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KANDUNGAN (CONTENTS)

CATATAN GEOLOGI (GEOLOGICAL NOTES)

- Abdullah Sani H. Hashim: Discovery of an ammonoid (*Agathiceras* sp.) and crinoid stems in the Kenny Hill Formation of Peninsular Malaysia, and its significance 205

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

- B. J. Skinner: 1. Changing patterns of mineralization through geologic time 213
 2. Environments and styles of mineralization in massive sulphide deposits
 J. Ford: Shuttle Imaging Radar (SIR-B) in resource survey 214
 D. J. Kirwin: Models for epithermal gold deposits 215
 Petang Metamorfisme 216
 Hamzah Mohamad: Perbandingan Fasies Formasi Bt. Kenny dan Formasi Bt. Dinding
 T. T. Khoo: Contact metamorphism and matrix recrystallization of the Setul Limestone, Langkawi
 O. von Knorring: Pegmatitic tin occurrences in Africa 218

BERITA PERSATUAN (NEWS OF THE SOCIETY)

- Petroleum Geology Seminar '85—final circular 221
 Penerbitan Persatuan (Publications of the Society) 223
 The Society's Logo—do we need a change? 224
 Annual Conference '86 225
 Honorary GSM members—3 new appointments 225
 Keahlian (Membership) 229
 Pertukaran Alamat (Change of Address) 229
 Pertambahan Baru Perpustakaan (New Library Addition) 230

BERITA-BERITA LAIN (OTHER NEWS)

- Tin-based industries show good progress 231
 AGID Workshop and Training Course on the Quaternary in S.E. Asia 232
 Petroleum and Geological Engineering Inc. Courses—1986 Offerings 234
 Joint Association for Petroleum Exploration Courses (UK)—List of courses 237
 International course in base mapping techniques 241
 Geocongress '86—2nd announcement 244
 Circum-Pacific Energy and Mineral Resources Conference—Singapore 245
 IGCP 220—Meeting of Working Group 5 251
 Symposium on innovative directions in Petroleum Exploration 252
 Conference on Geology of Indochina 252
 Kursus-kursus Latihan & Bengkel-bengkel (Training Courses and Workshop) 254
 Kalender (Calendar) 255



DIKELUARKAN DWIBULANAN
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CATATAN GEOLOGI (GEOLOGICAL NOTES)

DISCOVERY OF AN AMMONOID (*Agathiceras* sp.) AND CRINOID STEMS IN THE KENNY HILL FORMATION OF PENINSULAR MALAYSIA, AND ITS SIGNIFICANCE

Abdullah Sani b. H. Hashim, Geological Survey of Malaysia.

Abstract

*The Kenny Hill formation, for a number of years, has been referred to as a sequence of clastic sedimentary rocks occurring in the Kuala Lumpur area and further south in the Sepang area, but the age of this formation has never been properly defined. However, the discovery of an ammonoid (*Agathiceras* sp.) in the formation indicates that the age of this formation, at least in part, is Permian. The occurrence of ammonoid and crinoid stems in that same fossil locality indicates that the sediments are marine in origin.*

Introduction

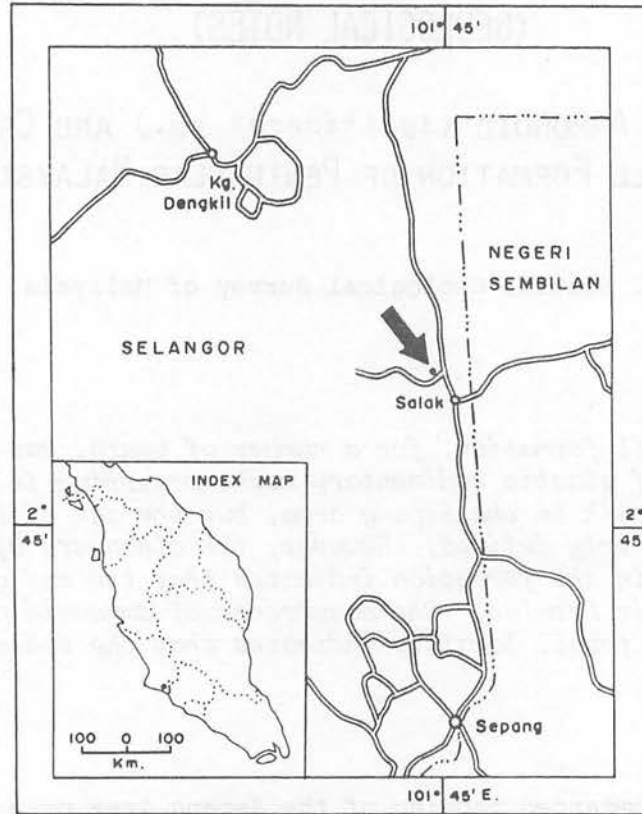
The author commenced mapping of the Sepang area on a scale 1:63,360 in early 1982 and mapping of the area has just been completed. However, the geological report of this area is still in preparation. Two types of fossils were found in the argillaceous rocks of the Kenny Hill formation. These fossils were found near the town of Salak in the Sepang area which is about 40 km south of Kuala Lumpur (Fig. 1 and 2).

The Kenny Hill formation was first mapped by Yin (1961) in the Kuala Lumpur area which is located north of the present study area. This formation is composed of arenaceous and argillaceous rocks which are mainly sandstones, siliceous shale and mudstone. The shales are found as thin (a few centimetres) to thick beds (1 m or more) and are often finely laminated. Beds of mudstone and sandstone are thicker commonly one to several metres thick. No datable fossils have been previously found in the Kenny Hill formation. Prior to the present work, only a few very poorly preserved fossils were known from the Kenny Hill (Rosly, 1980), these being probable pelecypods and brachiopods and some long, branching, segmented tubes of unknown affinities. Before this, the age of the Kenny Hill formation could be fixed only by its relationships to other rock units.

SYSTEMATIC PALAEOLOGY

Phylum:	Mollusca
Class:	Cephalopoda
Order:	Goniatitida Hyatt, 1884
Suborder:	Goniatitina Hyatt, 1884
Superfamily:	Goniatitaceae de Haan, 1825
Family:	Agathiceratidae ARTHABER, 1911
Genus:	<i>Agathiceras</i> GEMELLARO, 1887
Species:	<i>Agathiceras</i> sp.

Fig. 3



Scale 1 : 250,000

KB.IP. 7-85

Fig. 1. Index map showing fossil locality (arrowed) at Salak, Selangor, Peninsular Malaysia.



Fig. 2. Location of fossil occurrence (arrowed).

Agathiceras suessi GEMMELLARO, 1887, pp. 79-80, Pl. 6, Figs. 1-4, Pl. 7, Fig. 36.

Adrianites elegans GEMMELLARO, 1887, pp. 43-44, Pl. 6, Figs 14-17, Pl. 7, Figs. 23, 24.

Adrianites insignis GEMMELLARO, 1887, pp. 44-45, Pl. 6, Figs. 8-10, Pl. 7, Fig. 10.

Observations

An *Agathiceras* ornamented with prominent spiral ribbing. Each spiral ribbing is about 1 mm in size. It was a part of the spirally ornamented body chamber of fairly large ammonoid with a small portion of an inner whorl attached. Also, the slight traces of suture-lines were seen displaying a goniatitic pattern which are characteristic of the majority of Palaeozoic ammonoids.

Discussion

The specimen of *Agathiceras* sp. is indicative of Lower to Middle Permian age. Prominent spiral ribbing is not known in Devonian ammonoids, and the slight traces of suture-lines seen on this ammonoid are not those of Devonian forms. *Agathiceras* has a full age range of upper Carboniferous to about mid-Permian. The younger ones are much more widespread and low to mid-Permian is the most probable age of this specimen.

Occurrence

One specimen, Salak, Selangor, Malaysia.

Repository

British museum No. 102/AF/02

CRINOID stem fragments
Figs. 4, 5 & 6.

Observation

The fragments, probably all belong to the same species being cylindrical in external shape without ornament or cirral facets.

Description

The specimens consist of numerous fragments of crinoid stems. The central canals are circular in outline, very wide and expand between successive ossicles into lens-shaped spaces (spatial) which are radially crenulate. Unfortunately it is not possible to identify these fragments more closely than as crinoids.

Discussion

Somewhat comparable stem fragments are described by Moore and Refford (1968), as: *Grapherostigma grammodes* from the Lower Mississippian of Indiana and *Cyclomischus tennesseensis* from the Upper Silurian of Tennessee. Obviously no sort of age determination could be based on this, since crinoids range from Ordovician to Recent. The specimens were found in light grey shale. The sediment must be marine.

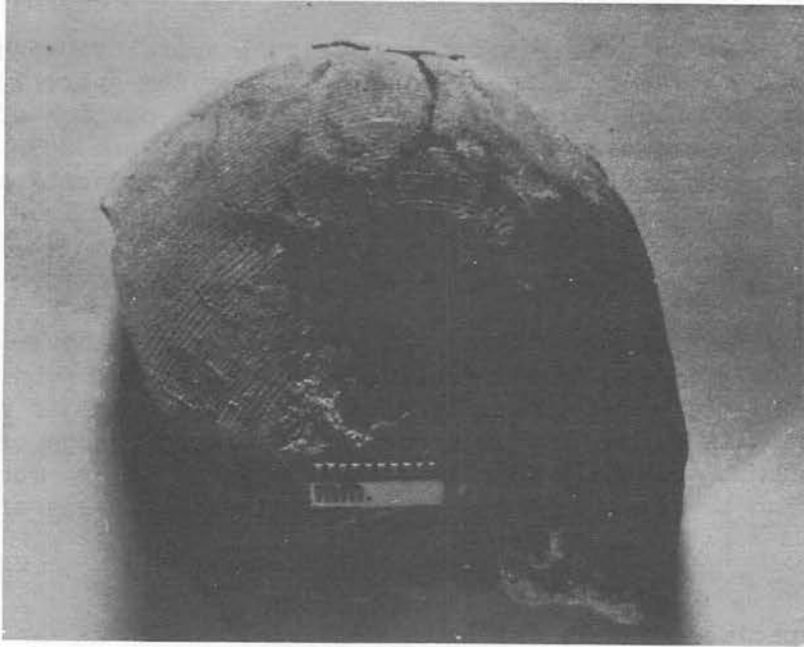


Fig. 3. *Agathiceras* sp. showing prominent spiral ribbing.



Fig. 4. The fragment of crinoid stem with cylindrical external shape.

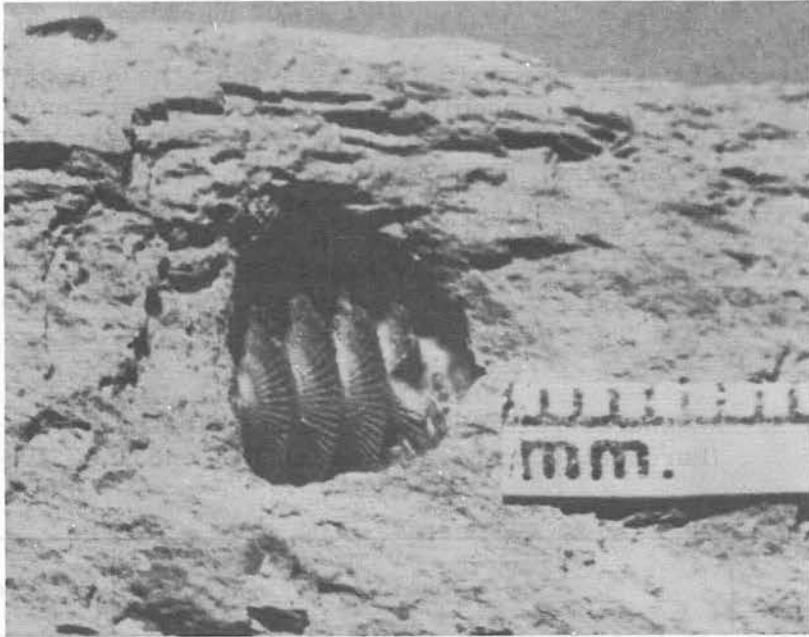


Fig. 5. The fragment of crinoid stem with the central canals which are circular in outline.

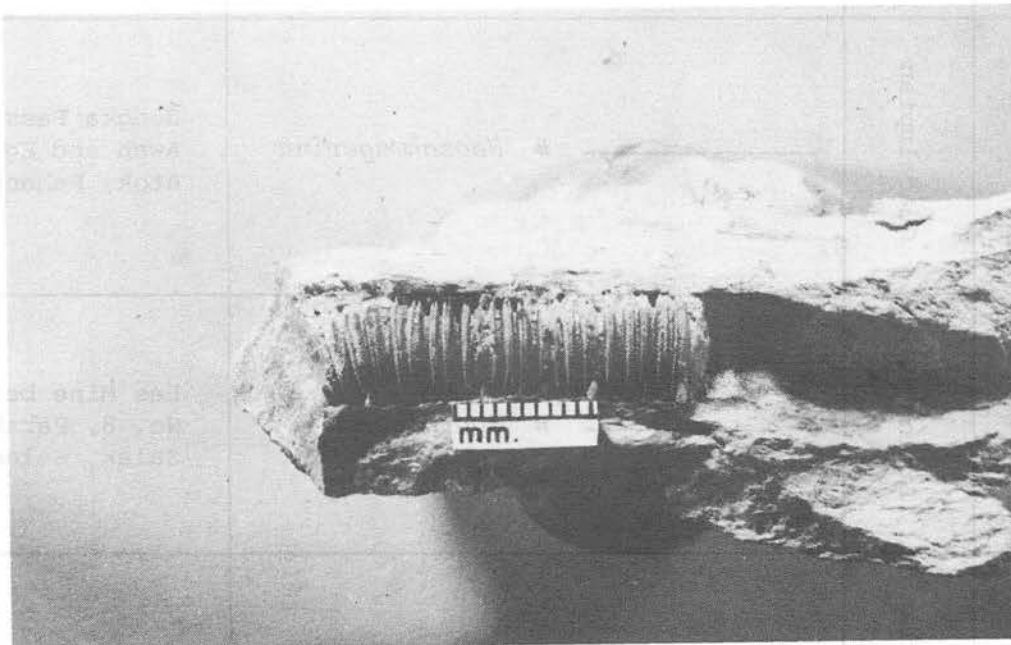


Fig. 6. The fragment of crinoid stem which are very wide and expand between successive ossicles into lens-shaped spaces (spatia) and are radially crenulate.

Occurrence

Several fragments, Salak, Selangor, Malaysia.

Repository

British museum, 102/AF/01,001.

Discussion

The presence of the ammonoid indicates that the age of the Kenny Hill formation at Salak is probably Lower to Middle Permian. On comparison with first ammonoid fossil from the upper part of Lee Mine beds, Kampar, Perak and that from Sungei Cheroh, Pahang (Jones, *et al.*, 1966; Stauffer, 1973), it was concluded that the Kenny Hill formation is of the lower part of Middle Permian. A general correlation chart of the Permian in Malaysia especially based on the well known ammonoid and other fossils is shown in Table 1. The three species were

Table 1. A general Permian correlation chart in Malaysia
(Personal communication with H. Fontaine, 1984)

Series		Fossil	Location
Upper	Dzhulfian	----- # <i>Palaeofusulina</i>	Sg. Aring, Kelantan.
Middle	Guadalupian	----- # <i>Neoschwagerina</i>	Jengka Pass, Kg. Awah and Sg. Atok, Pahang.
	Artinskian	----- # <i>Agathiceras</i>	Lee Mine bed, No. 8, Perak. Salak, Selangor.
Lower	Sakmarian	----- # <i>Boultonia wilsi</i>	Mata Air, Perlis.

studied and the assembly indicates a late Artinskian to early Guadalupian. While all the specimens from Sungei Cheroh, C. Lee (1978), have been ascertained to fall into three groups, the assemblages closely relate to the Sosio fauna (GEMMELARO, 1887) which indicates an early Guadalupian (Wordian) age and are slightly younger than the fauna discovered at Lee Mine which belong to the Artinskian (Leonardian) age. Although only one specimen of *Agathiceras* has been found in Salak area, it is important as it indicates the age of the Kenny Hill formation at Salak is probably lower to middle Permian. H. Fontaine (1984, personal communication) believed that the age of this formation has a very wide range because the Kenny Hill formation seems to be continued in the Malacca Straits where a similar formation has provided a palynological material which is of Lower Carboniferous in age. Moreover, Rosly (1980) mentioned a possible Devonian age for the chert beds in Dengkil area.

