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About the Society

The Society was founded in 1967 with the aim of promoting the advancement of earth sciences particularly in Malaysia and the Southeast Asian region.

The society has a membership of about 600 earth scientists interested in Malaysia and other Southeast Asian regions. The membership is worldwide in distribution.

The oldest rocks in Borneo: a note on the Tuang Formation, west Sarawak and its importance in relation to the presence of a "Basement" in west Borneo

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The recent publication of the preliminary results of regional mapping of central and West Kalimantan shows that the Schwaner Mountains area which forms the eastern, Bornean part of the Sunda shield (or Sunda platform or west Borneo hinterland) consists of a Cretaceous, subduction-related, granitoid batholithic complex (Williams *et al.*, 1988) and not, as has been accepted traditionally, a fragment of an ancient, igneous and metamorphic continent. The absence of "continental" basement therefore leads to renewed speculation about the distribution, origin and nature of the oldest rocks in Borneo.

In Kalimantan, the oldest fossiliferous rocks are Devonian coralline limestones (Rutten, 1940) found as allochthonous blocks within tectonic melange (Pieters & Supriatna, 1989). The oldest coherent strata are the Pinoh Metamorphics which occur as screens within the Schwaner Mountains granitoids and comprise biotite-grade metamorphic rocks consisting mostly of metasediments and basic and ultrabasic rocks all of which have been modified by the thermal overprint of later granitoid intrusions and unsuitable for radiometric dating. Further north, in NW Kalimantan and closer to the international

border, the Seminis Formation contains somewhat similar assemblages, although some volcanics may be younger (Pieters & Supriatna, 1989).

In west Sarawak, the oldest rocks are the Tuang and Kerait Schist Formations which occur in the Kuching-Kuap and Serian areas respectively. The Tuang Formation, distributed in an area covering about 80 km², comprises phyllite, some pelitic and basic schists and metasandstone, and minor pelitic hornfels and silicified volcanics and chert. The mineral assemblages of the rocks are outlined below:

Phyllite	quartz + muscovite + graphite ± chlorite ± albite ± calcite
Pelitic schist	quartz + muscovite + graphite ± chlorite ± albite ± calcite
Basic schist	<i>quartz-epidote schist</i> quartz + epidote + calcite + albite + muscovite + chlorite ± actinolite <i>quartz-actinolite schist</i> quartz + actinolite + muscovite + albite + chlorite ± epidote ± graphite
Metasandstone	<i>metafeldspathic graywacke</i> quartz + K feldspar + plagioclase in sericite-chlorite-quartz-feldspar matrix

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sericite quartzite (very rare)

granoblastic quartz with
minor interstitial sericite

Pelitic hornfels very rare and found close to
Tertiary intrusives

The Tuang Formation has undergone multiphase deformation, commonly with "similar-type" folds and Hon (in manuscript) has recognised at least three phases of folding. The metamorphic grade is greenschist facies. The type locality is in the Sg. Tuang, 17 km SE of Kuching and described in Hon (in manuscript). Outcrops in the vicinity of Kuching are generally poor and usually comprise the more pelitic rocks which, when weathered, could be mistaken easily for sheared Pedawan Formation. A recently excavated exposure which shows an excellent section of thick arenaceous layers in graphitic pelite occurs at the new Kim Hin ceramics factory site on Jln. Kg. Sudat, 1.6 km from the Kuching-Serian road, 7 km from Kuching (110°19'E, 1°29½'N). The metasandstones are probably turbiditic as they exhibit graded bedding and have been stretched and boudinaged and are enclosed in a very graphitic blue-grey pelitic phyllite (see Plate 1). Boulders of green chlorite schist also occur but are not found *in situ*. Elsewhere on the site, the rocks are predominantly weathered pelites which could be mistaken for Pedawan shales.

Another locality on Jalan Datu Stephen Yong, near Kg. Semeba, 4.5 km N of Jalan Batu Kitang (110°17'E, 1°28'N) consists of banded quartzitic schists associated with massive chlorite-epidote schists veined by quartz and with calcite-covered joint planes. The ubiquitous presence of epidote suggests that the rocks are derived from basic or ultrabasic rocks, basalt or gabbro.

