugate pair of wrench fault zones giving release to the compressional forces acting upon the Calabro-Peloritanian Arch from NW. This wrench fault system may be present in the left-lateral shear zone of the Comiso-Messina Fracture Zone and in the right-lateral shear of the Trapani-Taormina Fracture Zone.



H. Schmidt

CALL FOR PAPERS

GSM PETROLEUM GEOLOGY SEMINAR "81

DATE : 14TH & 15TH DEC. 1981

VENUE : HOTEL MERLIN, KUALA LUMPUR

ADVANCE NOTICE

PENINSULAR THAILAND - MALAYSIA BORDER CORRELATION WORKSHOP

DATE : APRIL - MAY 1982

VENUE : HATYAI, THAILAND

A lively discussion ensued and Dr. Schmidt confidently answered the various questions put forth. After the talk, Dr. Schmidt had to hurry back to Port Dickson to pack and catch the flight to Kota Kinabalu the next day to take up his new appointment at the Universiti Kebangsaan Malaysia Sabah.

G.H. Teh

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## BERITA PERSATUAN (NEWS OF THE SOCIETY)

### NEW SUBSCRIPTION RATES - CORRECTION

An error was discovered in the last issue of the WARTA on the new subscription rates.

The correct subscription rates, effective from 1st Jan 1982 are as follows:

Entrance fee	M\$10.00
Student Member	M\$10.00
Associate Member	M\$25.00
Full Member	M\$25.00
Institutional Member	M\$50.00

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### YOUNG GEOSCIENTIST PUBLICATIONS AWARD 1981

The Council has appointed the following to serve in the Award's Nominations Board 1981.

- Mr. K.K. Khoo (Chairman) - Geological Survey, Kuala Kangsar, Perak.
- Dr. T.H. Tan - Jabatan Geologi, Universiti Kebangsaan Malaysia.
- Dr. G.H. Teh - Geology Dept., University of Malaya.
- Mr. S.C. Toh - Conzinc Riotinto (M) Sdn. Bhd., Kuala Lumpur.
- Mr. S.S. Rajah - Geological Survey Laboratory, Ipoh, Perak.

Members should have received the YGS Publication Award Rules and Regulations and Nominations Forms by now.

Nominations should reach the Chairman, Award Nominations Board, Persatuan Geologi Malaysia, c/o Jabatan Geologi, Universiti Malaya, Kuala Lumpur, before 1st October 1981.

K.K. Khoo

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### TENTATIVE GSM TECHNICAL TALKS/SEMINAR PROGRAMME 1981/82

- 30 June 1981: Malam Petrologi - 3 talks
- Dr. Hamzah Mohamad (UKM) - Metamorphism
  - Dr. C.H. Yeap (PCM) - Chemical compositions,  
Peninsular Malaysian granites

Mr. Chandrakumar (UM) - Basic rocks, Peninsular Malaysia.

6 Nov 1981: Malam Langkawi - 3 talks  
 Mr. C.P. Lee (UM) - Stratigraphy, Machinchang Formation.  
 Dr. B.K. Tan (UM) - Some aspects and problems of Langkawi  
 geology.  
 Dr. T.T. Khoo (UM) - Tourmaline greisenization, Langkawi  
 granite.

December 1981: Petroleum Geology Seminar (Chairman: Mr. Leong Pheng San).

29 April - : Thai-Malay Border Correlation Seminar (Chairman: Mr. K.K.  
 1 May 82 Khoo, Venue: probably Hatyai). Seminar to be held in  
 cooperation with Thai organizations. Field trips will be  
 arranged in conjunction with the Seminar.

Early to Mid : Geotechnical Engineering Seminar and Fieldtrips (Chairman:  
 1982 Mr. Tan Boon Kong). Will probably be a joint meeting with  
 other Geotechnical Engineering bodies in Southeast Asia.

June 82 : Economic Geology Seminar (Chairman: Mr. M.K. Choo).

T.T. Khoo

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## VISIT TO SIRIM

The Society plans to organise a visit to SIRIM (Scientific Industrial  
 Research Institute of Malaysia) in Shah Alam towards the later half of  
 1981.

The outcome of such a visit will depend on members' response.  
 Members who are interested please write now to:

The Hon. Secretary  
 Geological Society of Malaysia  
 Dept. of Geology  
 University of Malaya  
 Kuala Lumpur 22-11.  
 (or Tel. 577036).

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## LAKE TOBA TRIP

Due to the poor response and unsuitable dates, the proposed  
 excursion to Lake Toba is now postponed indefinitely.

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## RAISING FUNDS FOR GEOSEA IV

The Society is looking into the possibility of raising funds to  
 subsidise members who might wish to attend the coming GEOSEA IV in

Manila, Philippines (Nov. 18-23rd 1981).

The Society is also attempting to arrange for cheap flights for say, 10-20 participants.

Members who wish to join this tour and be considered for possible subsidy are kindly requested to write in early to the Hon. Secretary.

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## PROFESSIONAL MEMBERSHIP

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

1. Chan Siew Hung (CSIRO, Australia)
2. S. Chandra Kumar (Universiti Malaya)
3. Chin Lik Suan (Datuk Keramat Smelting)
4. Choo Mun Keong (Pernas-Charter Management)
5. Choy Kam Wai (PRT-CRM)
6. P. Jagathasparan (Petronas)
7. Khoo Teng Tiong (Universiti Malaya)
8. Koh Tuck Wai (Petronas Carigali)
9. A.A. Meyerhoff (Meyerhoff & Cox, Inc.)
10. Quah Pheng Hai (Sarawak Shell)
11. J.A. Richardson (Layton & Assoc., Australia)
12. Seet Chin Peng (Geological Survey Malaysia)
13. Tang Ming Keong (Singapore Glass)
14. Dennis Taylor (Conzinc Riotinto (M))
15. Teh Guan Hoe (Universiti Malaya)
16. Toh Swee Cheng (Conzinc Riotinto (M))
17. Yap Lip Sin (Killinghall Tin)
18. Yong Fook Shin (Rahman Hydraulic Tin).

Any members who have objections to the election of any of the Professional Members above should write in to the Society by 30th September 1981.

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## MEMBERSHIP

The following person has joined the Society:

Full Membership: Dr. A.S. Balasubramaniam, A.I.T., P.O. Box 2754, Bangkok, Thailand.

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## CHANGE OF ADDRESS

The following have informed the Society of their new addresses:

1. P.A. Mundt, c/o Mobil Oil Indonesia, P.O. Bag 400, Jakarta Pusat, Jakarta, Indonesia.
2. James K. Blake, Geological Services Ltd., Room 1207, 12th Floor, Sim Lim Tower, 10 Jalan Besar, Singapore 0820.

3. J.F. Lambert, 10 Minchin Court, Padbury, Western Australia 6025.
4. Ripae Mohd. Arip, Pemas Charter Management, P.O. Box 936, Kuala Lumpur.
5. Tang Ming Kheong, ACI International (S), Tanglin P.O. Box 275, Singapore 9124.
6. T. Toyama, c/o Idemitsu Oil Development Co., Ltd., 1-1-3, Marunouchi, Chiyodau-ku, Tokyo, Japan.
7. Lum Hoi Kon, c/o Malaysia Mining Corp., 4129-A Jalan Tengku Ismail, Off Jalan Talipot, Kota Bharu, Kelantan.
8. Mr. R.B. Tate, c/o China Cement Co. (Hong Kong) Ltd., 502 World-Wide House, 19 Des Voeux Road Central, Hong Kong.
9. A.W. Allen, Raintree Cottage, Romaldkirk, Barnard Castle, Co. Durham, England.