The presence of crinoid stems indicates that the environment was probably shallow marine. This is also indicated by the various layers of sandstone in siliceous shale which are the result of channel filling forming lenticular bedding. There is no evidence that deposition was in a deep sea environment. Rosly (1980) erroneously stated that the age of the Kenny Hill formation ranges from Cretaceous up to Jurassic by finding angiosperm through his palynology study. But it apparently was contaminated perhaps from recent pollen.

The occurrence of ammonoids of probable Leonardian and Wordian ages in Malaysia is believed to be of not only stratigraphic interest but also palaeobiogeographic importance (House and Senior, 1981).

Acknowledgement

Special thanks are due to M.K. Howarth from British Museum for their kindness to examine these specimens. The writer is grateful to H. Fontaine, from ESCAP-UNITED NATIONS, for providing advice and encouragement. Finally, the author also records his sincere thanks to Mr. Wong Ting Woon and Mr. Gan Ah Sai of the Geological Survey of Malaysia for their assistance and kindness.

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PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

TECHNICAL TALKS

- B.J. Skinner: 1) Changing patterns of mineralization through geologic time.
2) Environments and styles of mineralization in massive sulphide deposits.

Report: Prof. Brian J. Skinner, who is with the Department of Geology and Geophysics, Yale University and currently Editor of Economic Geology presented the above two talks at the Geology Department, University of Malaya, on the 15th and 16th July, 1985 respectively. We are fortunate that Prof. Skinner has responded to my request for brief summaries of the two talks which I have just received.

- 1) Changing patterns of mineralization through geologic time.

The Archean-Proterozoic boundary separates distinct styles of mineralization. During the Archean, all mineralization was related to igneous activity, and most of the igneous activity was submarine. Evidence from several sources suggests that the volume of continental crust increased steadily during the Archean. As it did so, the composition of the atmosphere, and the oxidation state of the ocean slowly changed too. The Proterozoic is marked by the appearance of large sedimentary basins on cratons, and in those basins are observed distinctive, strata-bound, sediment-hosted mineral deposits. Quartz-pebble conglomerate gold and uranium deposits of detrital origin derived minerals from the Archean crust. The detrital deposits are succeeded by the Lake Superior type banded iron formations, which are probably the oldest evaporite deposits. These in turn are succeeded by copper-, and lead-zinc sediment hosted deposits as the importance and size of saline evaporites increased. Approximately 600 million years ago, the tectonic and geochemical style characterized by the Proterozoic seemed to change. Presumably this was associated with the break-up of the late Precambrian supercontinent. Deposits associated with magmatic activity along subducted edges of plates appear in large arcuate belts such as the Andean-type porphyry copper province, and the Southeast Asian tin province. The style of mineralization has not changed significantly throughout the Phanerozoic.

- 2) Environments and styles of mineralization in massive sulfide deposits.

Massive sulfide deposits first appear in the geological record about 2.7 billion years ago. The controlling factor was the growing amount of sulfate sulfur in the ocean. By 2.7 b.y. it was sufficient so that retrograde solubility caused gypsum to be precipitated when seawater was heated next to a sea-floor vent. The gypsum slowed the rising plume of hot water and allowed localized sulfide precipitation to occur. This in turn allowed massive sulfide deposits to form. During the Archean, sea-floor volcanism simply dispersed the material in solution. From 2.7 b.y. to the present, massive sulfide bodies have been forming on the sea-floor.

Deposition along spreading edges produces small, but numerous deposits.

None of the ore-bodies in the geological record can be demonstrably proved to have formed at a mature spreading edge. A few, such as those in Oman, Cyprus and Newfoundland, seem to have formed on spreading edges in young, back-arc basins. Most deposits in the geological record formed adjacent to subduction edges and are related to areas of brecciated igneous rock. The most likely places to find large, modern massive sulfide deposits, are the seas along modern subduction edges, and modern back-arc basins.

G.H. Teh



B.J. SKINNER



JOHN FORD

John Ford: Shuttle Imaging Radar (SIR-B) in Resource Survey

Dr. John Ford is a member of the NASA Space Shuttle Radar (SIR-B) Science Investigation Team and is from the Jet Propulsion Unit of the California Institute of Technology, Pasadena, California, U.S.A. He is currently involved in the SIR-B Indonesia Project and specializes in geological mapping of cloud-shrouded areas using space-borne radar imaging techniques.

The talk was held on the 30th September 1985 in the State Operations Room, 15th Floor, Bangunan Tunku Abdul Rahman, Kuching, at 1030 hrs and was attended by 22 persons including the Permanent Secretary to the State Ministry of Resource Planning, Dr. Yusoff Hanifah, the Director of Geological Survey of Malaysia, Sarawak, Mr. Kho thin Heng, and other members from the Geological Survey of Malaysia, Sarawak, surveyors from the Land and Survey Department, Sarawak and foresters from the Forest Department, Sarawak.

In his talk, Dr. Ford touched on the basics of radar imaging and its differences with and advantages over other optical methods including landsat imaging. He stressed on the sensitivity of radar imaging towards topography especially roughness and slopes of the object. Compared to optical methods, radar imaging uses longer wavelengths and as such is able

to penetrate clouds to give a clear cloud-free scene. This is particularly advantageous in equatorial areas as is borne out by two swaths taken recently over Borneo under the SIR-B Indonesia Project.

Dr. Ford went on to illustrate with slides his preliminary interpretation of the SIR-B scenes obtained for the Indonesia Project. He is able to map out different terrain categories such as coastal mangrove swamp areas, carbonate terrain, clastic rock terrain, imbricated melange terrain and volcanic terrain. Structural features such as faults, strikes and dips, folds and other lineaments may also be delineated.

The talk ended at 1215 hrs after an interesting question and answer time.

Victor Hon

D.J. Kirwin: Models for Epithermal Gold Deposits



Mr. D.J. Kirwin who is a consultant with the International Geological Services Pty. Ltd. (13 Buckby Street, Pallarenda, Toursville, Australia 4810), presented the above talk to an audience of 35 at the Geology Department, University of Malaya on 18th October 1985.

Mr. Kirwin began by observing that continuing depressed metal prices due to economic constraints world-wide have resulted in an increased focus on precious metal exploration by those companies still in the business. Historically most of the world's gold production has been from Precambrian or Tertiary geological environments including the Pacific Basin margin from which several thousands of tonnes of precious metals have been won.

Examination of epithermal gold and silver deposits located near the east and west Pacific coasts indicates that similarities exist in terms of geologic setting, styles of mineralisation and metal associations. On this basis Mr. Kirwin went on to show a series of comparative models which have been constructed to illustrate some of the analogies. This philosophy is perhaps not unlike that which was applied two decades ago during the porphyry copper times leading to discovery of several major deposits such as Bougainville, Philex and Ok Tedi.

The epithermal gold models include sinters and solfataras, calderas and half grabens, high level vein bonanzas, hydrothermal eruption breccias diatremes, sub-parallel veins and stockworks, gold-enargite deposits related to stratovolcanos, porphyries and carbonate replacement. Numerous examples of the above types of deposits are known around the Pacific rim and Mr. Kirwin believes that these models collectively comprise a useful practical basis for epithermal gold exploration in the west Pacific region.

G.H. Teh

PETANG METAMORFISME (METAMORPHIC EVENING)

Laporan: Pada petang Sabtu, 26hb Oktober, 1985 suatu pertemuan mengandungi dua ceramah teknik (technical talks) telah berlangsung di Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi. Seramai kira-kira 40 orang ahli hadir di ceramah tersebut. Ini ialah ceramah teknik Persatuan Geologi Malaysia yang julung kali diadakan di Universiti Kebangsaan, yang bertujuan untuk meluaskan kegiatan Persatuan serta memberi peluang penyertaan lebih ramai ahli. Salah satu ceramah teknik tersebut telah disampaikan sepenuhnya di dalam Bahasa Malaysia; suatu perkembangan dan kemajuan Persatuan ini dalam usaha meletakkan Bahasa Malaysia sebagai bahasa ilmu, di luar dewan kuliah.

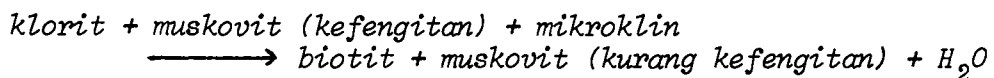
Dalam ceramah yang pertama, Dr. Hamzah Mohamad, pensyarah di Jabatan Geologi, UKM telah bercakap mengenai, "Perbandingan Fasies Metamorf Formasi Bukit Kenny dan Formasi Skis Dinding". Beliau berpendapat skis Dinding tidak semestinya telah mengalami metamorfisme pada gred (fasies) lebih tinggi daripada batuan Formasi Bukit Kenny kerana biotit yang ada di dalam skis Dinding, yang menunjukkan gred relatif tinggi itu, terbentuk kerana kesesuaian komposisi batuan enapan asal. Dr. Khoo Teng Tiong, Profesor Madya di Jabatan Geologi, Universiti Malaya dalam ceramah kedua yang bertajuk "Contact metamorphism and matrix recrystallization of the Setul Limestone, Langkawi" menyarankan bahawa pelet mikrit di dalam batu kapur ini adalah hasil metamorfisme sentuhan ($< 400^{\circ}\text{C}$). Beliau juga mengemukakan tanda-tanda penghabluran semula batu kapur ini telah dibantu oleh fasa awal metamorfisme rantau (Patani).

Hamzah Mohamad: Perbandingan Fasies Metamorf Formasi Bukit Kenny dan Formasi Skis Dinding.

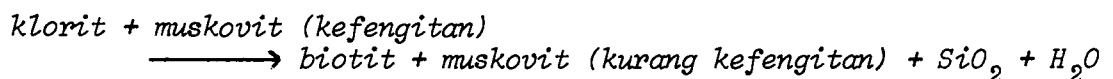
Abstrak

Kajian petrografi menunjukkan skis Formasi Bukit Dinding mengandungi himpunan stabil klorit + fengit + mikroklin, biotit + fengit + mikroklin, dan klorit + fengit + biotit. Skis dan filit di dalam Formasi Bukit Kenny pula hanya mengandungi himpunan stabil fengit (muskovit) + klorit. Garnet tidak wujud di dalam kedua-dua formasi.

Komposisi kimia batuan yang diplot di dalam gambarajah komposisi A'KF, dibantu oleh data mineralogi, mencadangkan biotit di dalam skis Formasi Dinding telah terbentuk melalui tindakbalas

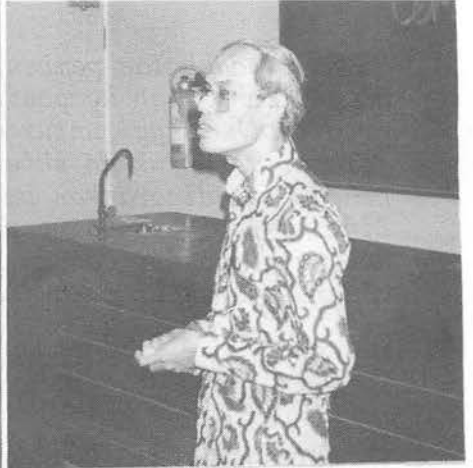


yang telah dibuktikan oleh pengkaji-pengkaji terdahulu berlaku pada gred rendah, dan



pada gred lebih tinggi. Di dalam Formasi Bukit Kenny pembentukan biotit adalah dijangka melalui tindakbalas kedua sahaja kerana ketiadaan mikroklin

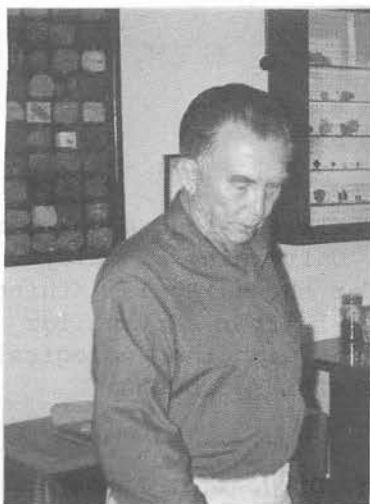
PETANG METAMORFISME



HAMZAH MOHAMAD



T.T. KHOO



VON KNORRING



DISCUSSIONS AT TEA-TIME

dalam endapan asalnya. Ini terbukti oleh 'indeks mikroklin'nya yang relatif tinggi.

Tindakbalas pembentukan biotit tanpa melibatkan mikroklin ini sangat dipengaruhi oleh komposisi batuan asal; batuan lebih beralumina perlukan gred lebih tinggi untuk membolehkan biotit terbentuk. Data kimia kedua formasi menunjukkan skis dan filit Formasi Bukit Kenny lebih beralumina. Dengan itu disarankan bahawa tidak semestinya gred (fasies) Formasi Bukit Dinding lebih tinggi berbanding Bukit Kenny; ketiadaan biotit cumalah kerana komposisi batuan Formasi Bukit Kenny tidak sesuai untuk membentuk mineral tersebut pada 'zon biotit'.

Khoo Teng Tiong: Contact Metamorphism and Matrix Recrystallization of the Setul Limestone, Langkawi.

Abstract

The northeastern part of the Langkawi area is underlain by the Setul Limestone outside the tremolite-phlogopite boundary of the Raya and Tuba aureoles. Specimens of the limestone from Teluk Belangkas to Tanjung Rhu including the islets of Pulau Gasing and Pulau Pasir show occurrence of pellets of micrite set in a more crystalline groundmass. Petrographic evidence show that these pellets are not organically extruded bodies but result from contact metamorphism ($< 400^{\circ}\text{C}$) by the adjacent granite bodies. The pellets are the non-recrystallized parts of the original micritic carbonaceous limestone. There is also evidence that tectonic deformation due to an earlier phase of regional metamorphism (Patani Metamorphics) could have aided the recrystallization.

At higher grades of contact metamorphism the pellets become scarce but they do persist up to grades where forsterite and wollastonite developed. However, schistose fabric in the limestone developed during the earlier regional metamorphism generally survive to high grades of contact metamorphism. The only change is just coarsening of the schistose fabric.

Hamzah Mohamad

O. von Knorring: Pegmatitic Tin Occurrences in Africa.

Report: Dr. Oleg von Knorring presented the above talk to about 40 members on the 31st October 1985 at the Geology Department, University of Malaya. Dr. von Knorring is presently in Malaysia working for the Malaysian Mining Corporation. He retired from Leeds University in 1981 after serving for 33 years. This is his third visit to Malaysia, he was with the Geological Survey from 1955-56 and external examiner for Universiti Kebangsaan Malaysia (1977-80).

Two former Ph.D. students of Dr. von Knorring, Dr. Jaafar Ahmad and Dr. Wan Fuad, were at hand to introduce and propose a vote of thanks on behalf of the Society respectively.

Abstract

In connection with the pegmatite research programme at Leeds, most of the economically important pegmatite regions in Africa have been investigated since 1951.

Although the major pegmatites of Africa have long been known, large-scale exploitation of the deposits only began during the Second World War. These pegmatites constitute major world resources of many rare-metal elements e.g. lithium, caesium, beryllium, scandium, rare-earths, niobium and tantalum, in addition, to tin and industrial minerals, such as mica, and many precious and semi-precious gemstones.

The major mineralized pegmatites of Africa are found south of the equator within the younger orogens e.g. Kibaran-, Mozambique- and Damaran belts, and within the older cratons, e.g. Tanzanian, Zimbabwean and Kaap-Vaal cratons. Another important mineralized area is the Orange River pegmatite belt of Kibaran age.

Pegmatitic tin occurrences are prominent within the Kibaran orogenic zone extending from southwest Uganda and neighbouring Tanzania through Rivanda, Kivu, Maniema and Shaba provinces of eastern Zaire to the Kamativi tin-field in Zimbabwe. Furthermore, extensive tin-bearing pegmatites are found within the Damaran sequence in Namibia.