The age of the Tuang Formation was thought to be pre-Carboniferous based on the evidence of a "dubious fossil tentaculid" reported by Tan (*in manuscript*).

The Kerait Schist Formation (Pimm, 1965) occurs as small inliers E and SE of Serian and comprises mostly muscovite-quartz and muscovite-tremolite-quartz schists but no basic rocks have been found.

Three other Formations in west Sarawak show certain affinities with the Tuang and Kerait Schist Formations, viz: the Serabang, Sejingkat and Sebangon Hornstone Formations.

The Serabang Formation west of Lundu (Wolfenden & Haile, 1963) is poorly exposed and poorly dated (?Upper Jurassic - Cretaceous) as the ages were obtained from radiolaria studied in thin section (G.F. Elliot *in*: Wolfenden & Haile, 1963) and from two unconfirmed specimens of *Orbitolina* (Hashimoto *et al.*, 1975). It forms a unique unit possessing a regional WNW strike totally discordantly with the rest of the Mesozoic and older rocks in west Sarawak. Unlike the Pedawan Formation alleged to be of the same age, the Serabang Formation is *regionally* metamorphosed to greenschist grade as well as being thermally metamorphosed by Cretaceous adamellite and granodiorite intrusions of Pueh and Gading. The rock types found in the Serabang Formation closely resemble those of the Tuang Formation and are most likely of deep water origin, probably with oceanic affinities, the epidote-rich rocks being derived from oceanic basalts and gabbros. Some of the rocks outcropping on the coast are described as chaotic and sheared "bouldery slate" is reported in Wolfenden & Haile (1963) and both could be interpreted as melange. The contact between the Serabang and Pedawan Formations is largely covered by the younger Kayan Sandstone and is very likely tectonic and not an unconformity as the regional strike parallels the regional structure in NW Kalimantan.

The lithologies of the Serabang Formation resemble also those in the Pinoh Metamorphics. Besides the main rock types (slate, phyllite, quartzite, schist, hornfels but with the exception of ?chert, ?gneiss and ?migmatite) metavolcanics, amphibolite and greenstone have been reported in both Formations and Cretaceous granitoids intrude both.

The Sebangon Hornstone near Sebuyau, N of the Kerait schist areas around Serian, is a chert-like rock which Haile (1954) suggested was a silicified volcanic rock and most likely of Carbo-Permian age. It is almost certainly a metamorphosed chert sequence as hills of chert,

mapped as Sebangau W and SW of the Sebuyau granite, show little or no thermal metamorphism.

The Sejingkat Formation forms a band of sheared cherty rocks across the Bako peninsula, N of Kuching. Isolated occurrences of spilitic basalt, basalt and gabbro together with chert and chert blocks in carbonaceous phyllite have been recorded around Muara Tebas in the Sarawak river delta by Roslan (1987). The metamorphic grade of the Sejingkat Formation, characterised by a prehnite/sericite/muscovite assemblage, is much lower than the greenschist grade in the Serabang Formation and the basalts and gabbros are mineralogically little altered and original igneous textures are still preserved (Roslan, 1987). Furthermore, sedimentological features are preserved in the cherts although there is some post-depositional diagenetic alteration of siliceous horizons. Tan (in manuscript) has identified graded bedding and sole markings in the cherts indicating a turbiditic origin. The Sejingkat Formation is commonly composed of chaotic blocks, mainly of chert

and chert in phyllite and the Formation is interpreted as a tectonic melange.

The Sebangau Hornstone and the Sejingkat Formations are probably equivalent as they are both chert sequences and show a roughly parallel spatial relationship. The lithology and metamorphic grade of the Sejingkat/Sebangau Hornstone Formations indicate that they are similar to the Lupar melange zone further E and are quite unlike the higher grade rocks of the Serabang, Tuang, Kerait Schist.