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## NEW LIBRARY ADDITIONS

The following publications were added to the Library:

1. Geophysical Research Bulletin, vol. 18, nos. 1-4, 1980 and vol. 19, no. 1, 1981.
2. National Geophysical Research Institute, Annual Report, 1979-1980.
3. Commonwealth Geological Liaison Office, Newsletter 5, 1981.
4. IMM Transactions A, vol. 90, 1981.
5. IMM Bulletin 896, 1981.
6. Jour. Geological Society, v. 138, pt. 3, 1981.
7. National Library Singapore, Adult Reference collections, accession list, May & June 1981.
8. Scripta Geologia, no. 57, 1980.
9. Mineralogia Polonica, vol. 10, no. 2, 1979.

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## BERITA - BERITA LAIN (OTHER NEWS)

### SHORT COURSE ON GEOTHERMAL ENERGY - Nov. 22 1981, MANILA, PHILIPPINES

This one day short course will be organised as part of the GEOSEA IV programme in Manila by the Society of Energy Explorationists Philippines (SEEP) and the Association of Geoscientists for International Development (AGID). The course is primarily to provide information to interested Southeast Asian geoscientists on the potential for geothermal energy in this region. GSM members interested in participating can contact:

Dr. T.T. Khoo  
Dept. of Geology  
University of Malaya  
Kuala Lumpur 22-11, Malaysia.

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## OPHIOLITES AND ACTUALISM

A meeting held by the Working Group on Mediterranean Ophiolites, Florence, 18-19 December 1981

The scientific session will begin in Florence on December 18th, 1981 and will continue on December 19th. The session will be concluded by a final discussion on the general meeting's themes.

### Participation in the Meeting

For registration and further information, write directly to the travel agency CTU VIAGGI, via S. Gallo, 12/r., 50100 Florence. Telex 570048.

### Presentation of papers

Titles and abstracts of papers (one typed page) should be received by the organizing committee before September 30, 1981. In case of an excess of submitted papers, the organizing committee will select those for presentation at the meeting.

Typescripts, in three copies, should be double-spaced, complete with figures suitable for reproduction and references should follow the style of OFIOLITI. Typescripts can be sent to the Organizing Committee or submitted at the beginning of scientific session.

### Reprints

100 reprints of each article will be supplied free of charge to the author(s). 1 to 200 more copies can be obtained at the price of USA 4 cents per page. Copies exceeding this number can be obtained at the price of 6 cents per page.

### Meeting's Proceedings

All papers submitted (whether or not accepted for presentation at the scientific session) will be published in the meeting's proceedings as a special issue of OFIOLITI, after the normal editorial procedure of the magazine. No proofs are supplied.

### Optional Field Trips

The scientific session will be preceded by two-day field excursions in the northern-Apennine ophiolites, starting from Florence in the early morning of December 16th.

Excursion one: December 16-17, 1981: Ophiolite olistoliths and olistostromes in the Cretaceous flysch, Ligurian-Aemilian Apennine.

Excursion two: December 16-17, 1981: Ophiolites and their primary sedimentary cover in Tuscany and Liguria.

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## GEOTECHNICAL ASPECTS OF OFFSHORE AND NEARSHORE STRUCTURES: SHORT COURSE AND SYMPOSIUM

Short Course: 7th - 11th December 1981

Symposium : 14th - 18th December 1981

Bangkok, Thailand.

The short course and the symposium to be held at the AIT Campus for the period 7th - 18th December will concentrate on the geotechnical aspects of all types of offshore and nearshore structures such as offshore platforms for oil and gas, gas and oil pipeline installation, bridges, harbours, dockyards, etc. During the two week period a number of short courses are designed on topics such as instrumentation and in-situ tests, piled foundations - recent methods of analysis, centrifugal modelling and geophysical methods in offshore and nearshore site investigation works.

The main feature of the symposium would be to include a large number of Guest Lectures from internationally reputed geotechnical engineers engaged in the field of offshore and nearshore structures. Included among the Guest Speakers are Prof. Jean Kerisel, Prof. Peter Rowe, Mr. Ove Edie, Prof. A.N. Schofield, Prof. Kaare Hoeg, Prof. C.P. Wroth, Dr. G.S. Little John, Mr. J. de Ruiter, Prof. T. Akagi, Dr. Elmo Dibiagio, Mr. Hiroshi Mori, Prof. Bengt Broms, Mr. B. McClelland and several others leading geotechnical figures in the world.

The symposium will also include comprehensive country reports to be presented on the offshore and nearshore works in Asia.

### Place and Date

The symposium will take place at the Asian Institute of Technology, Rangsit Campus, Pathumthani, Thailand. The dates for the short courses and symposium are as:

Short Courses --- 7th - 11th December 1981

(Running parallel)

- (i) Instrumentation and in-situ Test
- (ii) Piled Foundations - Recent Methods of Design & Analysis
- (iii) Critical State Soil Mechanics and its Applications
- (iv) Centrifugal Modelling
- (v) Geophysical Methods in Offshore and Nearshore Site Investigation Work.

Symposium on Geotechnical Aspects of Offshore and Nearshore Structures ---  
14th - 18th December 1981.

### Participants

Engineers, geologists, planners and scientists interested in offshore and nearshore structures are invited to attend the short courses and the symposium. The short courses would be very broad and would be of use to many geotechnical fields outside the scope of coastal structures.

### Registration fee

Participants can register for one of the five short course and/or the symposium which will follow the short courses. The registration fees are as follows:

- |   |          |
|---|----------|
| (i) Short Courses (7th - 11th December)                                       | US\$ 150 |
| (ii) Symposium on Offshore and Nearshore<br>Structures (14th - 18th December) | US\$ 80  |

Those participants who register both for a short course and the symposium will get a reduction of US\$30. The registration fee for the accompanying person (wife) is US\$40.

### Exhibition of Instruments

A large number of instrument manufacturers and other consultants and contractors involved in offshore and nearshore structures have indicated their strong interest to display exhibits and to have technical films and slide shows. A nominal fee of US\$750 would be charged on each organization displaying exhibits and showing technical films, slides, etc. Ample space is available in the Campus of the Asian Institute of Technology for demonstration of field equipment.

### Guest Lectures

The following is a partial list of the topics of Guest Lectures:

- 1) Geotechnical aspects of the installation of jack-up derived platforms for oil production from marginal fields, offshore power stations and industrial process plants.
- 2) Ocean wave-induced liquefaction of soils.
- 3) Foundations in offshore soft clays in Japan.
- 4) Offshore structures in Gulf of Thailand.
- 5) Grouting of platform's underbase.
- 6) Support and protection of pipelines offshore.
- 7) Open end steel pipe piles.
- 8) Cyclic behaviour of soils - mathematical modelling.
- 9) Design parameters from in-situ tests.
- 10) Laterally and axially loaded piles.
- 11) Closure barrier of Oosterschelde, Holland.
- 12) Gravity and piled offshore platforms in North Sea.
- 13) Foundations for power line crossing Jumuna River.
- 14) Effective stress analysis of piled foundations.
- 15) Critical state soil mechanics.
- 16) In-situ testing and instrumentation.
- 17) Offshore field tests.
- 18) Offshore soil sampling.
- 19) Soil improvement techniques in design of coastal structures.
- 20) Centrifugal modelling of liquefaction.