In the pegmatites of the Mozambique belt, however, tin is rare and even in the important mineralized pegmatite regions of Mozambique and Madagascar, cassiterite is virtually absent and tin may be accommodated in some tantalum minerals.

Within the older cratonic areas, pegmatitic tin is widespread in Zimbabwe, e.g. Bikita Tin-field. From a geochemical point of view tin seems to be primarily associated with lithium-bearing pegmatites, commonly spodumene pegmatites together with a variety of niobium-tantalum minerals.

As regards their genesis the major tin pegmatites are associated with synkinematic granites and especially with those formed in connection with the emplacement of later post-orogenic granite intrusions.

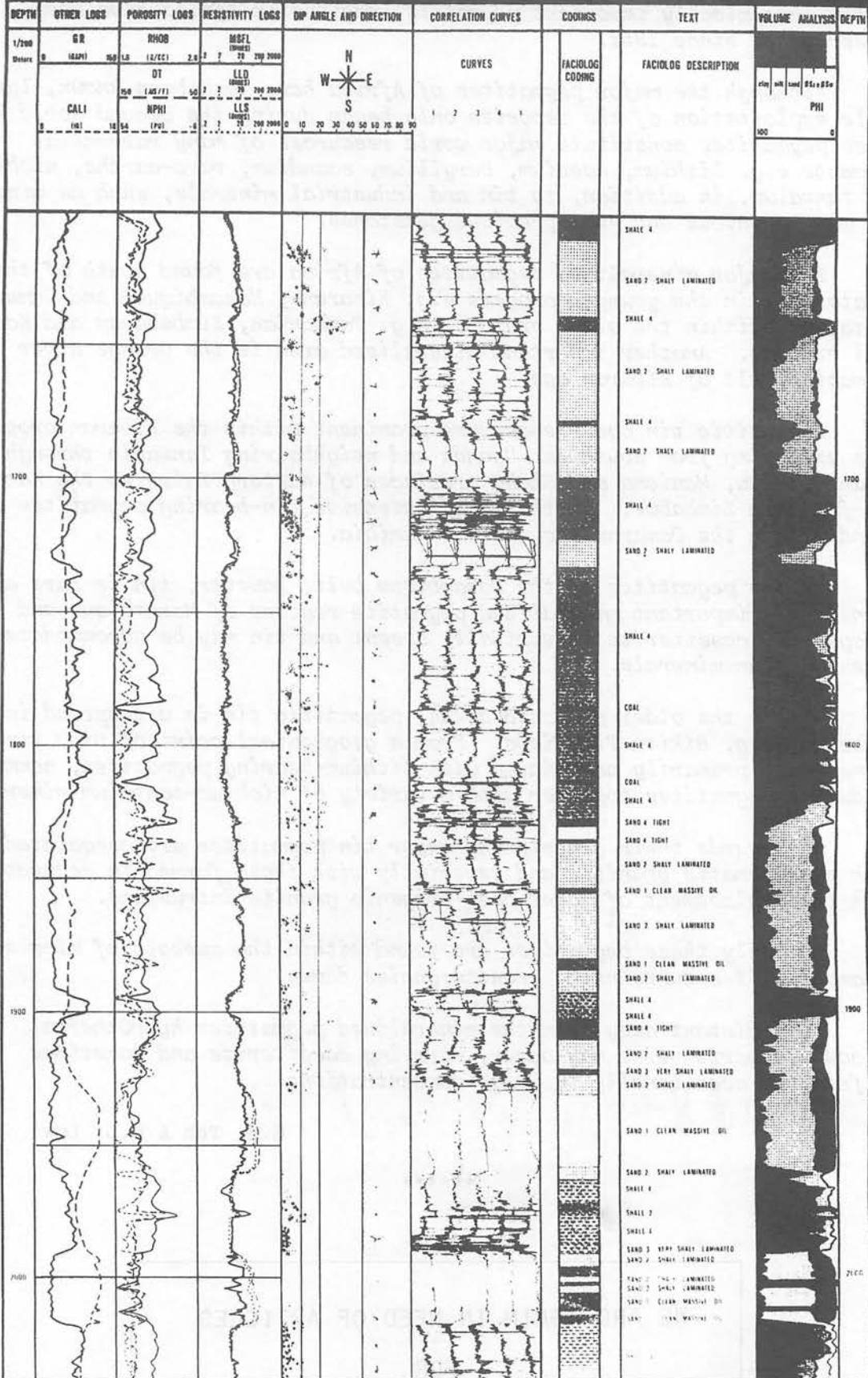
Commonly these pegmatites are found within the aureole of mica schists or amphibolites surrounding granite-gneiss domes.

Some distant away from the mineralized pegmatites hydrothermal muscovite-quartz veins may occur, carrying cassiterite and sometimes wolframite, occasionally in large concentrations.

G.H. Teh & K.L. Low

WE ARE AGAIN IN NEED OF ARTICLES
FOR
THE WARTA GEOLOGI

FACIOLOG



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

BERITA-BERITA PERSATUAN
(NEWS OF THE SOCIETY)

PETROLEUM GEOLOGY SEMINAR '85 - FINAL CIRCULAR

GEOLOGICAL SOCIETY OF MALAYSIA

**PETROLEUM GEOLOGY
SEMINAR '85**

PAPERS

We are pleased to announce that positive response has been received from various organisations confirming their willingness to present papers at the Petroleum Geology Seminar '85. So far a total of 18 papers have been tentatively offered for consideration and these are expected to improve the knowledge and understanding of the petroleum geology in the region as well as the various new and successful exploration techniques employed in petroleum exploration. In view of this positive response with regard to papers the Seminar will be extended for an additional day to **7th December 1985**.

University of Malaya—Dept. of Geology

1. "A Re-Assessment of the Evidence that the S.E. Asian Shear Basins Resulted from the India-Tibet Collision" by Prof. C.S. Hutchison.

Universiti Kebangsaan Malaysia—Dept. of Geology

2. "Superimposed Deformations and Vergence of Lower Tertiary Sediments Near Tatau, Sarawak" by Prof. Dr. H.D. Tjia.

Sabah Shell Petroleum Company

3. "The Nature and Significance of Regional Unconformities in the Hydrocarbon-bearing Neogene Sequence Offshore West Sabah" by Bruce K. Levell.
4. "Reservoir Geological Framework of Upper Miocene Shallow Marine Sandstones in the Erb West Field Offshore Sabah, N.W. Borneo" by S. Levell, H. Mohamed and H.D. Johnson.

Sarawak Shell Berhad

5. "Palaeobathymetrical Changes in N.W. Sarawak During the Oligocene to Pliocene" by J. Hageman.
6. "Computer-assisted Interpretation of Depositional Palaeoenvironments Based on Foraminifera" by Phillip Lesslar.
7. "Experience With Watergun (a new seismic source) in Sarawak" by Nik Mohamed.
8. "Marine Statics" by Chiem Boon Hong.

PETRONAS Carigali Sdn Bhd

9. "Structural Styles of Tenggol Arch and Southern Malay Basin" by Ng Tong San.

Chinese Petroleum Corporation, Taiwan

10. "Seismic Stratigraphic Interpretation for Thin Layer Cases" by Dr Lin Kuo-An.

Geophysical Service (Malaysia) Sdn Bhd

11. "Advances in Marine Seismic Energy Source Technology" by Ted Selby.
12. "Interactive Interpretation of 2D Seismic Data" by Alistair Brown.

Prakla Seismos GMBH

13. "Derivation of Seismic Depth Sections" by H. Buchholz and W. Houba.

Schlumberger Overseas S.A.

14. "Dipmeter Advisor—A Dipmeter Interpretation Workstation" by G. Shanor.

Esso Production Malaysia Inc.

15. "Regional Group J Geological Computer Modelling"
16. "Analysing a DHI—Tinggi Field, Malay Basin, Malaysia."

Teknica Resources Development Ltd.

17. "Use of Seislog for Basin Evaluation and Field Development" by R.C. Mummery.

Geophysical Company of Norway

18. "3D Seismic Interpretation and Modelling Using An Interactive Computer System" by Palle F. Miller.

**REGISTRATION AND GENERAL INFORMATION
TO PARTICIPANTS**

Advanced registrations for the Seminar will be accepted until **Friday, 29th November**. Late registrations will be accepted at the Geological Society of Malaysia's Registration Desk in Ming Court Hotel from 8.00 am to 8.40 am on **Friday, 6th December 1985**.

All intending participants will be required to pay the appropriate registration fees as indicated in the first circular with the exception of the speakers who are presenting papers, council members of the Geological Society of Malaysia and invited guests.

Lunches will be provided on both days for all registered participants except student participants.

In conjunction with the Seminar, the following activities are planned:

**Post-Seminar Field Excursion, Labuan Island, Sabah
3-D Seismic Data Interpretation Workshop**

GEOSEA V PROCEEDINGS VOLS. I & II



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PENERBITAN PERSATUAN (PUBLICATIONS OF THE SOCIETY)

1. Bulletin No. 18 - Special Issue on Petroleum Geology

This Bulletin is now available. It contains 8 papers, the majority of which were presented at the GSM Petroleum Geology Seminar 1984. After much deliberation, the Council has decided to give it free to members. However, members will be charged a nominal sum for future Bulletins. Members should each get a copy of the GEOSEA V Proceedings to help the Society offset the high cost for publishing the two voluminous Bulletins.

2. Bulletin No. 19 - GEOSEA V Proceedings Vol. I

All the papers for this volume are in the galley-proof stage. 12 papers, however, are already in page-proof stage.

3. Bulletin No. 20 - GEOSEA V Proceedings Vol. II

Typesetting is still in progress for the papers in this volume.

4. Bulletin No. 21

So far 4 papers have been received for consideration. Reviewing of the papers are in progress. There is still room for more papers.

Editor

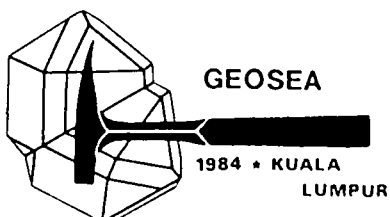
FORTHCOMING GSM BULLETINS

BULLETINS 19 & 20

GEOSEA V PROCEEDINGS VOLS. I & II

A collection of 95 papers presented at the 5th Geology, Energy and Mineral Resources of Southeast Asia Congress.

Available in Jan/Feb 1986.



For further information and advertising rates please contact:

The Editor
Geological Society of Malaysia
Geology Department
University of Malaya
95100 Kuala Lumpur
Malaysia.
Tel.: 03-577036
Telex: UNIMAL MA37453

THE SOCIETY'S LOGO - DO WE NEED A CHANGE?



During the Society's last AGM there was mention of improving or changing the Society's logo. Some members feel that it closely resembles that of the Geological Survey of Malaysia. What do you think? The Council would like to hear what the members have to say.

If you have any comments or suggestions or even design a new logo, please do not hesitate to submit it to the Hon. Secretary for consideration.

So members, let us hear your views on the Society's Logo.

PERSATUAN GEOLOGI MALAYSIA **Geological Society of Malaysia**

ANNUAL CONFERENCE '86



**Venue: Rumah Universiti
Universiti Malaya
Kuala Lumpur**

Date: 28-29 April, 1986

ANNUAL CONFERENCE '86

Conference Objectives

The Geological Society of Malaysia would be holding its Annual General Meeting (AGM) and Annual Dinner on 28th April, 1986. To coincide with this coming AGM, the Society announces the holding of a 2-day ANNUAL CONFERENCE scheduled for 28-29 April, 1986, to be held at Rumah Universiti, Universiti Malaya, Kuala Lumpur.

The ANNUAL CONFERENCE is held to:

- (i) promote greater participation by members at the AGM, and Annual Dinner,
- (ii) serve as a venue for the presentation, exchange and discussion of recent works done on various aspects of the geology of Malaysia.

Papers

Papers are invited from members and non-members of the Society in any of the following fields of studies:

General Geology
Economic Geology
Engineering Geology
Hydrogeology

Potential contributors are kindly requested to inform us of their intention and send in an abstract of their papers by 15th February 1986.

Further Information

For further information, please contact:

Mr. Tan Boon Kong
Organising Chairman,
Annual Conference '86,
Geological Society of Malaysia,
c/o Geology Department,
University of Malaya,
59100 Kuala Lumpur,
MALAYSIA.

Tel: 03-577036

HONORARY GSM MEMBERS

The GSM Council is happy to announce the appointment of another 3 new Honorary Members. After painstaking consideration of their contributions to the Society in particular and the geology of Malaysia in general, the following are the recipients (alphabetically):

1. Prof. C.S. Hutchison, University of Malaya.
2. Mr. Santokh Singh, Acting Director-General, Geological Survey of Malaysia.
3. Prof. H.D. Tjia, Universiti Kebangsaan Malaysia.

The new appointees will be presenting keynote addresses at the Annual Conference '86 in April 1986 and conferred with Honorary Membership at the Society's Annual Dinner '86.

Professor Charles S. Hutchison

Prof. C.S. Hutchison, born in Scotland, obtained his B.Sc. from the University of Aberdeen 1955 and his Ph.D. from the University of Malaya in 1966.

He is one of the early pioneers of the Geology Department, University of Malaya, first in Singapore in 1957 and later in Kuala Lumpur after giving up his earlier employment as oil geologist in Trinidad from 1955-1957.

He was initially Lecturer and later Associate Professor University of Malaya from 1957 till 1977. In 1979 he was appointed Professor of Applied Geology and served as Head of the Department of Geology, University of Malaya for 4 years.

He served as President of the Geological Society of Malaysia from 1969-1970 and presented his Presidential Address entitled "Meditations on Metamorphism" on the 30th January 1970. Prof. Hutchison is also responsible for the Society's Field Guide No. 1 and is co-author of the Society-sponsored "Geology of the Malay Peninsula" published in 1973. He was elected Fellow of the Institution of Mining and Metallurgy, London in 1977 and the Mineralogical Society of America in 1974.

Professor Hutchison has at the moment about 70 papers published in a variety of journals including the Geological Society of Malaysia Bulletin and Newsletter (Warta Geologi) on several aspects of petrology, geochemistry and tectonics of Malaysia and Southeast Asia. The books he has written include "Laboratory Handbook of Petrographic Techniques" published in 1974, "Economic Deposits and their Tectonic Setting" in 1983 and to be published in 1986, "Geological Evolution of Southeast Asia".

D. Santokh Singh

Mr. Santokh Singh who is presently the Acting Director General of the Geological Survey of Malaysia is from Kuala Kangsar.

He obtained his B.Sc. (Hons) from the University of Western Australia Perth, Australia, in 1957, D.I.C. Mining Geology, Imperial College of Science and Technology, London in 1964 and M.Sc. from London University in 1965. In addition he successfully completed the Mineral Exploration Management Course of the Australian Mineral Foundation in 1980.

Mr. Santokh Singh served as President of the Geological Society of Malaysia for two terms, 1974-75 and 1975-76.

He joined the Geological Survey of Malaysia in 1958 and his experience with the Survey include:

- 1958-59: Attached to the Mineral Investigation Drilling Unit, joint exploration for alluvial tin deposits with Mines Research Division, Mines Department.
- Participated with Tooms and Kwaibaidoon in first geochemical exploration for Tin in Sungei Lembing area, Pahang.
- 1959-60: Detailed geological mapping of the Batang Padang Dam Site; detailed logging of drill cores and tunnels.
- 1961-63: Systematic geological mapping and mineral resources assessment of the Gunong Stong Area, Kelantan. Identified first major injection complex in Malaysia.
- 1965-67: Supervised a number of regional geological mapping and mineral resource evaluation programmes in Malaysia.
- 1968-82: Assisted the Director General in administration, planning and implementation of the Department's programmes. Providing management leadership for effective implementation and completion of major mapping and mineral exploration programmes. Initiated first major mineral exploration programme in North-Central part of Peninsular Malaysia. Provided liaison for Canadian International Development Agency for bilateral aid for execution of project.
- 1983 (Feb) to present: Performing the administrative duties of Director General; supervising activities of a core of 140 professional staff in the department; and identification of target areas in order to accelerate mineral exploration activities for a number of important mineral commodities.
- Special adviser on mineral resources exploration and relevant geoscience activities in the country to Honourable Minister and Honourable Deputy Minister of Primary Industries, Government of Malaysia.
- Maintain close rapport with local and foreign universities to promote research activities in geosciences.
- Liaison and linkage with International, Regional Agencies and National Agencies of donor countries to mobilize bilateral assistance for implementation of exploration projects and training to up-grade skills of local professionals.
- Active participant in IGCP Project 30 (Circum Pacific Plutonism); Chairman of Organizing Committee for project meeting in 1975 in Kuala Lumpur. Currently active in IGCP Project 220 (Tin and Tungsten Granites in Southeast Asia and the Western Pacific).