COMMENT

The turbiditic nature of the metasediments and the basic/ultrabasic rock association suggests strongly that the Tuang Formation is a deep marine deposit possibly with oceanic affinities. Basic/ultrabasic rocks are not evident in the Kerait Schist Formation but similarities in mineralogy and rock type and the occurrence, apparently a continuation of the main Tuang Formation outcrop to the NW, indicate that



PLATE 1. Interbedded felspathic metasandstone and graphitic phyllite, Kim Hin factory site, 7 km from Kuching. The competent metasandstones are deformed and stretched into elliptical boudins. Some metasandstones show graded bedding indicating probably turbiditic deposition in deep water.

the Tuang and Kerait schist are probably equivalent. In the far west the Serabang Formation shows similar affinities with the Tuang Formation and is also a regionally metamorphosed deep marine sequence with oceanic basalts. Correlation with the Pinoh Metamorphics and Seminis Formation in Kalimantan indicate the Tuang and Kerait Schist Formations are certainly pre-Lower Cretaceous and probably Carbo-Permian and the Serabang Formation is likely to be of a similar age. Thus, in west Sarawak, there appears to be two groups of deep water rock sequences with similar compositional varieties but one group show a consistently higher grade metamorphism and are therefore, probably older. The rocks comprising the Tuang, Kerait Schist and Serabang Formations form an association of essentially deep water deposits with oceanic characteristics, are metamorphosed to greenschist grade and could be of the same age and origin. They probably represent a Carbo-Permian ocean floor. The Sejingkat/Sebangan Formations have clearly not undergone the same degree of metamorphism as the Serabang/Tuang/Kerait Formations and they show similar lithologies with the Late-Cretaceous - Eocene Lupar zone, although they could be older.

A whole-rock radiometric age determination on the basic rocks from the Tuang Formation would probably give the age of metamorphism and perhaps an original age of eruption. To obtain better paleontological ages, there is a need for careful re-examination of the radiolarian cherts in the Serabang Formation using the modern technique of whole specimen abstraction to enable positive identification of species. A closer examination of the unmetamorphosed cherts in the Sebangan Hornstone Formation may reveal radiolaria which could be dated and perhaps chert in the Tuang Formation may yet yield datable fossils.

In conclusion, previous interpretations concerning the nature of the Bornean part of the "Sunda Shield" and its synonyms appear incorrect; the so-called "Basement" of western Borneo seems to have been constructed of essentially deep water sediments associated with ocean floor extrusives.

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Some larger foraminifera and radiolaria from Telupid olistostrome, Sabah

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INTRODUCTION

An olistostrome unit is exposed along a new road cut from kilometer 115 to kilometer 123 Sandakan-Telupid highway. This unit is informally referred as Telupid olistostrome. The olistostrome is composed of various sizes of rock fragments ranging from pebble to large boulder, embedded in slightly sheared black mud matrix. The rock fragments consist of sandstone, limestone, chert and mudstone. Mafic and ultramafic rock fragments are not found.

Among the rock fragments, there was a large limestone boulder with a diameter of more than 2 m exposed at a road cut about 8 km east of Telupid Town (Fig. 1). The limestone boulder contains numerous larger foraminifera. At the same locality a broken bed of chert layer was found embedded in the mud just above the limestone boulder (Fig. 2). The chert contains very rare radiolaria. Only two species were identified.

GEOLOGICAL SETTING

The olistostrome unit was previously mapped as Kulapis Formation. The construction of a new road has exposed more outcrops and provided more information about the rock. The olistostrome consists of pebbles, cobbles and boulders of various sedimentary rocks such as sandstones, limestones, bedded cherts and mudstones embedded in a slightly sheared black mud matrix. Some sandstones and cherts occur as broken beds. This olistostrome was probably deposited as a result of submarine sliding. In Sabah, this type of olistostrome is usually found

near the dismembered ophiolite sequence (Chert-Spilite Formation).

In Telupid area, the olistostrome is overlying the Chert-Spilite Formation and the ultramafic rocks. The age of the olistostrome is not known but it is certainly younger than the Chert-Spilite Formation.