### Country Reports

In addition to the guest lectures and short presentations comprehensive country reports will be presented by several experts from Asia. These country reports will include a summary of the active offshore and nearshore projects in each country and the geotechnical problems encountered in the planning, design and construction phases of the projects.

### Correspondence

All correspondence related to the short courses and the symposium should be addressed to:

Professor A.S. Balasubramaniam  
 Division of Geotechnical & Transportation Eng.,  
 Asian Institute of Technology  
 P.O. Box 2754  
 Bangkok, Thailand.

## WORKSHOP ON ROLE OF GEOSCIENCE EDUCATIONAL INSTITUTES IN NATURAL RESOURCES DEVELOPMENT IN SOUTHEAST ASIA

Organized by AGID in cooperation with the Regional Network for Geosciences in Southeast Asia. To be held in conjunction with the Fourth Regional Conference on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA IV), Manila, Philippines.

### Dates

November 17, 1981, one day before GEOSEA IV, plus an additional session to be held during GEOSEA IV (November 18-23).

### Objectives

- 1) To provide a forum for the exchange of views and experiences between university, industry and government aimed at improving teaching programs and the use of available geoscience manpower, services and facilities in universities in the region.
- 2) To identify clearly the problem areas.
- 3) To design realistic ways of improving the present situation and to plan for practical follow-up activities.

### Background

Mineral, energy and water resources are of great importance to the economies of most Southeast Asian countries. There is therefore an obvious continuing need for an adequate supply of well-trained geologists, mining engineers, hydrogeologists etc. Many countries are aware of this and have established geoscience education units with detailed academic programs, well-trained staff and some research facilities. However, the relevance to natural resources development of the present curricula is often questioned. If, as many people believe, the sole function of the university is to produce graduates for industry and government, then a constant re-assessment of teaching programs is necessary. Moreover, it appears that industry and government departments are either unaware of or reluctant to utilize the research facilities and analytical services available in universities. Likewise, universities do not always encourage such interchange, and the result is too often a total lack of communication and cooperation.

The Workshop will examine these issues by considering questions related to the quality and suitability of university curricula, research programs, facilities and services. Industry and government geoscience departments will be asked to describe the type of graduates they wish to employ, the analytical services and research programs they would like to see universities develop, and the kind of support they might be willing to provide to this end.

### Some Key Questions to be Discussed

- 1) How relevant are current academic programs to the needs of industry and of government geoscience departments and enterprises?
- 2) What kind of research and other services do government and industry want from universities?
- 3) How can industry and government contribute more effectively to training and research programs within universities?
- 4) To what extent are universities interested in developing links with government departments and industry?
- 5) How can university departments meet more effectively the needs of government and industry?

- 6) How can national and regional non-governmental geoscience societies and associations assist in improving cooperation between government, industry and university?

#### Format of Workshop

Opening session (November 17) with invited keynote papers from industry, government and university, followed by discussion groups, each concentrating on a single topic or set of topics. These groups will report back to a final plenary session where a set of recommendations and a strategy for carrying them out will be discussed.

#### Participation

Limited. Representatives from universities, government departments and industry from Southeast Asia and adjacent countries.

#### Further Information

If you wish to receive further information please write to:

Dr. B.K. Tan  
 Convenor AGID Geoscience Education Workshop  
 Department of Geology  
 University of Malaya  
 Kuala Lumpur 22-11, Malaysia.

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## SHORT COURSE - DECISION ANALYSIS FOR PETROLEUM EXPLORATION

Dr. Paul Newendorp - Singapore October 12-23 1981

SEAPEX is sponsoring the presentation in Singapore of Dr. Newendorp's course which is now well known to the petroleum exploration industry. The course will be presented by Dr. Newendorp at the Hilton Hotel, Malaysia Room, from Monday 12th October to Friday 23rd October. Dr. Newendorp is an educator and consultant in the field of petroleum exploration economics and risk analysis. He holds BS, MS, and PhD degrees in petroleum engineering from the University of Oklahoma. His professional experience includes 9 years with the exploration affiliate of Standard Oil Company (Indiana), and 12 years as an international consultant.

The course is S\$2,750 per person and this includes the course text, notebook, and all related course materials, morning and afternoon refreshments. Students shall be responsible for their own accomodation, meals and travel costs. The Hilton Hotel have single rooms available to students at S\$135 + 13% service and tax.

To retain a seminar environment, the number of students will be restricted to 35. Early registration can be made by telex to RS 23047 or by writing to:

Bob Agnew  
 Secretary SEAPEX  
 P.O. Box 423  
 Tanglin Post Office  
 Singapore 3124.

Course outline

- 1) Measure of profitability.
- 2) The expected value concept.
- 3) Basic principles of probability and statistics.
- 4) Petroleum exploration risk analysis methods.
- 5) Risk analysis using simulation techniques.
- 6) Implementing risk analysis methods.
- 7) Related topics.

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ASIAN MINING '81 - Programme, Papers & Exhibition

Asian Mining '81 is an international conference that is being organized by the Institution of Mining and Metallurgy in response to the growing interest in the Southeast Asian minerals industry. On 23 November keynote speakers will appraise the mining scene in Southeast Asia and outline opportunities for investment within the region. Over the following three days technical papers on current mining projects in Asia will be presented for discussion by authors from the ASEAN countries, Australia, Canada, India, Hong Kong, Japan, Papua New Guinea, the United Kingdom and the United States.

Programme

Sunday, 22 November 1981

14.00 Registration, Mandarin Hotel, Singapore.

Monday, 23 November 1981

09.00 Registration, Mandarin Hotel, Singapore

14.00 Official opening and plenary session

Investment opportunities and mineral potential

Indonesia: Professor J.A. Katili, Director-General of Mines, Department of Mines, Indonesia.

Malaysia: Dato Paul Leong Khee Seong, Primary Industries Minister, Malaysia.

Thailand: Dr. Prabhas Chakkaphak, Director-General, Department of Mineral Resources, Thailand.

Philippines: To be announced.

18.15 Welcoming reception, Mandarin Hotel.

Tuesday, 24 November 1981

09.00 Geology of mineral deposits (exploration)

12.30 Luncheon

14.00 Tin mining

16.00 Tin dressing

Wednesday, 25 November 1981

09.00 Copper mining

11.00 Treatment and smelting

13.00 Luncheon

14.30 Visit to Asian Mining '81 exhibition.

Thursday, 26 November 1981

09.00 Mining

11.00- General topics and closure of conference

13.00

Papers

The papers listed below are expected to be considered for presentation on 24-26 November. All papers will be published in the conference volume, Asian Mining '81, which will be distributed to registrants in October, 1981.