He was a member of the Editorial Committee for the 4th and 5th World Tin Conferences held in Kuala Lumpur, in 1974 and 1981, and the National Mining Seminar in 1977.

He was Coordinator for 1974 World Tin Conference and Joint-Coordinator for 1981 World Tin Conference.

In 1969 he was appointed first Malaysian Permanent Representative to CCOP and resumed the same position again in 1983 to-date.

In 1975 he was appointed Vice President of Editeast (Association of Editors in Science in Southeast Asia) and in 1977 appointed Acting President of Editeast.

He has been Permanent Representative for Malaysia in RMRDC Governing Council since 1983.

He is the Permanent aide and has attended Board Sessions of SEATRAD Centre since its formation as aide and representative of the Geological Survey. He was Chairman of Board Session in Bandung in 1981 and acted as Chairman during the Centres' Seminars.

Professor H.D. Tjia

Prof. H.D. Tjia, born in Bandung, Indonesia, earned his Candidaats degree (major geology) from the Universitas Indonesia, Bandung, in 1957. In 1959, he earned his Doctorandus degree (geology) from Institut Teknologi Bandung and then 1966 the Doctor of Science (geology) degree from the same institution.

Professor Tjia believes that he owes very much of his geological education to the following; Th. H.F. Klompè, Peter Marks, Soetarjo Sigit, Robert W. Decker, John A. Katili, Rhodes W. Fairbridge and Marshall Kay.

Professor Tjia lectured at the Geology Department, Institut Teknologi Bandung from 1959-1968, the University of Malaya from 1968-70 and since 1970 he has been with Universiti Kebangsaan Malaysia. He was appointed Professor of Geology in 1973.

His publications have mainly centred on seismotectonics, structural geology (also of the Moon), Quaternary sea level changes, and geomorphology. Among the many books he has written are: Latihan Peta Kajibumi (1972; revised edition Latihan Peta Geologi, 1984), Istilah Geologi/Geological Terms (1975); Geomorfologi (in press by Dewan Bahasa dan Pustaka). In addition Prof. Tjia has contributed to the Encyclopedia of Oceanography (1966), Geology of the Malay Peninsula (1973), Encyclopaedia Britannica (1974), and Geodynamics of the Western Pacific-Indonesian Region (1983).

Prof. Tjia is an active member of the Geological Society of Malaysia and a charter member of Ikatan Ahli Geologi Indonesia. He is Chief Editor of Sains Malaysiana (Sains Bumi), Regional Coordinator IGCP 200 and Secretary INQUA Subcommission Quaternary Shorelines of the Indian and Pacific Oceans.

Among the expeditions he has participated in are the Baruna Oceanographic Expedition to Eastern Indonesia (1964), leader of the Volcanological Expedition to Gunung Umsini, Irian Jaya, and the Indonesian-Dutch Snellius II Expedition (East Sulawesi-Banggai part).

G.H. Teh

KEAHLIAN (MEMBERSHIP)

The following applications for membership were approved:

Full Members

Abu Bakar Mohamed, Petronas Carigali, P.O. Box 12407, Kuala Lumpur.
 Kenneth George Christie, Anadrill, Schlumberger, Suite D, 14 Floor, Wisma Angkasaraya, Jalan Ampang, Kuala Lumpur.
 Baddrul Hisham Mohamad Taib, Moh and Associates, 78-A, Kelawei Road, Pulau Pinang.
 Daniel A. Walker, 26 Deergrove Crescent, Regina, Saskatchewan, Canada S4S 5L9.
 Richard Batoi @ Lipai Ak. Jantou, Geological Survey Malaysia, P.O. Box 560, Kuching, Sarawak.
 Charanjit Singh c/o Katar Singh, Department of Geology, University of Malaya, Kuala Lumpur.

Student Members

Ng Bak Weng, UKM, Sabah, Locked Bag 62, Kota Kinabalu, Sabah.
 Azlan Mohd. Sabirin, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Lancelot Sering, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Abd. Nasir Janaro, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Abd. Rahim Nurdin, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Othman Ali Mahmud, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Mohd. Zuhar Haron, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Ann Yasmin Nordin, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Zulraini Mohd. Dahlim, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Salahuddin Aminy Jamaluddin, Jabatan Geologi, Universiti Malaya, Kuala Lumpur.
 Ang Hock Seng, Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi.
 Tan Yong Phang, Universiti Kebangsaan Malaysia, Bangi.
 Anne-Mette Bøe Vilpponen, Department of Geography, National University of Singapore, Kent Ridge, S'pore 0511.

PERTUKARAN ALAMAT (CHANGE OF ADDRESS)

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

Petroconsultants Ltd., Pottery Road, Kill O'Grange, Dun Laoghaire Dublin, Ireland.
 Roeland Hillen, Graan voor Visch 15608, 2132 ER Hoofddorp, the Netherlands.
 Roger T. Eubank, Lien Tower 09/21, 21 Holland Park, Singapore 1024, Republic of Singapore.
 Aw Peck Chin, Makmal Penyiasatan Kajibumi, Karung Berkunci No. 16, Ipoh, 30990, Perak.
 Clema, J.M., G.P.O. Box D181, Perth, W.A. 6001, Australia.
 Huzaidi b. Hashim, Asst. Quarry Engineer, Cement Industries of Malaysia Berhad, Bukit Ketri, 02450, Mukim of Chuping, Perlis.
 Minke, J.G., 12930 Belgrave Drive, Cypress, TX 77429.
 Abdullah Hasbi bin Haji Hassan, 126 Jalan Terasik Tiga, Bangsar Baru, 59100 Kuala Lumpur.
 Mohd. Badzran Mat Taib, Lot 196, Kg. Lating, Kedai Mulong, 16010 Kota Bharu, Kelantan.

PERTAMBAHAN BARU PERPUSTAKAAN (NEW LIBRARY ADDITIONS)

The following publications were added to the Library:

1. Offshore oil & gas. Fabrication equipment services.
2. Bulletin Science & Technology Malaysia, vol. 4, no. 2, 1985.
3. Southeast Asia Geosciences, vol. 7, no. 2, 1984.
4. Oklahoma Geology Notes, vol. 45, nos. 1-3, 1985.
5. AAPG Explorer, Aug. & Sept. 1985.
6. Bulletin of the National Science Museum, vol. 11, nos. 1 & 2, 1985.
7. Institution of Mining & Metallurgy Bulletin no. 946 & 947, 1985.
8. Seatrad Bulletin, vol. VI, no. 3, 1985.
9. National Library Singapore, Adult Reference Collections. Accession List, July & Aug. 1985.
10. AGID News, no. 44, 1985.
11. Berliner Geowissenschaftliche Abhandlungen Band 50-59, 1984.
12. Bewertung von Zinnvorkommen, 1983.
13. Principaux resultants scientifiques et techniques, 1984.
14. Postpaleozoic stratigraphy, structure and orogenetic evolution of the Southern Sabzewar Zone and the Takner Block (Khorassan, NE Iran) by H.G. Lindenberg, K. Gorler, V. Jacobshagen & H. Ibbeken, 1984.
15. Reconstruction of a lost sedimentary realm - the limestone boulders in the carbonifereus of the Malaguides (Betic Cordillera, Southern Spain by Hans - Georg Herbig, 1984).
16. On the fractional crystallization of tholeiitic basalts: The metabasaltic rocks of Elba Island (Italy) and their tectonic setting by A. Spohn, W. Busch, & A. Hofer, 1984.
17. Evidence of preadult sexual dimorphism in the Podocopa (Ostracoda) and variability of sizes in brackish Ostracods by Wolf-Michael Rohr, 1979.
18. Predictive assessment of mineral potential in desert terrain by M.J. Shulman & W. Skala.
19. The characterization of oils using multivariate statistics by Claudia Kliem, 1984.
20. Episodes, vol. 8, no. 3, 1985.
21. Institution of Mining & Metallurgy, Transactions, vol. 93, 1984.
22. Commonwealth Science Council, Newsletter, Sept/Oct. 1985.

BERITA-BERITA LAIN
(OTHER NEWS)

TIN-BASED INDUSTRIES SHOW GOOD PROGRESS

Malaysia is the world's largest producer of tin but up to as recently as four years' ago, consumption of tin in Malaysia was virtually confined to the pewter industry, consuming about 200 tonnes per year, and other assorted smaller industries (electroplating, pvc electric cables and others) accounting for another 200 tonnes.

In recent years, local consumption has been burgeoning and preliminary data collected by the Mines Department show that 1984 consumption has exceeded 1,500 tonnes. The first impetus to this growth was the establishment in 1981 of Malaysia's first and only tinsplate plant in Pasir Gudang, Johore. In 1984 the tinsplate manufacturing sector consumed 406 tonnes, a capacity that could increase greatly when the local tinsplate market improves.

In 1984, however, the solder manufacturing industry has taken first place, with a consumption of 727 tonnes, almost half total Malaysian consumption of tin. The impetus here has been the start-up of a solder manufacturing plant in Ipoh. Indeed, actual consumption data for solder may be much higher since the Mines Department figures only cover tin sold by the smelters to local users. The table below, based on smelter sales, does however give for the first time an indication of the trend in local consumption. This trend is increasing and is a measure of Malaysia's growing tin-based industries.

Malaysian Tin Consumption¹

	1st Qt.	2nd Qr.	3rd Qr.	4th Qr.	Total for 1984 (Tonnes)
Solder	223	213	163	128	727
Tinsplate	97	96	105	108	406
Pewter	35	46	44	24	149
Others* ²	37	59	62	79	237
	392	414	374	339	1,519

¹ Based on smelter sales only

*² Others include: Candle moulds, Sprayers, Sprinkles, PVC Electric Cables, Electroplating, etc.

Source: Mines Department, Malaysia.

→ Source:

Extracted from Tin News,
Vol. 12, No. 2, April, 1985

AGID INTERNATIONAL GEOLOGICAL CORRELATION PROGRAMME WORKSHOP AND TRAINING COURSE ON ECONOMIC GEOLOGY, TECTONICS, SEDIMENTARY PROCESSES AND ENVIRONMENT OF THE QUATERNARY IN SOUTHEAST ASIA.

Haadyai, Thailand
3-7 February, 1986.

Objectives

In Southeast Asia the Quaternary has become the focus of intensive study over the last 10 years. For example, in Thailand, the Quaternary deposits of its alluvial and coastal plains cover approximately one-third of the country. These deposits contain peat, detrital minerals, construction materials and ground water. Throughout the region they are particularly important for their vast alluvial and marine placer tin deposits. In recent years the importance of evaluating Quaternary deposits for land use planning and rural development as well as for developing coastal and nearshore resources has become apparent.

Throughout the region, more and more government agencies and organizations are participating in the activities of mapping and studying Quaternary processes and geology. Many agencies realize that the study of the Quaternary is a co-operative effort involving geoscientists, agronomists, palynologists, biologists, geotechnical engineers, and other scientists.

The workshop has the purpose of bringing together experts from many disciplines. They will be concerned with the mapping, analysis and interpretation of Quaternary deposits.

The followup training course is especially designed to teach young students how to map the Quaternary, a task which is seldom taught in our Universities today. Therefore, a special feature of this Training Course will be provision for 52 student scholarships to support participation in this course.

A one day field trip will bring together experts from the Department of Mineral Resources and the Department of Land Development who will conduct participants on a guided tour of the geology, geomorphology, land use and environmental aspects of Songkhla Lake which has been much in the spotlight lately for the role it will play in the growth and development of southern Thailand. For the first time, the history and development of this interesting Quaternary coastal lake will be presented as an example of the analysis of a modern coastal environment. Coastal management issues will also be considered during this field trip.

Programme (tentative)

Monday, February 3, 1986
Overview and History

- I. Status of Quaternary Studies in Thailand
- II. Status of Quaternary Studies in Indonesia
- III. Status of Quaternary Studies in Malaysia
- IV. Status of Quaternary Studies in Philippines

- V. Overview of Quaternary History in Southeast Asia
- VI. Impact of Quaternary Processes on Man
- VII. Palaeohistory of Man in the Quaternary of Southeast Asia
- VIII. Quaternary Volcanism and Tectonics in Southeast Asia
- IX. Quaternary Seismicity in Southeast Asia

Tuesday, February 3, 1986.

Mapping, Analysis and Stratigraphy

- I. Mapping of Quaternary Sediments
- II. Use of Geophysics in Subsurface Investigations of the Quaternary
- III. Geomorphological Mapping Techniques
- IV. Soil Mapping Techniques
- V. Sedimentological Analysis of Quaternary Sediments.
- VI. Dating of Quaternary Sediments
- VII. Geochemistry of Quaternary Sediments
- VIII. Biostratigraphy of the Quaternary in Southeast Asia
- IX. Fossil Record of the Quaternary in Asia
- X. Quaternary Problem

Wednesday, February 5, 1986.

Economic Geology

- I. Quaternary Tin Deposits of Indonesia
- II. Quaternary Tin Deposits of Malaysia
- III. Quaternary Tin Deposits of the Philippines
- IV. Quaternary Tin Deposits of Thailand
- V. Origin of Alluvial Tin Placers
- VI. Origin of Marine Tin Placers
- VII. Exploration for Deep Placer Deposits
- VIII. Gold in the Quaternary
- IX. Non-metallic Minerals of the Quaternary
- X. District Analysis of Placer Tin Deposits

Thursday, February 6, 1986.

Field Trip

- I. Field Trip to Songkhla Lake (DMR and DLD) (Concurrently with Training Course)

Friday, February 7, 1986.

Training Course

- I. Field Techniques for Mapping and Analysis of Quaternary Sediments.

Further information:

Dr. Jon L. Rau
 AGID Headquarters,
 P.O. Box 2754,
 Bangkok 10501,
 THAILAND.

PETROLEUM AND GEOLOGICAL ENGINEERING INC. COURSES - 1986 OFFERINGS

Objectives

Petroleum and Geological Engineering, Inc. constantly reviews its overall program to maintain the high quality training courses required by the industry. Emphasis is on the presentation of material that is of practical value to both the student and the employer. The object of each program is to afford the participant an opportunity to gain first hand knowledge about oil and gas operations through organized classroom lecture and work activities as well as group discussions of current technology.

Conduct of the Courses

The courses consist of a balanced series of lectures, discussions, problem-solving sessions and work periods. Formal sessions are held on a Monday through Friday basis and run from 0830 to 1200 and 1300 to 1630. Reading and problem assignments are given to reinforce course concepts.

Registration and Enrollment

Class enrollment will be limited during each week of the courses. In order to ensure a place for an individual, registration should be made promptly by letter, telephone, cable or telex or by submitting the registration form. All registrations will be confirmed by return mail and an invoice will be sent to each participating company.

Cost of Courses

The participant may enroll for individual weeks of the courses. The following fees in U.S. dollars apply:

	<u>England/Europe</u>	<u>Singapore</u>
One week (5 day) program	925	1025
Each additional week*	850	925
Three day program	615	-
Two day program	-	-

* Applicable to all 5-day programs taken at the same location within any of the above geographical areas.

The enrollment fee for an individual is due and payable on or before the first day of the course. All class materials and the manual for the course are included in the above fee. Living costs are not a part of the fee.