MATERIAL AND METHOD

Several limestone and chert samples were collected from a locality about 8km from Telupid Town (Fig. 3.). Each limestone sample was cut into two oriented thin sections, one represents an equatorial section and the other represents a median section of the larger foraminifera. Since the foraminifera are randomly distributed in the samples, more thin sections have been made and only very few oriented sections were available. The chert samples were crushed into smaller fractions and then treated with hydrofluoric acid. The samples were then washed and the residues were examined under the microscope.

RESULT AND DISCUSSION

The larger foraminifera from the Telupid limestone are mostly *Elphidium* and *Ammonia*. The foraminifera are mostly small, some are partly broken. The limestone is classified as a chert by Folk's (1974) or a carbonate grainstone by Dunham's (1962) classification. The larger foraminifera are not well preserved, some of them are partly broken. Margins of the tests are irregular as a result of abrasion. It seems that the limestone was originally

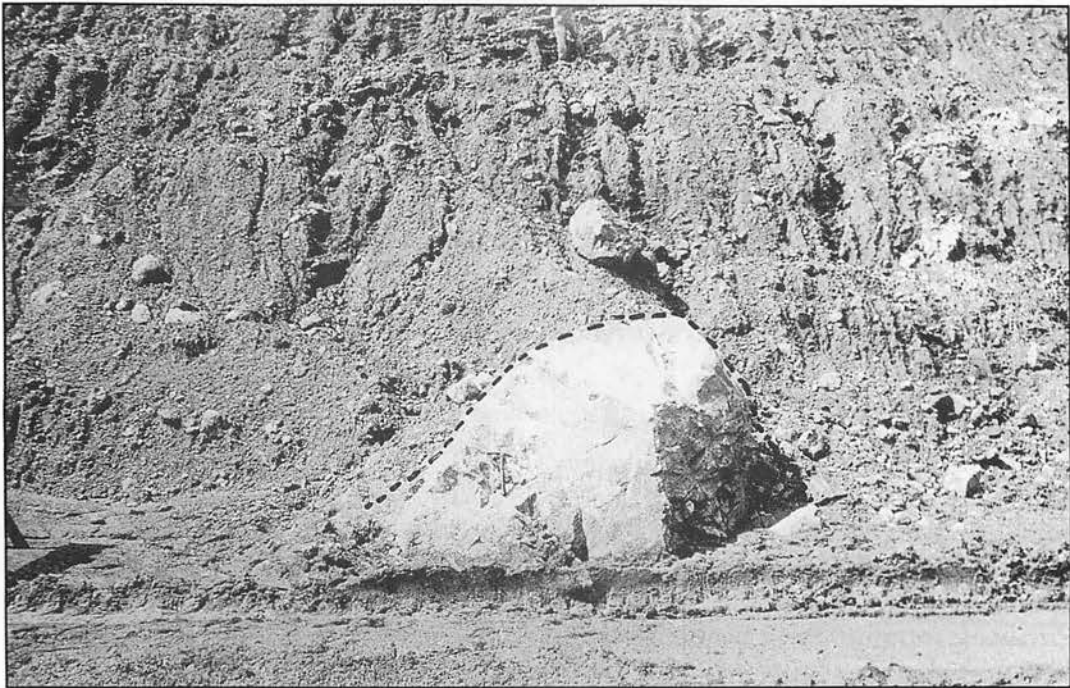


Figure 1: Photograph of the limestone boulder.