- Reduction of metal losses in matte smelting slags  
G.J. Brittingham (Australia)
- Lubricating oil analysis - an aid to maintenance planning and oil conservation in the iron ore operations of Hamersley Iron Pty. Ltd.  
K.L. Britton and C.A. McKenna (Australia)
- Production procedures at Bougainville Copper, Ltd.  
R.G. Byles (Papua New Guinea)
- How to prevent some inexcusable wastage of placer dredges  
Norman Cleaveland (U.S.A.)
- Dredging of deposited mill tailings at Marcopper  
P. Conder and P. Hernandez Jr. (Philippines)
- Realizing India's mineral potential  
J.F. Cook (United Kingdom)
- Development of moulded rubber plates for use in trommel screens  
W.P. Cross (Malaysia)
- Development of shaft-boring machinery  
Takumi Eguchi and Haruo Ohshika (Japan)
- Design of final face for Tai Sheung Kok quarry  
L.J. Endicott, J. Tong and J. Kwong (Hong Kong)
- New Concepts in electric initiating systems for blasting operations - their development and application  
R. Fox and J. Hoskinson (United Kingdom)
- Problems and prospects of small-scale mines in Indonesia  
S. Gandadisastra (Indonesia)
- Mining operations at Kolihan copper mine, Khetri Copper Complex  
B.L. Gupta (India)
- Structural techniques for comparison of tin- and gold-bearing batholiths in Thailand and northern Australia  
E.J. Heidecker and T. Supajanya (Australia)
- Radioisotope analysers in exploration and treatment of tin ores  
J. Howarth (Australia)
- Flotation of complex copper-lead-zinc ores in Western Pacific countries  
N. Jackson (Australia)
- Chromite in India  
D.C. Dale (India)
- Control and disposal of slimes in alluvial tin dredge paddocks  
Chan Yew Kee (Malaysia)
- Metallurgical slag as cementing material in underground mine fill  
S.C. Kheok (Singapore)
- Deviation of the Sungei Kinta by Malayan Tin Dredging (M) Berhad, Kampong Gajah Section  
Hor Ah Kow (Malaysia)
- Development of the Ambaji project, India  
A. Mitchell (United Kingdom)
- Economical application of mobile equipment in coal overburden stripping  
W.C. Morgan (U.S.A.)
- The bucket ladder dredge and its application in the mining industry  
C.D. Palmer (Malaysia)
- The carbon-in-pulp plant of the Masbate gold operations, Philippines  
R.S. Pizarro and F.V. Antonio (Philippines)

- Geology of the gold porphyry deposit at Masbate Island, Philippines  
A.N. Reyes (Philippines)
- Site selection and optimization studies for mill sites and tailings  
impoundments  
A. MacG. Robertson and A.S. Moss (Canada)
- Design and operation of Benguet Corporation's kaline concentrator  
E.M. Sacris and T.C. Cimafranca (Philippines)
- Design of mine site laboratory facility  
D.C. Shelton (U.S.A.)
- Advances in copper mining technology in India, with special reference to  
post-pillar stoping  
R.D. Singh (India)
- Indonesian tin in the future  
M. Simatupang (Indonesia)
- Experiences of mining coal seams at depth in India  
R.D. Singh (India)
- Coal mining in Southeast Asia - a geologist's view  
P. Strauss and M. Atkinson (Australia)
- The mathematics of gravel pump mining techniques in Malaysia  
S. S. Subramaniam (Malaysia)
- The Kushikino gold mine, Japan  
S. Suda (Japan)
- Burma - a country with major unexplored mineral potential  
R. Cox, J.L. Gaskell and C.M. Thomas (Australia)
- Introduction of mechanization at Mosaboni Group mines, Bihar, India  
D.E. Thomas and M.A. Khan (United Kingdom)
- Application of direct reduction technology in Southeast Asia  
L.L. Teoh (Malaysia)
- Regional mineral exploration in Pahang Tenggara - a case history of a  
base-metal exploration project in the Malay Peninsula  
D. Taylor and E. Toh Swee Cheng (Malaysia)
- Trend-surface analysis of trace elements in the granites of the tin-  
producing Kuala Lumpur and Seremban districts, Peninsular Malaysia  
Yeap Cheng Hock (Malaysia)
- The impact of manganese nodule mining on the developing world  
P.M.T. White (Canada).

### Exhibition

The exhibition, Asian Mining '81, will be held at the World Trade Centre, Singapore, from 23 to 27 November, 1981, and will cover all aspects of land and sea mining, prospecting and surveying and allied areas such as communications, health and safety. Enquiries relating to the exhibition should be addressed to the organizers, ITF Pte. Ltd., Suite 804, 8th Floor, World Trade Centre, 1 Maritime Square, Singapore 0409 (Telephone: 2711013; telex RS 26085).

### Enquiries

All enquiries in relation to the Asian Mining '81 conference and its associated tours should be addressed to the Meetings Secretary, The Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, England (telephone 01-580 3802; telex 261410; cables Minanmet London W1).

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## INTERNATIONAL MINE WATER ASSOCIATION

The formation of the International Mine Water Association (IMWA) has been established with the following main objectives:

1. To improve exploitation of mineral deposits consistent with the desirable standards of safety against water hazards.
2. To increase protection of the environment against the impact of mine drainage and related activities.
3. To improve the utilization of mine waters.
4. To improve technology and economy of mine drainage control operations.
5. To create a forum for international exchange of information concerning the latest developments in the field of mine water problems.

The pressing needs of persons involved with mine water problems have encouraged the establishment of an international authoritative body, to provide individuals and institutions with a better opportunity to benefit from world-wide experiences in this field.

If you are interested in the IMWA activities, please write in to:

Dr. Rafael Fernandex-Rubio  
 Secretary IMWA  
 Department of Hydrogeology  
 University of Granada  
 Apdo. de Correos 556 Granada, Spain.

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## BOOK REVIEWS

### New Publications from the Geological Survey of Malaysia

Three new publications from the Geological Survey of Malaysia form a welcome addition to the literature of Malaysian geology. These three works are:

- \* Chung, S.K. (ed.), 1980. Laporan Tahunan Penyiasatan Kajibumi Malaysia (Annual Report Geological Survey of Malaysia) 1978, 330 p. (101 fig's., 38 tbls.) Price: M\$20.
- \* Jaafar bin Ahmad, 1980. The geology and mineral resources of the Sungai Teris area, Pahang. Geol. Surv. Malaysia District Memoir 18, 148 p. (29 fig's., 18 tbls., colored geol. map and sheet of cross-section at 1:63360 in back pocket) Price: M\$20.
- \* Procter, W.D., 1980. Geology and mineral resources, Benta area, Pahang. Geol. Surv. Malaysia Map Bulletin 4, 25 p. (4 fig's., colored geol. map at 1:63360 in back pocket) Price: M\$15.

Procter's volume is a very brief account, as is appropriate for a Map Bulletin, to accompany the geologic map of an interesting area east of the Main Range of Malaya. The stratigraphy includes rocks of the 'Bentong Group' (Lower to Middle Paleozoic), the Raub Group (Carbon-Permian), and Triassic System, intruded by Mesozoic granites. Gold mineralisation is described which was not considered economic at the time the Bulletin was put together, but one wonders what the evaluation of it should be now, in light of changes in the price of gold.