The above fees include an administrative fee of 10 percent; the remainder is the instructional fee. In the case of a registration cancellation, the administrative fee is not refundable unless notice of such cancellation is received at least two weeks prior to the start of the course. In the event that an enrollee does not complete his program, the unused portion of the instructional fee will be credited toward future course enrollments. The participating company can change enrollees at any time.

A program may be cancelled if the level of enrollment is insufficient to provide for effective sessions. In this case, enrollment fees will be refunded in full.

Sponsoring Organizations

For more information about the programs in Indonesia, Australia, the Permian Basin Graduate Center and the Oklahoma Center for Continuing Education, please contact:

Australian Programs

Mr. David Linn, Operations Mgr.
Australian Mineral Foundation Inc.
Conyngham St., Private Bag 97,
Glenside, South Australia 5065.

Indonesian Programs

Ir. Moeljono A., Managing Dir.
P.T. Singgar Mulia,
Jl. H.R. Rasuna Said Kav B-10,
Jakarta, Indonesia.

Permian Basin Graduate Center

Ms. Lola M. Igou, Exec. Dir
Permian Basin Grad. Center,
221 N. Main, P.O. Box 1518,
Midland, TX 79702-1518, U.S.A.

Oklahoma Center for Continuing Education

Mr. W.E. Kinnebrew, Prof. Mgr.
Okla. Center for Cont. Educ.
University of Oklahoma,
Norman, OK 73069, U.S.A.

Requests for information, enrollments, fee payments and request for hotel reservations for our sponsored programs should be made through the above contacts.

1986 Schedule of Offerings

Jakarta, Indonesia*

Crude Oil Dehydration and Desalting	January 6-10
Process and Pipeline Safety Practices	January 13-17
Oil and Gas Well Testing	March 3-7
Basic Oil Field Development and Operations	March 10-14
Waterflooding for Engineers	March 17-21

Adelaide and Brisbane, Australia*

Process and Pipeline Safety Practices	February 3-7
Process and Pipeline Safety Practices	February 10-14

London, England

Basic Oil Field Geology	May 12-16
Natural Gas Operations - Production, Reinjection and Storage	May 19-23

Jakarta, Indonesia*

Metallurgy for the Oil Field	May 14-16
Corrosion Technology	May 19-23
Drilling Fluids and Related Hole problems	August 4-8

Madrid, Spain

Oil and Gas Well Stimulation	May 26-30
Drilling Fluids and Related Hole Problems	June 2-6

Basic Oil Field Development and Operations	June 16-20
Total Optimization of Production Systems	June 23-27
Reservoir Management Practices and Techniques	June 30-July 4

Singapore

Reservoir Management Practices and Techniques	July 28-August 1
Natural Gas Operations - Production, Reinjection and Storage	August 4-8
Gas Process Plant Operation	August 11-15
Process and Pipeline Safety Practices	August 18-22

Madrid, Spain

Metallurgy for the Oil Field	August 6-8
Corrosion Technology	August 11-15
Basic Reservoir Engineering	September 22-26
Waterflooding for Engineers	September 29-October 3

* Sponsored program.

Further information

Please contact: Dr. Paul J. Root
Petroleum & Geological Engineering Inc.,
1839 Rolling Hills,
Norman, Oklahoma 73069,
U.S.A.

OGCI
Seminar

Geology of Southeast Asia

February 3-7, 1986

Singapore

Instructors: Richard W. Murphy and
Dr. Thomas W. C. Hilde

OGCI also offers other geoscience seminars in Singapore in 1986:

Basic Petroleum Geology	Practical Well Testing	Exploration Methods for Sandstone Reservoirs
Gas Production Operations	Applied Reservoir Engineering	Exploration for Carbonate Reservoirs
Production Operations I	Applied Sedimentology in Hydrocarbon	Basic Reservoir Engineering
Formation Evaluation — Basic and	Exploration	Formation Evaluation — Advanced Concepts
Intermediate Concepts	Exploration Stratigraphy	Production Logging

For more information or detailed course descriptions on any OGCI seminar, please refer to OGCI's Petroleum Training Program catalog, available by calling, telexing, or writing to OGCI.



Oil & Gas Consultants International, Inc.
4554 South Harvard
Tulsa, Oklahoma 74135 U.S.A.

Toll-free in continental U.S.A. 1-800-821-5933
International and in Oklahoma (918) 742-2334
Telex: 49-7438 OGCI TUL Cable: OGCI TUL

JOINT ASSOCIATION FOR PETROLEUM EXPLORATION COURSE (JAPEC)

1986 SHORT COURSES IN EXPLORATION

(First Listing: September, 1985)

This listing includes all exploration orientated courses in the UK, of which JAPEC has received notification.

The listing is set out as: date, title of course, course organisers, location and cost. Full titles and addresses of the organisers are attached, and further information can be obtained directly from them. Although we have taken care to ensure accuracy, JAPEC can take no responsibility for the information included, and the listing of a course in no way implies an endorsement.

February 17-22	"Basic Reservoir Engineering". OGCI. Maidenhead. US\$975
March 10-11	"Introduction to Oilfield Operations". CPS. Oxford.
March 17-19	"Oilfield Data Acquisition for Reservoir Evaluation and Development Planning, Pt. 1". CPS. Oxford.
March 17-21	"Clastic Depositional Environments and Tectonics". SRA. Oxford. £500 + VAT.
March 17-21	"Deconvolution and Wavelet Processing". Geoquest. London. US\$875.
March 20-21	"Risk Analysis and Decision Making in Oilfield Development, Pt. 1". CPS. Oxford.
March 24-26	"Interpretive View of Migration". Geoquest. London. US\$850.
March 24-26	"Communication Skills Workshop". JAPEC, London. £285.
April 8-11	"North Sea Reservoirs Field Course". RRI. £580
April 10-13	"Jurassic Sequence of Yorkshire". RRI. Field Course. £475.
April 14-18	"Development Geology". JAPEC. London. £475.
April 14-18	"Reservoir Geology". OGCI. Maidenhead. US\$975.
April 17-20	"Moray Firth Field Course". RRI. £475.
April 20-25	"Fluvial, Deltaic and Submarine Fan Facies". SRA. Field course in Eire. £520.
April 21-23	"Introduction to Petroleum Exploration for Non-Geologists". JAPEC. London. £285.
April 21-25	"Stratigraphy for Geophysicists". OGCI. Maidenhead. US\$975.
April 28-May 9	"Decision Analysis for Petroleum Exploration". JAPEC. Oxford. £970.
May 8-11	"Introduction to Petroleum Geology - South Coast of England". RRI. Field course. £350.
May 12-15	"The Geology of Petroleum". IC. London. £340.
May 12-16	"Applied Well Log Interpretation". Geoquest. London. US\$875.
May 12-16	"Structural Styles in Petroleum Exploration". OGCI. Bournemouth. US\$1000.
May 12-16	"Seismic Interpretation for Geologists". OGCI. Maidenhead. US\$975.

May 15-17 "Carbonate Facies and Fracture Analysis Models - Derbyshire". RRI. Field Course. £400.
 May 19-23 "Seismic Exploration Concepts for Geologists". OGCI. London. US\$975.
 May 19-23 "Petroleum Generation and Occurrence for Exploration Geologists". OGCI. Maidenhead. US\$975.
 May 19-23 "Well Log Analysis for Geophysicists". Geoquest. London-US\$875.
 May 21-23 "Basic Petroleum Technology". OGCI. Maidenhead. US\$650.
 May 22-23 "Introduction to the Petroleum Geology of the North Sea". JAPEC. London. £190.
 May 26-30 "Exploration Methods for Sandstone Reservoirs". OGCI. Maidenhead. US\$975.
 May 27-30 "Introduction to Exploration Geophysics". OGCI. Maidenhead. US\$775.
 June 2-6 "Seismic Field Techniques". OGCI. Maidenhead. US\$975.
 June 2-7 "Description and Interpretation of Sedimentary Sequences in Fluvial, Deltaic and Shallow Marine Sequences". SRA. Field course in Wales. £500 + VAT.
 June 4-8 "Potential Mesozoic Reservoirs of NW Scotland - Skye and Raasay". RRI. Field Course. £525.
 June 9-13 "Maximum Likelihood Deconvolution". Geoquest. London. US\$875.
 June 9-13 "Basic Structural Interpretation". Geoquest. London. US\$875.
 June 9-13 "Basic Reservoir Engineering". OGCI. Maidenhead. US\$975.
 June 9-13 "Effective Seismic Data Processing". OGCI. Maidenhead. US\$975.
 June 9-20 "Applied Reservoir Engineering". OGCI. Maidenhead. US\$1550.
 June 16-19 "Seismic Reflection Techniques". JAPEC. London. £380.
 June 16-20 "Seismic Wavelet Analysis and Interpretation". Geoquest. London. US\$875.
 June 16-20. "Basic Petroleum Geology". OGCI. London. US\$975.
 June 16-27 "Formation Evaluation - Basic and Intermediate Concepts". OGCI. Maidenhead. US\$1550.
 June 23-27 "Applied Sedimentology in Hydrocarbon Exploration". OGCI. London. US\$975.
 June 30-July 4 "Seismic Acquisition". Geoquest. London. US\$875.
 June 30-July 4 "Exploration for Carbonate Reservoirs". OGCI. Maidenhead. US\$975.
 June 30-July 4 "Formation Evaluation - Advanced Concepts". OGCI. Maidenhead. US\$975.
 June 30-July 4 "Seismic Exploration for Technical Assistants". Geoquest. London. US\$875.
 July 2-3 "Communicating Skills". JAPEC. London. £190.
 July 7-11 "Petroleum Sedimentology". JAPEC. London, £470.
 July 7-11 "Petroleum Geochemistry for Geologists and Geophysicists". OGCI. London. US\$975.
 July 7-11 "Modern Shaley Sand Log Analysis". OGCI. Maidenhead. US\$975.
 July 7-11 "Seismic Data Processing". Geoquest, London. US\$875.
 July 14-18 "Geological Applications of Logging Measurements". OGCI. Maidenhead. US\$975.
 July 14-18 "Exploration Management, Risk and Prospect Evaluation". OGCI. Maidenhead. US\$975.
 July 21-25 "Seismic Interpretation Workshop". JAPEC. London. £475.
 August 4-8 "Reservoir Geology". OGCI. Maidenhead. US\$975.
 August 11-15 "Development Geology". OGCI. Maidenhead. US\$975.

- September 4-7 "Devonian of the Orcadian Basin - Caithness".
RRI. Field Course. £475.
- September 8-12 "Geophysics for Geologists". Geoquest. London. US\$875.
- September 8-12 "Basic Reservoir Engineering". OGCI. Maidenhead. US\$975.
- September 8-12 "Basic Petroleum Geology". OGCI. London. US\$975.
- September 15-19 "Applied Seismic Stratigraphic Interpretation".
Geoquest. London. US\$875.
- September 15-19 "Exploration Stratigraphy". OGCI. Maidenhead. US\$975.
- September 15-19 "Methods in Structural Geology". OGCI. London. US\$975.
- September 15-19 "Seismic Field Techniques". OGCI. Maidenhead. US\$975.
- September 18-21 "A Model for Tectono-Sedimentary Evolution - Wessex
Basin". RRI. Field Course. £450.
- September 22-25 "Structural Interpretation with Emphasis on Extensional
Tectonics". JAPEC. London. £380.
- September 22-26 "Economics of Petroleum Production". OGCI. Maidenhead.
US\$975.
- September 22-26 "Seismic Facies Analysis". Geoquest. London. US\$875.
- September 25-28 "Olistostromal and Continental Slope Sedimentation -
Anglesey". RRI. Field Course. £375.
- September 25-28 "Moray Firth Field Course". RRI. £475.
- September 26 "Tectonic Development of NW Europe". JAPEC. London.
£95.
- September 29 - "Petroleum Engineering". OGCI. Maidenhead.
October 3 US\$975.
- September 29 - "Geological Applications of Logging Measurements".
October 3 OGCI. Aberdeen. US\$975.
- October 6-10 "Seismic Interpretation for Geologists". OGCI.
Maidenhead. US\$975.
- October 7-10 "Basic Geology". UA. Aberdeen. £250.
- October 7-10 "North Sea Reservoirs Field Course". RRI. £580.
- October 13-17 "Petroleum Generation and Occurrence for Exploration
Geologists". OGCI. Maidenhead. US\$975.
- October 13-24 "Formation Evaluation - Basic and Intermediate
Concepts". OGCI. Maidenhead. US\$1550.
- October 16-19 "Permian to Pliocene Basin Evolution - Normandy,
France". RRI. Field Course. £600.
- October 20-24 "Porosity Development and Diagenesis in Carbonate
Reservoirs". OGCI. Maidenhead. US\$975.
- October 23-26 "The Jurassic Sequence of Yorkshire". RRI. Field
Course. £475.
- October 27-31 "Basic Reservoir Engineering". OGCI. Maidenhead.
US\$975.
- October 27-31 "Exploration Management, Risk and Prospect Evaluation".
OGCI. Maidenhead. US\$975.
- October 27-29 "Third Conference on the Petroleum Geology of NW
Europe". London.
- October 30-31 "Deltaic Sedimentation with Reference to the North Sea
Jurassic". JAPEC. London. £190.
- November 17-19 "Oilfield Data Acquisition for Reservoir Evaluation
and Development Planning. Pt. 2". CPS. Oxford.
- November 20-21 "Risk Analysis and Decision Making in Oilfield
Development. Pt. 2". CPS. Oxford.
- November 24-27 "Introduction to Exploration Geophysics". OGCI.
Maidenhead. US\$775.
- November 26-27 "Petroleum Exploration Economics and Risk Analysis".
JAPEC. London. £190.

December 1-5 "Exploration Methods for Sandstone Reservoirs".
OGCI. Maidenhead. US\$975.
December 8-12 "Seismic Resolution" Geoquest, London. US\$875.
December 15-19 "Fundamentals of Geophysical Exploration". UA.
Aberdeen. £340.

COURSE ORGANISERS

CPS The College of Petroleum Studies,
Sun Alliance House,
New Inn Hall Street,
Oxford. OX1 2QD

Geoquest Geoquest International Inc.,
4605 Post Oak Place, Suite 130,
Houston, Texas 77027,
U.S.A.

IC Petroleum Geology Section,
Department of Geology,
Imperial College of Science and Technology,
Prince Consort Road,
London, SW7 2BP

JAPEC Joint Association of Petroleum Exploration
Courses (UK),
c/o The Geological Society,
Burlington House, Piccadilly,
London, W1V OJU

OGCI Oil and Gas Consultants International Inc.,
4554 South Harvard,
Tulsa, Oklahoma 74135,
U.S.A.

RRI Robertson Research International Ltd.,
Ty'n-y-Coed,
Llanrhos,
Llandudno,
Gwynedd,
LL30 1SA

SRA Sedimentary Research Associates,
Department of Earth Sciences,
Parks Road,
Oxford, OX1 3PR

UA Department of Adult Education and Extra-
Mural Studies,
University of Aberdeen,
Taylor Building,
The University,
Aberdeen, AB9 2UB

INTERNATIONAL COURSE IN BASE MAPPING TECHNIQUES

U.S. Geological Survey, Reston, Virginia 22092.
May 17, - June 6, 1986.

The U.S. Geological Survey (USGS) is presenting course especially for foreign participants in the preparation, publication, and use of base maps. The course is being presented by the personnel of the National Mapping Division, USGS, and is intended for professionals in agencies responsible for map presentation of natural resources, agriculture, forestry, land use, hydrology, renewable and non-renewable resources, census statistics and information from related disciplines. Professionals of these disciplines will acquire a knowledge of base mapping concepts, modern digital cartographic techniques, and publication principles.

Objectives and Program

Participants will be provided a basic understanding of how to compile, prepare, and present base map data. Instruction in digital manipulation techniques and digital cartographic data use will also be included. The program will consist of a series of lectures, supplemented by equipment use and production examples to demonstrate how one combines, compares, and measures base map data. Hands-on experience with various mapping instruments will augment classroom exercises.