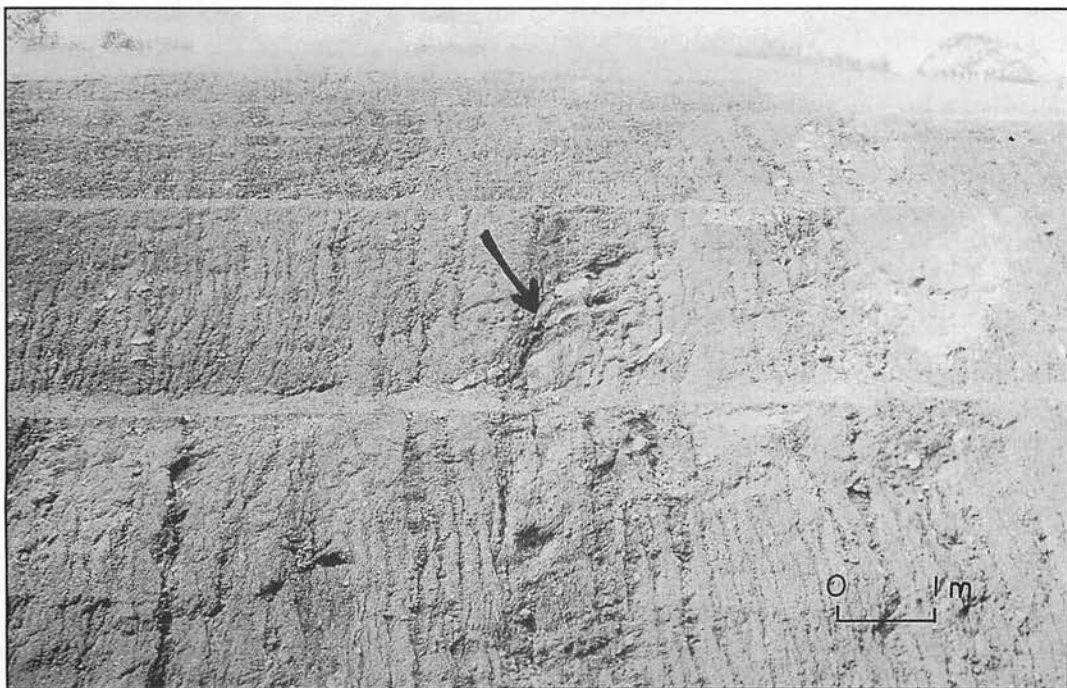


Figure 2: Photograph of the broken chert layer.