This work unfortunately illustrates the confusion sometimes caused when there are long delays in publications. The preface by the Director of the Survey (Mr. S.K. Chung), which is dated 1972, states that field

work in the area was begun in 1937 and, after interruption by World War II and the Emergency, completed in 1956. The front cover bears the prominent date 1972, but the back of the title page has 1980 in small type. To complicate matters, the folded geologic map in the back states that the area was "geologically surveyed during 1957 (sic) by H. Service and W.D. Procter" and that the map itself was drawn in 1972 and printed in 1974! This is the sort of thing that drives librarians to an early grave.

The District Memoir by Jaafar bin Ahmad also represents work done some time ago, in this case during 1961-65, but all dates on the final product agree on 1980. The area described here (in considerably more detail than in the Map Bulletin) is also in Malaya's Central Basin. It includes sedimentary rocks assigned to two Triassic formations (dated by six fossil localities), associated with some acid tuffs, and acid to intermediate plutonic rocks of Upper Triassic to Jurassic age. These plutonic rocks form part of the Benom granite and adjoining bodies continuing that range southward.

Among other interesting features, this Memoir documents the definite occurrence of cassiterite in the central 'gold belt' of Malaya, long thought to be totally barren of tin ore. The cassiterite occurs in stream deposits, sometimes associated with gold. The area has some history of alluvial gold mining, and it is judged in this work to have possible future potential for gold, iron, and also base metals.

The Survey Annual Report follows the pattern of previous volumes in this series: an introductory account of the Survey's activities during 1978 is followed by general articles on mineral resources and regional geology of Peninsular Malaysia and the Borneo States (Sabah and Sarawak), and then the bulk of the volume is formed by progress reports (19 for Peninsular Malaysia, 4 for Borneo). The reviews of general geology are concise and clear summaries, but they could use some updating before the next annual volume: Paleozoic sedimentation in Peninsular Malaysia is still interpreted by the (largely discredited) classical geosynclinal theory. The pebbly mudstones in the Carboniferous, an important facies for the interpretation of the geologic history, are not mentioned at all, nor is the equally significant melange belt in the Lupar Valley of Sarawak.

The progress reports concern both regional mapping and topical projects. P. Loganathan's paper on the Ma'Okil Fm. (Mesozoic continental clastics) in Johore also includes a useful review of Peninsular Malaysia's Mesozoic continental deposits (although the Saiong beds of Kedah are left off his map, Figure 18). Other reports concern, among other topics, barite deposits, ceramic raw materials, geochemical and geophysical exploration, groundwater, engineering geology, the chemistry of the Semporna volcanics in Sabah (by P.S. Lim), and feldspar resources in the pegmatites and graphic granite of Tg. Jaga, Kedah (by P.C. Aw). This last article includes a slightly extravagant table (taking up four full pages) listing the dimensions and volumes of 167 individual boulders!

Small-scale coloured geological maps on the end papers and a complete listing of Geological Survey publications round out this substantial and useful volume on the state of the Survey's work as of 1978.

One pleasant feature of these publications is the modest price. All are well-printed and cloth-bound. Equivalent works from most commercial publishers would be five times the price or more. The Annual Report volume in particular represents excellent value for the money.

Book Reviewer

Prof. Peter H. Stauffer is Professor of Geology, Dept. of Geology, University of Malaya, Kuala Lumpur, Malaysia.

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## ASCOPE '81 - Programme, Papers, Plenary Sessions

Programme

- 1000      Opening Ceremony
- 1400      Presentation: ASCOPE Council Policy Papers  
           Judo Sumbono  
           President/Director, PERTAMINA
- Tan Sri Abdullah Mohd Salleh  
           Chairman and Chief Executive, PETRONAS
- Tan Boon Teik  
           Attorney-General of Singapore  
           Chairman, Singapore Petroleum Co., Ltd. Ltd.
- Flying Officer Sulee Mahasandana  
           Minister of the Prime Minister's Office  
           Director and Sub-Committee Chairman  
           Petroleum Authority of Thailand
- Antonio V. Del Rosario  
           Deputy Minister of Energy  
           Senior Vice-President, Philippine National Oil Company

Technical Sessions Programme

Session "A" Developments in Hydrocarbon Exploration: Thursday, October 8, 1981

Morning Session (Moderator: Sutan Assin, Pertamina)

- 0900 - 0930 Paper 1 Hydrocarbon potential: an outlook for the ASEAN Region by ASCOPE Technical Committee
- 0930 - 1000 Paper 2 Organic facies: stratigraphic concept and exploration tool by R.W. Jones, Chevron Oil Field Research Co.
- 1020 - 1050 Paper 3 Geochemical constraints on petroleum generation and migration - a review by K.K. Bissada, Texaco.
- 1050 - 1120 Paper 4 Deep water exploration by Normal L. Burnett, Phillips Petroleum Company.
- 1120 - 1150 Paper 5 The Tertiary basins of Offshore Taiwan by Si-Chih Sun, Chinese Petroleum Institute.

Afternoon Session (Moderator: Dr. Mohammad Ayob, Petronas)

- 1330 - 1400 Paper 6 The geology of Offshore Northwest Palawan, Philippines by Dr. A. Saldivar-Sali, Phil. Bureau of Energy Development; H.G. Oesterie and D.N. Brownlee, Phil. Cities Service.
- 1400 - 1430 Paper 7 The FPSO, a new design concept in offshore production systems by L.M. Williams, Amoco Production Company; and L.H. Smulders, Single Buoy Moorings, Inc.
- 1430 - 1500 Paper 8 Geological, geophysical and geochemical investigations in the Visayan Basin, Philippines: a technical cooperation project as an incentive to commercial oil exploration by Dr. H. Porth, C.v. Daniels, A.

Glocke, H. Hufnagel, H. Jurgan, C. Mueller and H. Wehner, German Advisory Group, Bureau of Energy Development Philippines.

- 1520 - 1550 Paper 9 Comparative study relating to the existing petroleum legislations in ASCOPE Member-Countries by ASCOPE Legal Committee.
- 1550 - 1620 Paper 10 Hydrocarbon distribution in the Gulf of Thailand and South China Sea by Dr. Ernest P. Du Bois, CCOP.
- 1620 - 1650 Paper 11 Chinese offshore oil developments by Dr. Tatsu Kambara, Japan National Corporation.

Session "B" Prospects for renewable energy and conservation: Thursday, October 8, 1981

Morning Session (Moderator: Rufo S. Bernardo, Philippine National Oil Co)

- 0900 - 0930 Paper 1 Alternative energy resource systems by Prof. John P. Holdren, University of California.
- 0930 - 1000 Paper 2 Planning and management of energy/environment systems by Prof. Wesley K. Foell, Wisconsin University.
- 1020 - 1050 Paper 3 Renewable energy forests by Tuomo Marjokorpi, Ekono Oy, Finland.
- 1050 - 1120 Paper 4 The Philippine non-conventional energy development program: prospects and problems by Dr. Ernesto N. Terrado, Administrator, Center for Non-Conventional Energy Development (CNED).
- 1120 - 1150 Paper 5 Photovoltaic and oil: competitors or collaborators by James F. Skane, Vice President, Solar Power Corporation.