The following topics will be addressed during the course sessions:

- Compilation and publication of a base map
- Map accuracy, what does it mean?
- Detail required for a base map
- How can a base map be linked to a thematic map?
- Related publication processes
- Relation of base mapping to digital image processing
- Construction of a digital cartographic data base
- Application of maps to specific needs

Participants who successfully complete the Base Mapping Course will be able to prepare base maps, present thematic data, assemble image mosaics, and understand digital cartographic data applications. Attendees will also acquire an awareness of how the various disciplines (i.e., geology, forestry, agriculture, land use, cadastral, and census) are integrated through the use of a base map as a reference tool.

Course Outline

First Week: "Base Map Planning"

Organizing a base mapping program

- A. Base map definition
- B. Basic mapping - a multi-step process
- C. Quality control
- D. Operational control

Map Specifications and Design

- A. Exact specifications of map fundamentals

- B. Design specifications
- C. Check on specifications

Second Week: "Base Map Production"

- A. Satellite image processing
- B. Manual mapping operations
- C. Digital mapping
- D. Processing through a Geographic Information System
- E. Map reproduction

Third Week: "Base Map Applications"

- A. Introduction, map aggregation
- B. Earth materials and their attributes
- C. Water
- D. Distribution and environment of living things, environmental maps.
- E. Natural hazards, man made and induced hazards
- G. Census statistics

Procedure for Application

Candidates sponsored by a university, private company, or a non-national government entity must submit their applications through their national government agency. All applications should be sent to:

Training Section, Office of International Geology
U.S. Geological Survey,
National Center (917),
Reston, Virginia 22092.

Schedule pertinent to the Course series:

- March 14, 1986 - Deadline date for receipt of application for the Course.
- March 24, 1986 - Notification by USGS to those selected for attendance.
- May 17, 1986 - Base Mapping Course Begins at George Mason University, Annandale, Virginia - Tuition for course is due.

Enrollment

Because the course is intensive, and to ensure adequate instructor-student interaction, enrollment will be limited to approximately 25 persons. Application deadline must be met to allow time for planning course details. As all lectures and discussions will be in English, attendees must be able to understand, speak, and read the language. Interpreters cannot be provided at the course. If possible, applicants should provide English language test scores.

Candidates who cannot be accommodated at the May, 1986, mapping course will be given priority consideration in a succeeding course.

Cost

The total tuition fee for the course is \$3,850 which includes cost of instruction, training materials, food and lodging (single occupancy) at residential dormitories of George Mason University. Payment of tuition fee must be made prior to the start of the course.

Bank checks or drafts made payable to the U.S. Department of the Interior - U.S.G.S. in U.S. dollars should be sent to:

Training Section, Office of International Geology
U.S. Geological Survey,
National Center (917),
Reston, Virginia 22092,
U.S.A.

Please do not send traveller's checks.

The cost for international travel to and from Washington, D.C. and miscellaneous, personal expenses for attendees at the course are to be met by the sponsoring entities.

A statement is required for each attendee that all hospital and health costs not covered by insurance will be paid by the sponsor. A form for providing this statement is included with the application.

Visits to U.S. Institutions

Although visits to local institutions in the Washington, D.C. area will be made in conjunction with course activities, participants may wish to visit agencies and academic research centers related to their fields of interest. Assistance in planning these activities will be provided if specific agencies, personal contacts, or types of activities are designated by the candidate.

Training Site

The George Mason University, the State University in Northern Virginia, is located approximately 15 miles south of the nation's capital, Washington, D.C. Located on 571 wooded acres in the historic area of Fairfax, the surrounding region features a bounty of natural resources and recreational opportunities. Students can take advantage of the wealth of cultural and research resources in Washington, D.C., including a wide range of libraries, archives, data bases, governmental agencies, museums and galleries.

Housing facilities are modern, airconditioned, carpeted double occupancy rooms with a private bathroom that is shared with the adjoining room. Each room will be equipped with a supply of linens and towels for the duration of one's stay.

Meals will be served to all course attendees at the Student Union Cafeteria located on campus. Three meals per day will be provided all attendees.

Additional information concerning facilities available at the training site will be provided to all candidates at the time of acceptance at the course.

GEOCONGRESS '86 - SECOND ANNOUNCEMENT

Theme and Objectives

This congress will commemorate the centenary of the discovery, in 1886, of the world's largest known goldfield in the Witwatersrand Basin. The accent will therefore fall primarily on placer-hosted gold so that the main theme will be:

Precambrian gold - uranium placer deposits with special reference to the Witwatersrand conglomeratic type.

A scene-setting keynote review address on the geological and historical aspects of the Witwatersrand goldfield will be followed by analogous keynote reviews of similar ancient placer deposits in the world.

As is customary at our biennial congresses, sessions or parts of sessions are also devoted to other subjects so that as many scientists as possible, from within geological profession as well as from related earth-science disciplines, will be able to participate. The following subthemes have been selected in consultation with our sponsors, the intending participants known to us at this stage, and the various specialist divisions within the Geological Society of South Africa:

- Evolution of greenstone belts and associated gold mineralization.
- The sedimentology and sediment-hosted mineral deposits of Transvaal-aged basins.
- Open sessions devoted to the latest research results or findings on any topic not related to the above themes.

For all the themes listed, contributors will be provided with an opportunity of presenting state-of-the-art reviews of research results and current concepts in those specialized fields. Speakers have also been invited to deliver keynote addresses concerning their latest findings elsewhere in the world on topics related to the subthemes.

Venue and Dates

The congress will be held at the Witwatersrand in Johannesburg and will be centred on the Great Hall, the Oppenheimer Life Sciences Building, and adjacent facilities. Registration and the getting-to-know-you function will take place on Sunday, 6th July. The scientific programme will commence on Monday, 7th July and conclude with the closing luncheon on Friday, 11th July, 1986. Excursions will be organised for the week preceding and the week following congress. A companions' programme will run concurrently with the scientific programme.

Opening Ceremony

The congress will be opened by the Minister of Mineral and Energy Affairs in the Great Hall of the University on Monday, 7th July, 1986. An important overseas personality has been invited to deliver the main address at the opening ceremony immediately afterwards.

Technical Programme

The plenary session will follow the opening ceremony after a break

for tea, and will feature two keynote speakers as follows.

- Professor Desmond A. Pretorius, Director of the Economic Geology Research Unit of the University of the Witwatersrand, will open the proceedings with an overview of the main theme entitled: Witwatersrand: the men, the money, the mineralization.
- Dr. Richard P. Viljoen, President of the Geological Society of South Africa for 1986 and Consulting Geologist for Gold Fields of South Africa Limited, will deliver his Presidential Address entitled: A Witwatersrand Goldfield: past, present, and future.

The technical sessions commence after lunch on 7th July and have been organized into four sections, which will run in six parallel sessions including the poster session.

For further information:

The Symposium Secretariat S. 339,
CSIR, P.O. Box 395,
Pretoria,
SOUTH AFRICA 0001.

4TH CIRCUM-PACIFIC ENERGY AND MINERAL RESOURCES CONFERENCE

Technical Program

The technical program for the Fourth Circum-Pacific Energy and Mineral Resources Conference will feature papers covering case histories, state-of-the-art techniques, current activities and future trends in energy and mineral programs in the Circum-Pacific's "Region of Promise". As its fundamental aim, the Conference seeks to demonstrate and reinforce the types of ideas, attitudes and skills that will continue to be a primary force in unlocking the rich natural resources base within the entire Pacific Basin.

Although many of the papers will be concerned with Southeast Asia, the Southwest Pacific and Australia, the remainder of the Pacific Basin along with selected areas outside the Circum-Pacific region will not be neglected.

Opening General Session

Monday, August 18, 1986

The general session will include keynote addresses and major technical papers by leading scientists and prominent personalities from the energy and mineral industries and host nations of the Pacific Basin. Overview papers will be presented by Sir Arvi Parbo, Chairman and Managing Director, Western Mining Corp., Melbourne, Australia; Michel T. Halbouty, Chairman and CEO, Michel T. Halbouty Energy Company, Houston, Texas; and Carel Otte, President, Geothermal Division, Unocal Corporation, Los Angeles, California; plus other recognized experts, addressing the current status and future

prognosis for the hydrocarbon, geothermal and mineral industries.

Technical Sessions

Tuesday, August 19 - Friday August 22

Hydrocarbon

These sessions will include significant papers of specific regional interest which will review the geology of China and the progress being made exploring the Chinese continental shelf; contributions will be forthcoming from both the Government and the oil companies participating in the offshore programs. Papers on the exploration potential of Australia will include an overview paper covering offshore exploration, as well as a closer look at the onshore Cooper Basin. The geology of Southeast Asia will be represented by papers on activities in Thailand, Indonesia, Malaysia and the Philippines. A look at petroleum exploration and development opportunities in South and Central America, Papua-New Guinea and the McKenzie Delta area of Canada are also planned.

A special session will present some of the latest developments in global tectonics where Basin Evolution, Tectonostratigraphic Terranes and Island Arc Bending will be discussed in the context of the Pacific Basin and the relation of these events to the exploration for hydrocarbons. Exploration in frontier areas offers the greatest hope for bolstering declining oil and gas reserves in the future. A session devoted to case histories of recent successful and ongoing exploration in such far-flung areas as the Llanos Basin of Colombia, new discoveries in Indonesia, exploration activities in the Canadian Arctic and the development of discoveries in the Yemen Arab Republic will reinforce the axiom that oil and gas exploration requires large amounts of vision and stamina, in roughly equal proportions. These papers will be supplemented with contributions on some of the future frontier exploration areas.

Geothermal

The general session will include an overview on the promise of geothermal in the Pacific Basin as an energy source for electric power generation, whereas the technical sessions will feature papers about activities and resources in Japan, the Philippines, Indonesia and New Zealand as well as technical presentations on state-of-the-art exploration and production methods.

Minerals

Papers will review significant mining discoveries and developments, including Roxby Downs and the Argyle diamond pipe of Australia; the geology of several gold deposits in Papua-New Guinea plus mineral exploration in Canada and South America. The geology, economics and development methods of deep sea minerals and carbonatites are also expected to be presented.

Marine Frontiers

Two sessions will review newly acquired and mostly unpublished geological and geophysical data from governmental and academic sources, covering areas from the Bering Sea across the Pacific Basin to Antarctica and from the West Coast of South America, the Southwest Pacific and offshore

China and Indonesia. They will concentrate on reviewing data on mid-ocean, spreading centers, ocean margins and backarc basin studies that are important to understanding and assessing hydrocarbon and mineral resource potentials. Additional data displays and discussion sessions on three afternoons and evenings will complement the technical sessions.

Other Technical Sessions

Additional sessions are also planned on volcanology and volcanic hazards, remote sensing, energy economics and forecasting. Also included will be reviews and discussions of the status of current and future activities of the Circum-Pacific Map Project.

Selected Authors

Sulfide Mineralization of the East Pacific Rise

Robert Ballard, Woods Hole Oceanographic Institute

Structure and Origin of the South China Basin

Dennis Hayes, Lamont-Doherty Geological Observatory

Australia's New Diamond Search

A. Jones, E. Tyler, Ashton Mining N.L.

Tectonostratigraphic Terranes of the Circum-Pacific

David Howell, U.S. Geological Survey

Sea Floor Mineral Resource Potential off Western Canada

James Franklin, Geological Survey of Canada

Petroleum Prospects in Central America

Michael Scrutton, Robertson Research

Philippines - A Tectonic Railway Siding

Jack Gallagher, Occidental Exploration and Production Co.

Reservoir Engineering Applications - Philippine Geothermal Fields

N.C. Vasquez, Z. Sarmicto, PNOC, Energy Development Corporation

Oil and Gas Development, Cooper Basin, Australia

V. Greg Swindon, CSR Oil and Gas Division

Exploration and Development of Natural Gas, Gulf of Thailand

Harold M. Lian, Unocal of Thailand

Sedimentary Basin Classification and Oil and Gas Occurrences in China

Yan Dunshi, Ministry of Petroleum Industry, China

Island Arc Bending

Robert McCabe, Texas A & M.

An Overview of Offshore Exploration in Australia

B.R. Griffith, BHP Petroleum PTY, Ltd.

Structure and Petroleum Potential, Ross Sea, Antarctica

Alan Cooper, U.S. Geological Survey

Evolution of Sedimentary Basins

John Dewey, Durham University

Neogene and Quaternary Volcanism and Mineral Deposits in the Central Andes

George Erickson, U.S. Geological Survey

Geology and Petroleum Prospects in Colombia's Llanos Basin

C. McCollough, E. Padfield, Occidental Exploration & Production Co.

Hydrocarbons and the Global Basin Classification System

D.R. Kingston, Esso Exploration, Inc.

Geology and Petroleum Prospects in the East China Sea

Lie Guangding, Bureau of Petroleum Geology, China

Roxby Downs Ore Deposit in South Australia

J.H. Lalor, Western Mining Company

Petroleum Prospects in the McKenzie Delta Area, Canada

Peter Kaya, Petro-Canada Resources

Oil Exploration and Development in Marib, Yemen Arab Republic

Ian Maycock, Hunt Oil Company

The World Bank and the Private Sector

Eric Daffen, Energy Department, The World Bank

An Overview of Exploration Activity in Southeast Asia

Peter Gaffney, Gaffney Cline and Associates

Pacific Basin Data Displays

The Circum-Pacific Council will present data displays of newly acquired, reprocessed, or previously unpublished geological and geophysical information and map compilations from frontier exploration areas of the Pacific Basin. Data, maps and sections will be presented in poster format by academic and government research groups from 20 cooperating nations.

Approximately 50 displays will range geographically from the Bering Sea southward to Antarctica, east to South America and west to Southern China and Indonesia. Topically the displays will concentrate on mid-ocean, spreading center, ocean margin and backarc basin studies that are pertinent to assessing petroleum and mineral resource potentials. Three frontier-area sessions will feature: Northern-Hemisphere, Southern-Hemisphere and a Special Map and Transect Compilations including large-area seafloor GLORIA images, SEATAR maps and transects of Southeast Asia and the Western Pacific, Antarctic and SOPAC Atlases, and offshore California geological maps.

The data displays will be open late afternoon on Tuesday through Thursday, August 19-21 immediately following the technical sessions.

Tuesday, August 19

Northern Hemisphere

Northern Rim

Deep Bering Sea

Bering Sea GLORIA Records

Aleutian and Alaska Margin

Eastern Pacific Rim

Queen Charlotte-Vancouver Margin

Pioneer-Juan de Fuca-Gorda Ridges

Offshore Western US, GLORIA

Images

Washington-Oregon Margin

Gulf of California

East-Pacific Rise

Central Pacific

Hawaiian Ridge

Pacific Seamounts & Atolls

Western Pacific

Palawan
 South China Basin
 Mariana
 China Margin
 Japan Margin

Specials

Pacific ODP Drilling in 1988-90

Wednesday, August 20

(Presented jointly with Circum-Pacific Map Project Displays)

Special Maps and Transects - Common-Scale Compilations

Offshore Geologic Maps, California

SOPAC Atlases

Indonesia-Western Pacific, SEATAR

Transects Burma-Thailand and

Andaman-Gulf of Thailand

Sumatra-Malay Peninsula-Sunds

Shelf and Java Banda Arc and

Sulu Sea New Guinea and Bismark-Solomon Seas

Philippines-Mariana and Japan-Korea

Thursday, August 21

Southern Hemisphere

Antarctic

Ross Sea

Wilkes Land

Antarctic Atlas

New Zealand and Australia

North Island, New Zealand Margin

Australia Margins

Southwestern Pacific-Indonesia

Southern and Central Tonga Platform

Lau Basin and Lau Ridge

Vanuatu-New Hebrides-Ridge

d'Entrecasteaux-Torres Massif

Solomon Islands

Western Solomon Sea

Bismark Sea/Manus

Indonesia Sumba-Timor/Banda Sea

Central Pacific

Manihiki Plateau

Eastern Pacific

Peru-Chile Trench Margin

Chile Margin General

Educational Opportunities

Remote Sensing Seminar

Sponsored by the International Union of Geological Sciences, the Circum-Pacific Council for Energy & Mineral Resources, and the Economic and Social Commission for Asia and the Pacific Regional Remote Sensing Program. Convenors are Dr. Andrew Green, Commonwealth Scientific Industrial Research Organization, Australia and Dr. Paul Teleko, U.S. Geological Survey, Reston, Virginia.