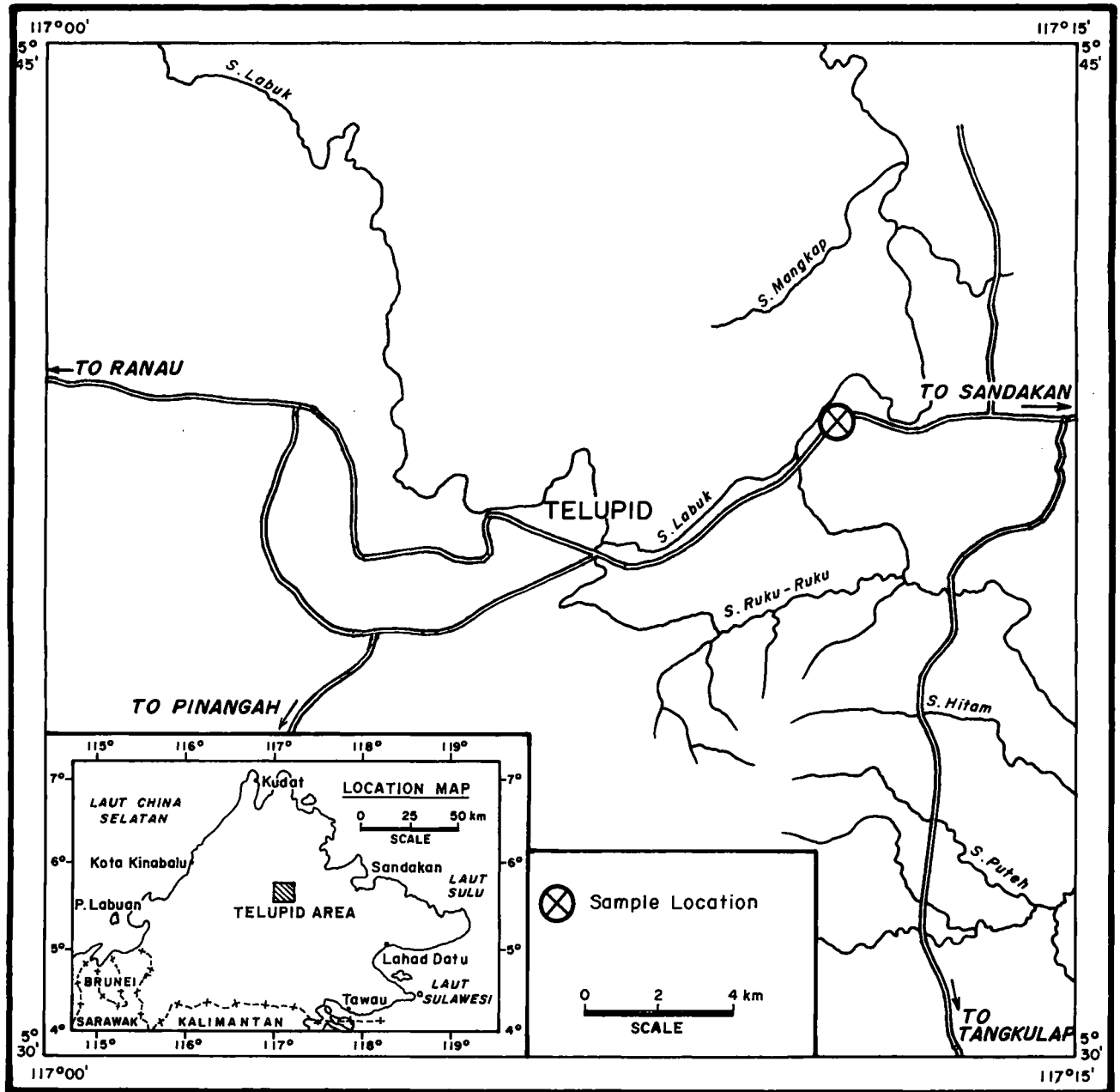


Figure 3: Map of sample location

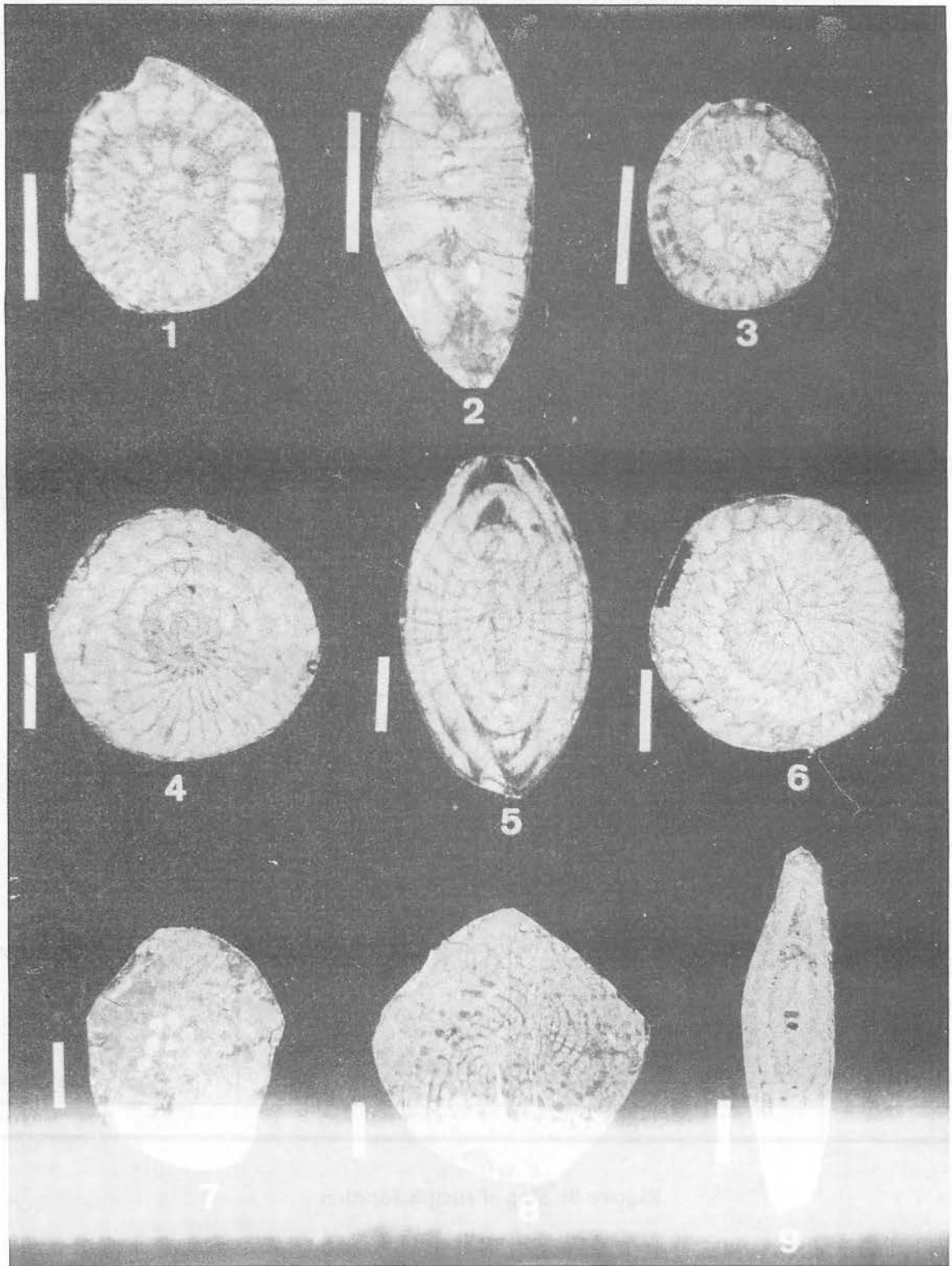


Plate 1: (Scale bar = 1 mm)

Figs. 1-3. *Pellatospira orbitoidea* (Provale); Figs. 1 & 3. equatorial sections; Fig. 2. vertical section.

Figs. 4-6. *Nummulites striatus* (Bruguiere); Figs. 4 & 6. equatorial sections; Fig. 5. vertical section.

Fig. 7. *Bilanispira* sp. equatorial section.

Fig. 8 & 9. *Spiroclypeus* sp.; Fig. 8. equatorial section; Fig. 9. vertical section.