Afternoon Session (Moderator: C.Y. Shen, Singapore National Oil Company)

- 1330 - 1400 Paper 6 AlcoGas: the prospects for the ASEAN Region by Stephen N. Rothman and Lawrence H. Weiss, Chemical Systems, Inc.
- 1400 - 1430 Paper 7 Liquid alternative fuels for diesel and S.I. engines in Brazil by Dr. Georg Pischinger and R. W. Siekmann, Volkswagen Do Brazil S/A.
- 1430 - 1500 Paper 8 Energy conservation in refinery furnace and flares by J.G. Seebold, Standard Oil of California.
- 1520 - 1550 Paper 9 Gas conservation in Malaysia by Hamid Ibrahim, Petronas.
- 1550 - 1620 Paper 10 Bottom of the barrel processing: parameters for refinery configurations by John R. Bennett and Richard E. Conser, UOP Process Division.
- 1620 - 1650 Paper 11 Total energy concept or cogeneration by P.R. Srinivasan, National Productivity Council, India.

Session "C" Innovations in energy planning and financing: Thursday, October 8, 1981

Morning Session (Moderator: M.A. Warga Dalem, Pertamina)

- 0900 - 0930 Paper 1 Energy planning for developing countries by Dr. P. A. Phelps, J.F. Houle, R.G.J. Zimmermann, Bechtel National, Inc.
- 0930 - 1000 Paper 2 The supply/demand outlook for petroleum in the context of the total energy situation in the ASEAN Region by ASCOPE Economic Committee.
- 1020 - 1050 Paper 3 Petroleum resources in Southeast Asia: implications of the contractual framework by Dr. Corazon M. Siddayao, Resource Systems Institute, The East-West Center.

- 1050 - 1120 Paper 4 Capital requirements and financing alternatives of the world petroleum industry by P.J. Keenan, Vice President, Chase Manhattan Bank, N.A.
- 1120 - 1150 Paper 5 Designing economically efficient energy futures by Amory B. Lovins, Friends of the Earth Foundation, Inc.

Afternoon Session (Moderator: Virgili C. Arriola, Philippine National Oil Company)

- 1330 - 1400 Paper 6 Implementing economically efficient energy futures by Dr. L. Hunter Lovins, Friends of the Earth Foundation, Inc.
- 1400 - 1430 Paper 7 World Bank policies for financing of energy development in developing countries by Eugene D. McCarthy, Division Chief, EMENA-Asia Division, The World Bank.
- 1430 - 1500 Paper 8 Energy financing requirements of the petroleum industry in the ASEAN region by ASCOPE Economic Committee.
- 1520 - 1550 Paper 9 Financing oil development projects by Ian W. Ross, Vice President, Chemical Bank, Australia.
- 1550 - 1620 Paper 10 The impact of energy resource financing on developing countries by Peter Rugg, Vice President, Morgan Guaranty Trust Company, Hongkong.
- 1620 - 1650 Paper 11 Economics of marginal oil field development off-shore by Grant V. Bowler and Alan J. Gaynor, Gaffney, Cline and Associates Pte. Ltd., Singapore.

Session "D" The solid alternatives: coal and uranium: Friday October 9, 1981

Morning Session (Moderator: Dr. Rudy C. Obial, Consultant, Ministry of Industry, and Professor, Dept. of Geology, University of the Philippines)

- 0900 - 0930 Paper 1 Criteria for the evaluation of coal properties in the Pacific market by Charles E. Mann, Associate, Dames and Moore.
- 0930 - 1000 Paper 2 Status and prospects of Indonesian coal development by A. Prijono Nitihardjo and A. Kusuma, PN Tambang Batubara, Indonesia.
- 1020 - 1050 Paper 3 Australia's coal, uranium and other energy export potential by P.H. Barratt, Deputy Secretary, Department of Trade and Resources, Canberra, Australia.
- 1050 - 1120 Paper 4 Status and potential of Philippine coal development by R.B. Bomasang, Chief, Coal and Uranium Division, Bureau of Energy Development.
- 1120 - 1150 Paper 5 International coal trading and marketing trends by Gian Franco Pecchioli, Managing Director, Shell Coal International.

Afternoon Session (Moderator: Dr. Charan Achalabhuti, Petroleum Authority of Thailand)

- 1330 - 1400 Paper 6 Computerized coal deposit evaluation by W.L. Hodgson, N.D. Beaton, D.J. Cox, D.T. Merson, J.P. Murphy and M.R. Purser, Mincom Pty. Ltd. Australia.
- 1400 - 1430 Paper 7 Status and potentials of Thailand's coal industry by Prakal Oudomugsorn and Ard Chana.
- 1430 - 1500 Paper 8 The technology of using low rank coal by Dr. Josef Korak, Austrominerals.

- 1520 - 1550 Paper 9 Coal gasification and liquefaction: energy source of the future by Dr. Warren Schlinger, Texaco.
- 1550 - 1620 Paper 10 Regional characteristics for the siting of nuclear waste disposal by Richard M. Winar, Partner, Dames and Moore.
- 1620 - 1650 Paper 11 Nuclear safety: lessons learned and special concerns for the nuclear energy option in the ASEAN region by E.P. O'Donnell, Vice President, Enviro-sphere Company, Ebasco Services, Inc.
- 1650 - 1720 Paper 12 The Canada deuterium uranium (CANDU) system of nuclear electric generation - operating experience and economics by Ontario Hydro, Canada.

**Session "E" Harnessing geothermal and hydro power: Friday, October 9, 1981  
Morning Session (Moderator: Arturo P. Alcaraz, Philippine National Oil Co)**

- 0900 - 0930 Paper 1 Geothermal energy exploration and exploitation in Latin America by Dr. Edoardo Dominco, Electroconsult, Italy.
- 0930 - 1000 Paper 2 Commercial development of the Tiwi and Mak-Ban geothermal fields of the Philippines by R.M. Horton, T.N. Minette and C.F. Budd, Jr. of Philippine Geothermal, Inc., and A.P. Alcaraz, PNOC/NPC.
- 1020 - 1050 Paper 3 Design and performance of the Tiwi gathering system by R.N. Upadhyay, T.N. Minette, W.R. Nellis, Jr., J.T. Duree, and J.G. Broadus of Union Oil Company of California.
- 1050 - 1120 Paper 4 The distribution of alteration minerals in Philippine geothermal areas by Agnes G. Reyes and Bernardo S. Tolentino, PNOC Energy Development Corporation.
- 1120 - 1150 Paper 5 Well stimulation techniques in hot water dominated geothermal fields by Dr. Tim P. Dobbie, KRTA, New Zealand.