Thursday, August 14 - Saturday, August 16.
Westin Raffles City Convention Centre.

Seismic Stratigraphic Interpretation

Sponsored by the American Association of Petroleum Geologists
Thursday, August 14 - Saturday, August 16, 1986.
Westin Raffles City Convention Centre.

The Interactive Interpretation of Seismic and Well data

Sponsored by the American Association of Petroleum Geologists
Presented by John H. Caldwell
Sunday, August 17, 1986; 1:00 - 4:00 p.m.
Westin Raffles City Convention Centre.

Quantitative Chemistry of High Temperature Geothermal Fluids

Sponsored by the Circum-Pacific Council
Friday, August 22 - Sunday, August 24, 1986
Westin Raffles City Convention Centre.

Registration

Pre-registration for the conference with a deposit of \$150 (U.S.) on the conference fee and selected activities will be accepted until May 1, 1986. After May 1 full payment of the conference fee and all selected activities must accompany the registration form. A US \$100 per room deposit is also due when rooms are requested.

For further information:

AAPG Singapore,
P.O. Box 979
Tulsa, OK 74101-0979.

IGCP PROJECT 220

**CORRELATION AND RESOURCE EVALUATION OF TIN/TUNGSTEN GRANITES
IN SE ASIA AND THE WESTERN PACIFIC REGION.**

MEETING OF WORKING GROUP 5

September 1986
To be held at Ipoh, Malaysia.

First Circular and Call for Papers

Invitation

The organizing committee invites all earth scientists to attend a meeting of Working Group 5 of Project 220 and asks those who wish to receive the Second Circular to complete and return the attached Reply Form by 1 April 1986. The meeting shall consist of a symposium to be followed by some relevant training courses and field excursions. The registration fee is expected to be in the region of US\$100.

Conference topics

Theme: Exploration and Evaluation Techniques

Topics covered by general theme on which papers are invited and provisional sessional groupings are:

1. Geological characteristics
2. Metallogenic models of ore deposits and ore provinces
3. Exploration strategies and analytical methods
4. Remote sensing techniques
5. Exploration costs



Reply Form

I hope to attend the IGCP 220 Meeting and would like to receive the Second Circular.

Name (Dr/Mr/Mrs/Ms)

.....

Address

.....

.....

I wish to present paper(s)

entitled:

.....

.....

Please enclose a brief synopsis (not more than 200 words) of each proposed paper. If accepted, you will be asked to provide an extended abstract of each paper at a later date for inclusion in the pre-conference publication of Abstracts.

Please return this form to:

The Director
SEATRAD Centre
Tiger Lane
31400 IPOH
Malaysia

SYMPOSIUM ON INNOVATIVE DIRECTIONS IN PETROLEUM EXPLORATION

8-10 September 1986, London.

Presented by The Institute for the Study of Earth and Man at SMU, Dallas and co-sponsored by Imperial College, Department of Geology, London.

This meeting will present state-of-the-art technologies and their applications to hydrocarbon exploration with particular emphasis being given not only to innovation but also to integrated approaches. Papers will deal with all aspects of geophysics, geochemistry, geobotany, remote sensing and fluid migration. This will not only mark a cornerstone in European exploration, but will also be vital in the exchange of American and European technology.

For further information contact:

Mr. Ian Williamson
Department of Geology,
Imperial College,
London SW7 2BP,
United Kingdom.

Ms. Netta Blanchard
Director, Special Programs
ISEM,
SMU Box 274,
Dallas, Texas 75275.

CONFERENCE ON GEOLOGY OF INDOCHINA

Date: 5-7 December 1986.

Vanue. Ho Chi Minh City, Vietnam.

Organized by: General Department of Geology of Vietnam.

In collaboration with: Geological Society of Vietnam.

CGI is held in Indochina countries. Its aims are to provide a forum for exchange of experiences and information in the field of Geology and Mineral Resources between geoscientists in and outside Indochina.

The General Department of Geology of Vietnam, the organizer of the First CGI, warmly welcomes geoscientists from Southeast Asian Nations and the World over who would participate in the Conference. Participants are also invited to present papers on Geology and Mineral Resources of Indochina and neighbouring areas.

Paper Topics

Regional Geology, Palaeontology, Stratigraphy, Mineralogy, Petrology, Tectonics, Structural Geology, Mineral Resources, Metallogeny, Geochemistry, Marine Geology, Hydrogeology, Geoengineering, Geothermics, Geomorphology, Geophysics, Photogeology and Quaternary.

Language

English, French, Russian and Vietnamese will be official languages of the Conference. Anyhow, participants are encouraged to present their papers in English. In case of submission of papers and abstracts in French, Russian or Vietnamese, an English version must be attached to the original.

Paper Submission

Abstract of paper (within 200-300 words) must be submitted to the Conference Secretariat within January 1986. Authors of papers will be informed about acceptance of their papers by February 1986. Full paper (not exceeding 6,000 words) must be submitted to the Conference Secretariat before June 1986 for selection and publication in the Conference Proceedings.

Pre-Conference Workshops/Seminars

- (1) Shallow marine geology exploration.
- (2) Small scale mining and geological exploration.
- (3) Hydrogeological exploration methods for deltaic areas.
- (4) Geochemical investigation in tropical areas.

Post-Conference Field Trips

- (1) Quang Ninh Triassic coal basin (North Vietnam).
- (2) Cenozoic lateritic bauxite, Mesozoic metasediments, tin bearing granites in Dzu Linh-Dalat areas (South Vietnam).
- (3) Lower Mekong basin (Hydrogeological, Quaternary).

Further Information

Further information of the Conference will be given in the Second Circular which will be dispatched by the end of February 1986. Please contact:

CGI-I Secretariat
General Department of Geology,
6, Pham Ngu Lao St.,
Hanoi-Vietnam.

KURSUS-KURSUS LATIHAN & BENGKEL-BENGKEL (TRAINING COURSES & WORKSHOPS)

January 1986 - April 1986

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

February 1986

METALLOGENY (Quito, Ecuador). Annual training course for Latin Americans organized by Central University of Quito, the Autonomous University of Madrid (Spain) and UNESCO. Language: Spanish. For information: Ing. Antonia Salgado, Director, Curso Internacional de Metalogenia, Escuela de Ingenieria en Geologia, Minas y Petroleos, Division de Post-grado, Universidad Central, Quito, Ecuador.

February 1986 - March 1986

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

February 1986 - June 1986

MINERAL EXPLORATION (Leoben, Austria). Diploma course organized annually by the University of Mining and Metallurgy in Leoben and sponsored by Unesco. Language: English. For information: University for Mining and Metallurgy, Postgraduate course on Mineral exploration, Montanuniversitat, Leoben, A-8700, Austria.

February 1986 - December 1986

GEO THERMICS (Pisa, Italy). Certificate course organized annually by the Instituto Internazionale per le Ricerche Geotermiche and sponsored by Unesco, UNDP and Italy. Language: Spanish. For information: Istituto Internazionale per le Ricerche Geotermiche, 1, Via Buongusto, 56100 Pisa, Italy.

March 1986 - April 1986

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

March 1986 - April 1986

STRUCTURAL GEOLOGY (Dehra Dun, India). Regional training course organized by Wadia Institute of Himalayan Geology and sponsored by Unesco. For information: Dr. V.C. Thakur, Wadia Institute of Himalayan Geology, Dehra Dun - 248001, India.

March 1986 - November 1986

PHOTOINTERPRETATION APPLIED TO GEOLOGY AND GEOTECHNICS (Bogota, Colombia). Diploma course organized by the Interamerican Centre of Photointerpretation (CIAF) in cooperation with ITC and Unesco. Language: Spanish. For information: Academic Secretariat of the CIAF, Apartado Aereo 53754, Bogota 2, Colombia.

May 1986 - June 1986

GEOPHYSICS APPLIED TO GEOTHERMAL PROSPECTION (Manizales, Colombia). Annual course organized for Latin Americans by the Latin American Organization for Energy with financial assistance from Unesco. Language: Spanish. For information: Organizacion Latinoamericana de Energia (OLADE), P.O. Box 119, Quito, Ecuador.

KALENDAR (CALENDAR)

1986

January 14 - 15, 1986

COMPUTER APPLICATIONS IN MINERAL EXPLORATION, 1986 - BYTING THE ROCKS (Conference and Exhibition), Toronto, Ontario, Canada. (T.J. Bottrill, CAME '86, 192 Weldon Avenue, Oakville, Ontario, Canada L6K 2H8).

January 26, 1986

GEOTECHNICAL APPLICATIONS OF REMOTE SENSING AND REMOTE DATA TRANSMISSION (International Symposium), Coco Beach, Florida, USA. (A. Ivan Johnson, Woodward-Clyde Consultants, Harlequin Plaza-North, 7600 East Orchard Road, Englewood, Co. 80111, USA).

January 28 - 31, 1986

OFFSHORE SOUTH EAST ASIA (6th Conference), Singapore. Sponsored by SE Asia Petroleum Exploration Society. (Marathon Petroleum Exploration Ltd., P.O. Box 227, Tanglin P.O. Singapore 9124).

February 1 - 9, 1986

INTERNATIONAL VOLCANOLOGICAL CONGRESS, (Including symposia on PHREATO-MAGMATIC ERUPTIONS AND THE ROLE OF WATER IN EXPLOSIVE VOLCANISM and GEO-CHEMISTRY OF ERUPTIVE MAGMAS: TECTONIC CONTROLS ON PETROGENESIS) Auckland, Hamilton, Rotorua, New Zealand. Sponsored by IAVCEI. (Secretary, Organising Committee, Dr. J.A. Gamble, International Volcanological Congress 1986, Department of Geology, Victoria University of Wellington, Private Bag, Wellington, New Zealand).

February 16 - 21, 1986

EARTH RESOURCES IN TIME AND SPACE (8th Australian Geological Convention), Adelaide, Australia. (M.A. Cobb, Convenor, Publicity and Promotion Committee, Box 292, Eastwood, SA 5063, Australia).

February 18 - 21, 1986

NEOTECTONICS IN SOUTH ASIA (International Symposium), Dehra Dun, India. Co-sponsored by ICL. (M.G. Arur, Director, Geodetic and Research Branch, Survey of India, Post Box 77, Dehra Dun, U.P.-248001, India).

February 23 - 28, 1986

ROCK ENGINEERING AND EXCAVATION IN AN URBAN ENVIRONMENT (1st International Conference), Hong Kong. (Conference Office, The Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK.).

March 31 - April 4, 1986

RIVER SEDIMENTATION (3rd International Symposium), Jackson, Miss., USA. (S.Y. Wang, School of Engineering, University of Mississippi, University, MS 38677, USA).

April 2 - 5, 1986

GEOCHEMISTRY AND MINERALIZATION OF PROTEROZOIC VOLCANIC SUITES (International Symposium), Keyworth, Nottingham, U.K. Co-sponsored by IGCP Project 217 and ILP Working Group 3. (Dr. Tim Pharaoh, Deep Geology Research Group, British Geological Survey, Keyworth, Nottingham NG12 5GG, U.K.).

April 8 - 11, 1986

COAL AND COAL-BEARING STRATA (International Symposium), London, UK. (A.C. Scott, Department of Geology, Chelsea College, 552 King's Road, London SW10 0UA, U.K.).

April 14 - 19, 1986

ENGINEERING GEOLOGY: PROBLEMS IN SEISMIC AREAS (IAEG International

Symposium), Bari, Italy. (Prof. G. Melidoro, Istituto di Geologia Applicata e Geotecnica, Via Re David 200, 70125 Bari, Italy).

April 21 - 24, 1986

ENVIRONMENTAL GEOTECHNOLOGY (International Symposium), Allentown, Penn. USA. (Prof. H.Y. Fang, Symposium Chairman, Geotechnical Engineering Division, Department of Civil Engineering, Lehigh University 13, Bethlehem, PA 18015, USA).

April 21 - 25, 1986

GLOBAL CHANGE IN AFRICA DURING QUATERNARY, PAST-PRESENT-FUTURE (International Symposium), Dakar, Senegal. Sponsored by INQUA, GSA (Africa), AGID, IUGS, IGCP, ILP. Languages: English and French. (INQUA/1986 Dakar Symposium Secretariat, Laboratoire de Geologie du Quaternaire, Faculte des Sciences, LUMINY, Case 907, 13288 Marseille Cedex 9, France).

April 24 - 27, 1986

INDUSTRIAL MINERALS (7th International Congress), Athens, Greece. (G.M. Clarke, Editor, Industrial Minerals, 16 Lower Marsch, London SE1, UK).

May 11 - 16, 1986

MINING AND METALLURGICAL INSTITUTIONS (13th Congress), Canberra, Australia. (Council of Mining and Metallurgical Institutions, c/o The Australian Institute of Mining and Metallurgy, P.O. Box 310, Carlton South, Victoria, Australia 3053).

May 17 - 19, 1986

SEDIMENT-HOSTED STRATIFORM COPPER DEPOSITS (Symposium), Ottawa, Ontario, Canada. Sponsored by GAC/MAC. (Prof. A.J. Naldrett, Department of Geology, University of Toronto, Toronto, Ontario, Canada M5S 1A1).

May 19 - 21, 1986

GEOLOGICAL, MINERALOGICAL ASSOCIATIONS OF CANADA (Joint Annual Meeting with Canadian Geophysical Union), Ottawa, Ontario, Canada. (Dr. J.A. Donaldson, Department of Geology, Carleton University, Ottawa, Ontario, Canada K1S 5B6).

May 19 - 23, 1986

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Baltimore, Maryland, USA. (AGU Meetings, 2000 Florida Avenue NW, Washington, DC 20009, USA).

June 1 - 6, 1986

GEOSCIENCE INFORMATION (3rd International Conference), Adelaide, South Australia. (Conference Secretariat 31CGL, c/o Australian Mineral Foundation Private Bag 97, Glenside, South Australia 5065, Australia).

June 2 - 5, 1986

DINOSAUR SYSTEMATICS (Symposium), Drumheller, Alberta, Canada. (Kenneth Carpenter, Academy of Natural Sciences, 19th and the Parkway, Philadelphia, PA 19103, USA).

June 15 - 18, 1986

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Convention), Atlanta, Georgia, USA. (Howard Cramer, Emory University, Department of Geology, Atlanta, GA 30322, USA)

June 23 - 26, 1986

ARENACEOUS FORAMINIFERA (2nd Workshop), Vienna, Austria. (Dr. Fred Rogl, Naturhistorisches Museum, Burgring 7, A-1014 Wien, Austria).

June 30 - July 4, 1986

GEOCHRONOLOGY, COSMOCHRONOLOGY AND ISOTOPE GEOLOGY (6th International Conference), Cambridge, U.K. Sponsored by IAVCEI. (Organizing Committee, 6th International Conference, Department of Earth Sciences, University of

Cambridge, Downing Street, Cambridge CB2 3EQ, UK.).

July 7 - 11, 1986

GEOCONGRESS '86 (GSSA 21st Biennial Congress: Precambrian gold/uranium deposits), Johannesburg, South Africa. Co-sponsored by IUGS. (The Symposium Secretariat, S.339, CSIR, P.O. Box 395, Pretoria, South Africa 0001).

July 13 - 18, 1986

INTERNATIONAL MINERALOGICAL Association (General Meeting), Stanford, Calif., USA. (Prof. C.T. Prewitt, Department of Earth and Space Sciences, State University of New York, Stony Brook, NY 11794, USA).

July 14 - 17, 1986

THE COMPUTER HANDLING AND DISSEMINATION OF DATA: Numerical Data Processing and Dissemination in the Geosciences (10th International CODATA Conference), Ottawa, Canada. (Mrs. Lois Baignee, Conference Services, National Research Council of Canada, Montreal Road, Ottawa, Ontario, Canada K1A 0R6).

July 15 - 17, 1986

DEEP SEISMIC REFLECTION PROFILING OF THE CONTINENTAL LITHOSPHERE (Meeting), Cambridge, UK. (BIRPS, Bullard Labs, Magingley Road, Cambridge, CB3 0EZ, UK).