**Afternoon Session (Moderator: P.L. Coutrier, Pertamina).**

- 1330 - 1400 Paper 6 Geothermal reservoirs assessment - examples from the Philippines by Dr. Subir K. Sanyal, Stanford University.
- 1400 - 1430 Paper 7 Fracture detection from wireline surveys as applied to geothermal wells by J.R. Olesen, Schlumberger Overseas S.A.
- 1430 - 1500 Paper 8 Environmental aspects of geothermal energy development by Dr. Mario C. Berbano, PNOC, and Dr. Charles Darby, KRTA.
- 1520 - 1550 Paper 9 Hydro power and resources development in the Philippines by Filemon C. Rodriguez, President, EDCOP; Dr. Friedrich Fahlbusch, Lahmeyer Int'l., and Eduardo P. Abesamis, NPC.
- 1550 - 1620 Paper 10 Environment related policies and activities in ASCOPE Member-Countries by P.L. Coutrier, Pertamina.
- 1620 - 1650 Paper 11 Some environmental implications of reducing petroleum dependence in the Asia-Pacific Region by Dr. Toufiq A. Siddiqi, Research Associate, The East-West Center.

**Session "F" Seismic exploration day sponsored by Norwegian Petroleum Society; Friday, October 9, 1981.**

**Morning Session (Moderator: K.G. Finstad, Technical Adviser Petroleum, United Nations)**

- 0900 - 0930                    Opening address by A. Saldivar-Sali, Ph.D., DIC, FGS, Chairman, Technical Programme Committee, ASCOPE '81.
- 0930 - 1000    Paper 1    General exploration. Exploration strategy by K. G. Finstad, Technical Adviser Petroleum, U.N., and E. Bandlien, NOPEC A.S.
- 1020 - 1050    Paper 2    Planning and performance of seismic surveys by S.E. Johansen, O. Torvanger and N. Nilsen, NOPEC A.S.
- 1050 - 1120    Paper 3    Acquisition. Seismic sources by H. Brandsaether, GECO A/S and O. Torvanger, S.E. Johanse, NOPEC A.S.
- 1120 - 1150    Paper 4    Noise attenuation, long arrays, wide arrays by H. Brandsaether, GECO A/S.

**Afternoon Session (Moderator: Preecha Supalak, Petroleum Authority of Thailand)**

- 1330 - 1400    Paper 5    Real time processing of shallow marine seismic data by A. Tegdan, IKU, The Continental Shelf Institute.
- 1400 - 1430    Paper 6    Processing. Single trace processing, using iterative stacking by O. Naess, Norwegian Petroleum Directorate.
- 1430 - 1500    Paper 7    Migration processing by J. Hosken, British Petroleum, U.K.
- 1520 - 1550    Paper 8    3D onshore surveys by E.G. Selby, GSI, Bedford, U.K.
- 1550 - 1620    Paper 9    Interpretation. Seismic hydrocarbon indicators in the North Sea by K.A. Oppeboen, NORSK HYDRO A.S.
- 1620 - 1650    Paper 10    Acoustic impedance estimates by J. Zimmermann, GECO A/S.

**Closing Plenary Session: October 10, 1981.**

- Paper 1    Japanese cooperation/contribution to the ASEAN development Programs by the Honorable Rokusuke Tanaka, Minister of International Trade and Industry, Japan.
- Paper 2    Nuclear power as an alternative energy source by Mr. Gordon C. Hurlbert, President, Power Systems Company, Westinghouse Electric Corp.
- Paper 3    The future of geothermal energy as a renewable energy resource by Mr. Fred L. Hartley, Chairman & President, Union Oil of California.
- Paper 4    Canadian-Asean cooperation in the field of energy by the Honorable Marc Lalonde, Minister of Mines, Energy and Resources, Canada.
- Paper 5    Policy paper by Mr. Taroichi Yoshida, President, Asian Development Bank.
- Paper 6    World energy outlook by Mr. P.W.J. Wood, Executive Vice-President, Cities Service Company.
- Paper 7    Iraqi oil and the Asean consumer by Dr. Ramzi Salman, President, State Oil Marketing Organization, Iraq.
- Paper 8    Norway, a young net exporter of petroleum: The petroleum policy by The Honorable Harald Norvik, Secretary of State, Norwegian Royal Ministry of Petroleum & Energy.

- Paper 9 Regional cooperation among developing countries with reference to OAPEC experience by Dr. Abdelaziz Abdellatif Alwattari, Assistant Secretary-General, Organization of Arab Petroleum Exporting Countries.
- Paper 10 OPEC policies for third world countries by His Excellency Rene G. Ortiz, Secretary-General, Organization of Petroleum Exporting Countries.

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SENARAI DISERTASI-DISERTASI DAN LAPURAN-LAPURAN PROJECK  
DITERIMA OLIH JABATAN GEOLOGI, UNIVERSITI MALAYA, TAHUN  
AKADEMIK 1980/81

(List of Dissections and Project Reports, University of Malaya Academic Year 1980/81)

- I. Ijazah Kedoktoran (Ph.D.)  
Yeap Cheng Hock: A comparative study of Peninsular Malaysian granites with special reference to tin mineralisation.
- II. Ijazah Sarjana Sains (M.Sc.)  
Chandra Kumar: The orogenic basic intrusive bodies of the eastern belt of Malay Peninsula.  
Yap Kok Thye: Trace fossils from Tertiary deposits of Labuan Island, Sabah, Malaysia.
- III. Ijazah Sarjana Muda Sains (B.Sc. Hons)  
Abdul Rahman bin Mohd. Eusoff: Granite geology of Pulau Pangkor.  
Amran bin Ahmad: Geology, mineralisation and a geochemical study of the Kajang Kemaman area, Trengganu.  
Chua Beng Yap: Sedimentology and structure of the Crocker Formation, Kampung Balabakah area, Sabah, East Malaysia.  
Kamaludin Hassan: Sedimentology, structural and stratigraphy of the Tamparuli area, Crocker Formation, Sabah, East Malaysia.  
Lim Kock Hooi: NRM measurements on the Bau Limestone, their precision and relationship of intensity to lithology and diagenesis.  
Mahendran S. Ganesan: Sedimentology, stratigraphy and structure of the Crocker Formation in the Kampung Bongol area, Sabah, East Malaysia.  
Mohd. Noor Ismail: Petrology of the Bukit Labohan area, Kerteh, Trengganu.  
Mohd. Redzuan Mohd. Said: Geology of the Bakri area, Johore, Peninsular Malaysia.  
Preamakanthan Kanapathy: General geology (igneous) and magnetometer study of the Linden Hill - Senai area, South Johore.  
Romanus Rocky: Stratigraphy and palaeontology of Temerloh - Mentekab - Kerdau area, central Pahang, West Malaysia.  
Saim Suratman: Igneous petrology of the Kulai area.  
Sia Hok Kiang: Geology, geochemistry, biogeochemistry and mineralisation of the Chemor River Hydraulic Mine, Chemor, Perak, West Malaysia.  
Sohor Omar: Geology of Kalumpang area, Ulu Selangor, with some aspects of the granite geology and mineralisation.  
Tajom Paul Ponar Sinjeng: Geology of the Serabang area, Sematan, West Sarawak.

- Tee Thian San: The geology and mineralisation of the Gakak Mine area, Sungai Lembing, Pahang, Peninsular Malaysia.
- Vijayan s/o V.V. Rajah: Definition of the structure of the norite body of Singapore by geophysical methods.
- Zainol Abidin Sulaiman: Metamorphic rocks, petrology and structure-Bukit Besar - Bukit Raya (Kedah).
- Zaidi Zolkipli-Sulkipli: Geology of the Kampung Taie area, West Sarawak.

P.H. Stauffer

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## INTERNATIONAL SYMPOSIUM ON THE HELLENIC ARC AND TRENCH (H.E.A.T.) - ABSTRACTS

A volume of abstracts of the symposium on the Hellenic Arc and Trench (H.E.A.T.) will be sent free-of-charge to those interested in the subject, upon request.

Write to:

Prof. S.S. Augustithis  
National Technical University  
Department of Mineralogy - Petrography - Geology  
42 October 28th Street, Athens T.T. 147  
Greece.

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## CALENDAR

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

### 1981

- Aug : United Nations Conference on New and Renewable Sources of Energy, Nairobi, Kenya. Information Officer, UN Conference on New & Renewable Sources of Energy, DESI/DPI - Room 1072-C, United Nations, New York, N.Y. 10017, USA. (Jul-Aug. 1980).
- 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).
- Aug 9 - 14 : Second international symposium of the Cambrian system, Golden, Colorado, U.S.A. Sponsored by the Cambrian Subcommittee of the IUGS Commission on Stratigraphy and the U.S. Geological Survey. (The Cambrian Symposium, Paleontology and Stratigraphy Branch, U.S. Geological Survey, Box 25046, Mail Stop 919, Denver, Federal Center, Co. 80225, USA). (Nov-Dec 1980).
- Aug 16 - 25 : XIIth Congress and General Assembly - International Union of Crystallography, Carleton University, Ottawa,

Canada, Mr. Charbonneau, XIIth I.U. Cr. Congress, National Research Council of Canada, Ottawa, Ontario, Canada K1A 0R6. (Jul-Aug 1980).

- Aug 28 - : Arc volcanism, symposium, Tokyo (Aug. 31/Sept. 5), &  
 Sep 9 : field trips (Aug 28-30 to Hokkaido & geothermal fields; Sept. 6-9 to Kyushu, Izu, Oshima & Asama), by Volcanology & Chemistry of the Earth's Interior. Daisuke Shimozuru, Earthquake Research Institute, University of Tokyo, Bunkyo-ku, Tokyo 113, Japan.
- Sep 1 - 6 : Second International Conference, Graptolite working group for the International Palaeontological Association, (Conference and field excursions), Cambridge, U. K. (P.R. Crowther, Dept. of Geology, University of Cambridge, Sedgewick Museum, Downing Street, Cambridge CB2 3EQ, U.K.).
- Sep 6 - 12 : 7th International Clay Conference. Bologna & Pavia, Italy. Prof. Fernando Veniale, Chairman of Organizing Committee, 7th International Clay Conference, c/o Instituto Mineralogia Petrografia - Universita via Bassi, 4-27100 Pavia, Italy. (Jan-Feb 1981).
- Sep 21 - 23 : 5th International Tin Conference, Kuala Lumpur. Organised by the International Tin Council & Ministry of Primary Industries, Malaysia. Contact: Ketua Setiausaha, Kementerian Perusahaan Utama, Tingkat 8-10, Wisma Keramat, Jalan Gurney, Kuala Lumpur 15-01.
- Oct 7 - 9 : ASCOPE '81, ASEAN Council on Petroleum (meeting), Manila, Philippines. (ASCOPE '81 Organizing Secretariat), Philippine National Oil Co., 7901 Makati Ave., Makati Metro Manila, Philippines, Telex: 63667 PNOC PM).
- Oct 19 - 23 : Extraction Metallurgy '81 London. Contact: Meetings Secretary, Institution of Mining & Metallurgy, 44 Portland Place, London W1N 4BR. (Mar-Apr 1981).
- Nov 18 - 23 : GEOSEA IV - Geology, Mineral and Energy Resources of Southeast Asia: Philippine International Convention Center, Manila, Philippines. The Secretary, Geological Society of the Philippines, Bureau of Mines Bldg., Pedro Gil St., Malate, Manila, Philippines. (Jul-Aug 1980 & Jan-Feb 1981).
- Sep - Oct : International Conference on Industrial Minerals and Rocks and the role they play in a developing country: Kingston. Contact: Neville Mc-Farlane, Head, Mineral Resources Division, Science Research Council, P.O. Box 350, Kingston 6, Jamaica.
- Nov 23 - 26 : Asian Mining '81, Singapore. The Secretary, IMM, 44 Portland Place, London W1N 4BR, England (May-Jun 1980).
- Dec 7 - 11 : Ore deposits, ann.workshop, Toronto. (E.T.C. Spooner, Dept. of Geology, University of Toronto, M5S 1A1).
- Dec 14 - 18 : Short Course and Symposium on geotechnical aspects of offshore structures, Bangkok. Guest Lectures, Country Reports, and short presentations.  
 Contact: Prof. A.S. Balasubramaniam, Div. of Geotechnical & Transportation Engineering,

AIT, P.O. Box 2754, Bangkok, Thailand.

1982

- Feb 9 - 12 : Offshore Southeast Asia (OSEA) Conference & Exhibition, Singapore. Contact: Dr Glenn L. Shepherd, OSEA Program Chairman. P.O.Box 423, Tanglin Post Office, Singapore 9124.
- Mar 1 - 5 : Workshop on Palaeomagnetic Research in Southeast and East Asia. University of Malaya, Kuala Lumpur. Abstracts by 1 August. Full Papers by 15 December. Contact A. Johannas, Project Manager, Coordinator CCOP, Bangkok, Thailand.
- Apr 1 - 3 : First international symposium on Soil, Geology and Landforms - impact on land use planning in developing countries, Bangkok. Contact Dr Prinya Nutalaya, Symposium Secretary, LANDPLAN 1, Div. of Geotechnical & Transportation Eng. AIT, P.O. Box 2754, Bangkok, Thailand.
- May 12 - 14 : 9th International Geochemical Exploration Symposium, Saskatoon, Canada. (L.A. Clark, Saskatchewan Mining Development Corp., 122 3rd Ave. North, Saskatoon, Sask., Canada S7K 2HG)
- Aug 20 - 23 : IV International Symposium on the Ordovician System, Oslo, Norway. One pre-meeting excursion in Norway and three post-meeting excursions in Sweden. (D.L. Bruton, Paleontologisk Museum, Sars gate 1, Oslo, 5, Norway).
- Aug 22 - 28 : Circum Pacific Energy and Mineral Resources Conference, Honolulu, Hawaii, USA. (M.T Halbouty, 5100 Westheimer Road, Houston, Texas 77056. USA)
- Aug 22 - 28 : Eleventh International Congress on Sedimentology, Hamilton, Ontario, Canada, IAS Congress 1982, Dept. of Geology, McMaster University, Hamilton, Ontario L8S 4M1, Canada. (Nov-Dec 1980)
- Sep 6 - 12 : VI IAGOD Symposium. Tbilisi. Contact: A.C. Tvacchrelidze, Caucasian Institute of Mineral Resources, 85 Paliashvili St., 380030 Tbilisi, USSR.
- Dec 1 - 6 : 4th International Congress of Engineering Geology, New Delhi. Contact: G. Pant, Geological Survey of India, 47-48 Pragati Bhawan, Nehru Place, New Delhi 110019, India.

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