July 23 - 26, 1986

ARENACEOUS FORAMINIFERA (2nd Workshop), Vienna, Austria. (Fred. Rogl, Naturhistorisches Museum, Burgring 7, A-1014 Vienna, Austria).

August/September 1986

LANDSCAPES OF THE SOUTHERN HEMISPHERE (International Conference), Adelaide, Australia. (Prof. Jon Firman, S.A. Department of Mines and Energy, P.O. Box 151, Eastwood, S.A. 5063, Australia).

August 4 - 8, 1986

DRAINAGE BASIN SEDIMENT DELIVERY (International Symposium), Albuquerque, New Mexico, USA. (R.F. Hadley, Secretary ICCE, c/o Department of Geography, University of Denver, Denver, Co. 80208-0183, USA).

August 8 - 17, 1986

WATER-ROCK INTERACTION (5th International Symposium), Reykjavik, Iceland. Sponsored by IAGC. (Dr. Haldor Armannsson, Orkustofnun - The National Energy Authority, Grensasvegur 9, 108 Reykjavik, Iceland).

August 11 - 14, 1986

ENERGY RESOURCES IN ASIA (International Conference), Hong Kong. Language: English. (The Co-ordinator, AEMP, Asian Research Service, GPO Box 2232, Hong Kong).

August 11 - 15, 1986

KIMBERLITE (4th International Conference), Perth, Western Australia (Dr. A.F. Trendall, Geological Survey of Western Australia, 66, Adelaide Terrace, Perth, W.A., Australia).

August 13 - 20, 1986

SOIL SCIENCE (13th ISSS International Congress), Bamberg, F.R.G. (Prof. Dr. K.H. Hartge, Inst. fur Bodenkunde, Univ. Hannover, Herrenhaserstrasse 2, D-3000 Hannover 21, F.R.G.).

August 15 - 16, 1986

QUATERNARY SEA LEVELS OF AUSTRALIA (Meeting), Warrnambool, Victoria, Australia. Sponsored by IGCP-200 and INQUA. (Associate Prof. D. Hopley, Department of Geography, James Cook University, Townsville, Queensland, Australia).

August 17 - 22, 1986

CIRCUM-PACIFIC ENERGY AND MINERAL RESOURCES (4th Conference), Singapore. (Circum-Pacific Conference IV, c/o AAPG, P.O. Box 979, Tulsa, Ok 74101, USA).

August 18 - 22, 1986

INTERNATIONAL ASSOCIATION ON THE GENESIS OF ORE DEPOSITS (7th Symposium), Lulea, Sweden. (Centek Conference, S-951 87 Lulea, Sweden).

August 24 - 30, 1986

INTERNATIONAL ASSOCIATION OF SEDIMENTOLOGISTS (12th International Congress), Canberra, Australia. (Graham Taylor, Department of Geology, School of Applied Sciences, Canberra College of Advanced Education, Box 1, Belconnen, ACT 2616, Australia).

September 1986

ENGINEERING IN COMPLEX ROCK FORMATIONS (International Symposium), Beijing, P.R. China. (Prof. Tan Tjong-Kie, Institute of Geophysics, Academia Sinica, Beijing, People's Republic of China).

September 8 - 12, 1986

PALEOCEANOGRAPHY (2nd International Conference), Woods Hole, USA. (W.A. Berggren, Woods Hole Oceanographic Institute, Woods Hole, MA 02543, USA).

September 22 - 28, 1986

BENTHOS '86 (3rd International Symposium on Benthic Foraminifera), Geneva, Switzerland. (D. Decrouez, Department of Geology and Invertebrate Palaeontology, Museum d'Histoire naturelle de Geneve, CP 434, 1211 Geneve 6, Switzerland).

September 29 - October 1, 1986

GOLD '86 (International Symposium), Toronto, Canada. (E. Craigie, Selco Division of BP Resources Canada Ltd., 55 University Avenue, Suite 1700, Toronto, Ontario, Canada M5J 2H7).

October 5 - 11, 1986

WORLD ENERGY (13th Congress), Cannes, France. (R. Ruttley, World Energy Conference, 34 St. James' Street, London SW1A 1HD, UK).

October 7 - 14, 1986

SEA-LEVEL CHANGES AND APPLICATIONS (Symposium), Qingdao, People's Republic of China. IGCP Project 200. Language: English. (Prof. Zhao Songling, Institute of Oceanology, Academia Sinica, 7 Nan-hai Road, Qingdao, People's Republic of China).

October 20 - 25, 1986

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY (Meeting), Buenos Aires, Argentina. (John D. Rockaway, Department of Geological Engineering, University of Missouri, Rolla, MO 65401, USA).

November 2 - 6, 1986

SOCIETY OF EXPLORATION GEOPHYSICISTS (56th Annual Meeting), Houston, Texas, USA. (Convention Assistant, Society of Exploration Geophysicists, P.O. Box 3098, Tulsa, Ok. 74101, USA).

November 10 - 13, 1986

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), San Antonio, Texas, USA. (Meetings Department, Geological Society of America, P.O. Box 9140, Boulder, Co. 80301, USA).

December 8 - 12, 1986

AMERICAN GEOPHYSICAL UNION (Fall Meeting), San Francisco, California, USA. (AGU Meetings, 2000 Florida Avenue NW, Washington, DC 20009, USA).

1987

January 1987

GRANITES AND ASSOCIATED MINERALIZATIONS (International Symposium), Salvador, Bahai, Brazil. (ISGAM, Augusto J. Pedreira, SME-CPM: Rua Ceara, 3-Pituba, 40,000, Salvador, Bahia, Brazil).

January 19 - 23, 1987

HOW VOLCANOES WORK (Hawaii Symposium), Hilo, Hawaii. (Robert Decker, U.S. Geological Survey, MS-910, 345 Middlefield Road, Menlo Park, Ca. 94025, USA).

April 23 - 26, 1987

INTERNATIONAL GEOCHEMICAL EXPLORATION (12th Symposium) and METHODS OF GEOCHEMICAL PROSPECTING (4th Symposium), Orleans La Source, France. (The Organizing Committee, 12th IGES - 4th SMGP, BRGM, B.P. 6009, 45060 Orleans Cedex, France).

May 3 - 7, 1987

ENGINEERING GEOLOGICAL ENVIRONMENT IN MOUNTAINOUS AREAS (International Symposium), Beijing, P.R. China. (Geological Society of China, Ministry of Geology, Pai Wan Chung, Fuchengmenwai, Beijing, People's Republic of China).

May 18 - 22, 1987

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Baltimore, Maryland, USA. (AGU Meetings, 2000 Florida Avenue, NW, Washington, CD 20009, USA.)

May 25 - 27, 1987

GEOLOGICAL, MINERALOGICAL ASSOCIATIONS OF CANADA (Joint Annual Meeting), Saskatoon, Canada. (Dr. W.O. Kupsch, Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 0W0).

May 31 - June 5, 1987

WORLD MINING CONGRESS (13th), Stockholm, Sweden. (Organizing Secretary, 13th World Mining Congress, University of Lulea, S-951 87 Lulea, Sweden).

June 1987

AUSTRALIA'S INTERNATIONAL MINING AND EXPLORATION EXHIBITION 87 (Meeting), Sydney, Australia. (Thomson Exhibitions, 47 Chippen Street, Chipendale, NSW 2008, Australia).

June 7 - 10, 1987

AAPG AND SEPM (Annual Meeting), Los Angeles, Calif., USA. (AAPG Headquarters, Box 979, Tulsa, Ok. 74101, USA).

July 31 - August 9, 1987

INTERNATIONAL UNION FOR QUATERNARY RESEARCH (12th Congress), Ottawa, Ontario, Canada. (Dr. Alan V. Morgan, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1).

August 1987

PACIFIC NEOGENE PALEOCEANOGRAPHIC AND BIOSTRATIGRAPHIC EVENTS (Meeting), Berkeley, Calif., USA. (Dr. C. Brunner, Department of Paleontology, University of California, Berkeley, Ca. 94720, USA).

August 9 - 22, 1987

IUGG (XIX General Assembly), Vancouver, Canada (R.D. Russell, Department of Geophysics and Astronomy, University of British Columbia, Vancouver, B.C., Canada V6T 1W5)

August 12 - 20, 1987

INTERNATIONAL UNION OF CRYSTALLOGRAPHY (Congress), Perth, Western Australia. (E.N. Maslen, Crystallography Centre, University of Western Australia, Nedlands, 6009, Australia).

August 17 - 20, 1987

DEVONIAN SYSTEM (CSPG 2nd International Symposium), Calgary, Alberta, Canada. (Devonian Symposium, Canadian Society of Petroleum Geologists, 505-206 7th Avenue SW, Calgary, Alberta, Canada T2P OW7).

August 20 - 30, 1987

PACIFIC SCIENCE ASSOCIATION (16th Congress), Seoul, South Korea, Section B: Solid Earth Sciences (Prof. Bong Kyun Kim, Department of Geological Sciences, College of Natural Sciences, Seoul National University, Seoul, South Korea).

August 30 - September 4, 1987

INTERNATIONAL SOCIETY FOR ROCK MECHANICS (6th International Congress), Montreal, Canada. (Prof. B. Ladanyi, Dept. of Civil Engineering, Ecole Polytechnique, Box 6079, Stn. A. Montreal, Canada H3C 3A7).

August 31 - September 3, 1987

SOIL MECHANICS AND FOUNDATION ENGINEERING (9th European Conference), Dublin, Ireland. Languages: English and French. (Dr. Trevor Orr, Civil Engineering Department, Trinity College, Dublin 2, Ireland).

September 7 - 11, 1987

CARBONIFEROUS STRATIGRAPHY AND GEOLOGY (11th International Congress), Beijing, People's Republic of China. (Prof. Yang Jing-zhi, Nanjing Institute of Geology and Palaeontology, Chi-Ming-Sseu, Nanjing, People's Republic of China).

October 11 - 15, 1987

SOCIETY OF EXPLORATION GEOPHYSICISTS (57th Annual Meeting), New Orleans, La., USA. (Marvin R. Hewitt, Amoco Production Co., Box 591, Tulsa, Ok. 74102, USA).

October 26 - 29, 1987

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Phoenix, Arizona, USA. (Meetings Department, GSA Headquarters, Box 9140, Boulder, Co. 80301, USA).

December 7 - 11, 1987

AMERICAN GEOPHYSICAL UNION (Fall Meeting), San Francisco, California, USA (AGU Meetings, 2000 Florida Avenue, NW, Washington, DC 20009, USA).

1988

March 8 - 11, 1988

ASIAN MINING 88 (3rd International Conference and Exhibition), Kuala Lumpur, Malaysia. (The Conference Office, the Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK).

May 16 - 20, 1988

BICENTENNIAL GOLD 88 (Conference), Melbourne, Australia. Co-sponsored by SEG, (Australian Convention and Travel Services Pty Ltd. (ACTS), GPO Box 1929, Canberra ACT 2601, Australia).

October 1988

COAL RESEARCH (International Conference), Tokyo, Japan. (Dr. W.G. Jensen, International Committee for Coal Research, Bte 11, B-1150, Bruxelles, Belgium).

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KANDUNGAN (CONTENTS)

- 1 **Slumping at the late Miocene shelf-edge offshore West Sabah: a view of a turbidite basin margin**
B.K. Levell & Awang Kasumajaya
- 31 **Aspects to the resolving power of 3-D seismic surveys**
Wolfgang Houba
- 55 **The mechanics of progressive deformation in crustal plates—a working model for S.E. Asia**
B.G.M. Wood
- 101 **LITHO, a computerized approach to lithofacies determination**
Ali R. Somturk & S. Des Ligneris
- 119 **Assessment of undiscovered conventionally recoverable petroleum resources in Tertiary sedimentary basins of Malaysia and Brunei**
Keith Robinson
- 133 **Seismic HC reservoir prediction: a (critical) review on the determination of lithological parameters from seismic data**
Burkhard Buttkus
- 151 **Seismic evidences of relative changes of sea level in the Tertiary depositional sequences near Taiwan**
C.H. Liu & Y.S. Pan
- 167 **Review of principal hydrocarbon-bearing basins around the South China Sea**
Ernest P. Du Bois

Editors

G.H. TEH

S. PARAMANANTHAN

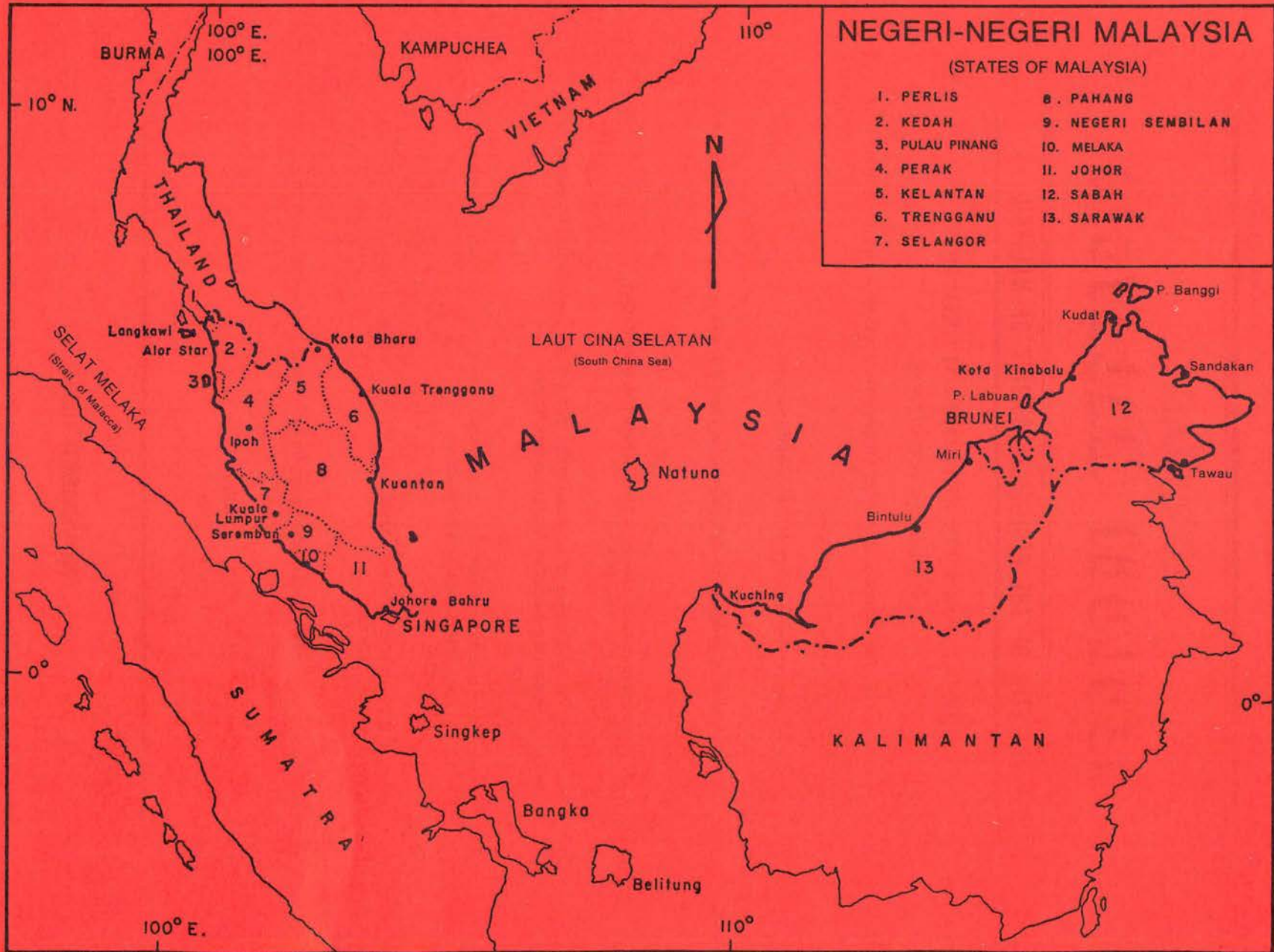


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