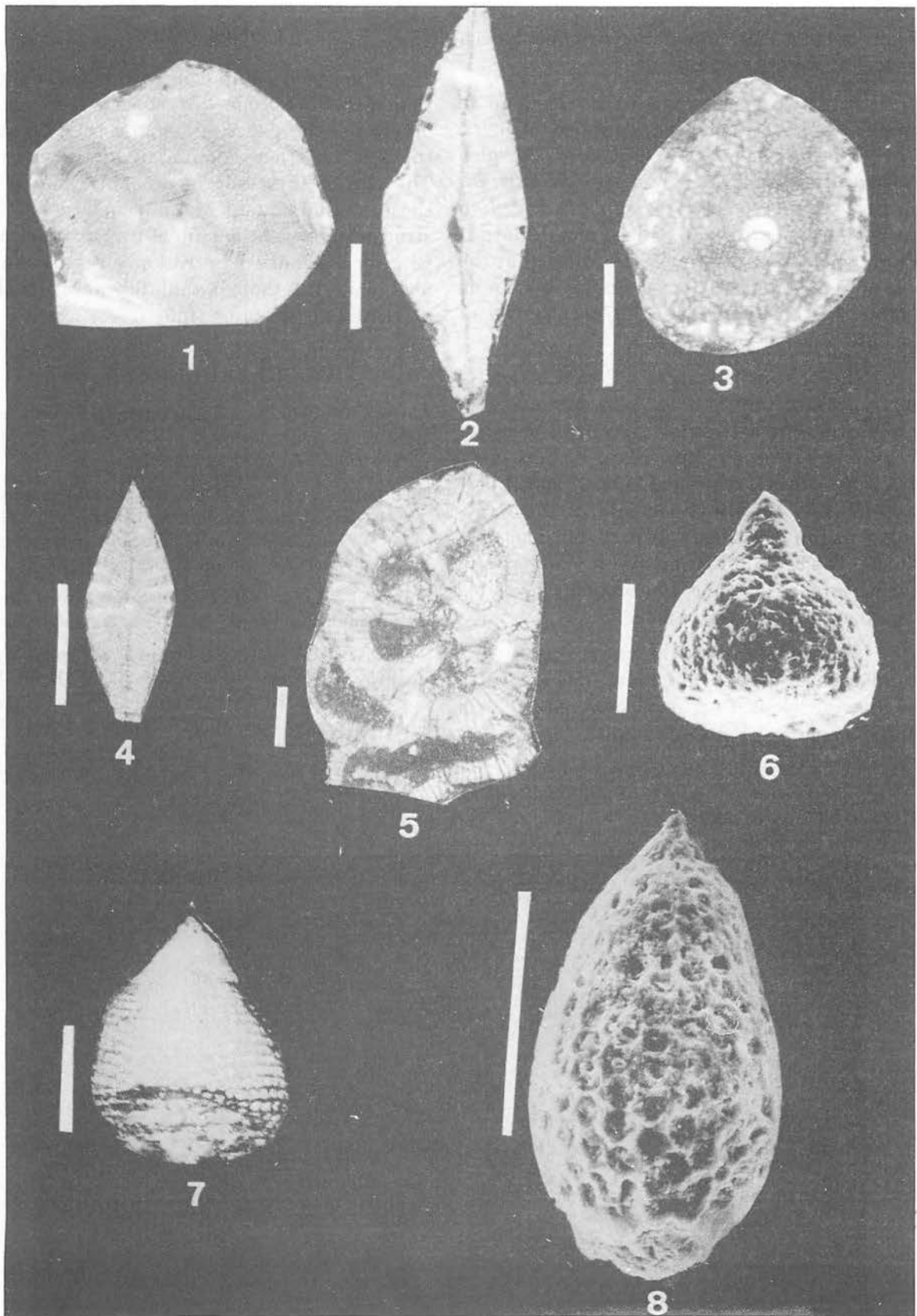


Plate 2: (Scale bar for figs.1-5 = 1 mm; scale for Figs. 6-8 = 0.1mm)
 Figs. 1 & 2. *Astrocyclina* sp.; Fig. 1. equatorial section; Fig. 2. vertical section.
 Figs. 3 & 4. *Discocyclina* sp.; Fig. 3, equatorial section; Fig. 4, vertical section.
 Fig. 5. *Carpentaria* sp.
 Figs. 6 & 7. *Theocotyle ficus*.
 Fig. 8. *Podocyrtis* sp.

deposited in a shallow water environment, such as a sea-mount.

Only two species were identified up to specific level, the others were identified to generic level. They are *Pellatispira orbitoidea* (Provale), *Nummulites striatus* (Bruguere), *Bilanispira* sp. *Spiroclypeus* sp. *Astrocyclina* sp. *Discocyclina* sp. and *Carpentaria* sp. (Plate 1 and Plate 2, Figs. 1-5). This assemblage indicates that the age of limestone is Tb, based on the East India Letter Classification (Adams, 1974) or equivalent to Late Eocene.

The chert sample is composed of microcrystalline quartz. Two species of radiolaria were retrieved. They are *Theocotyle ficus* and *Podocyrtsis* sp. (Plate 2, Figs. 6-8). *Theocotyle ficus* is restricted to Early and Middle Eocene only (Sanfilippo *et al.*, 1985). This suggests that the chert was probably deposited during the Middle Eocene and it is older than the limestone. The chert was probably deposited in a deep-water environment.

The limestone, the chert layer, the sandstone and the mudstone slid down a submarine slope to a mud dominated basin and became an olistotrome unit.

CONCLUSION

The age of Telupid olistotrome is younger than Middle Eocene. It is very difficult to determine the exact age of the rock because there is no other microfossil in the matrix. The age of this unit is probably similar to those of Kudat, and Mandurian areas. The stratigraphic relationship of this unit and the Crocker Formation or Kulapis Formation is not known. It is thought that they were probably deposited at the same time.

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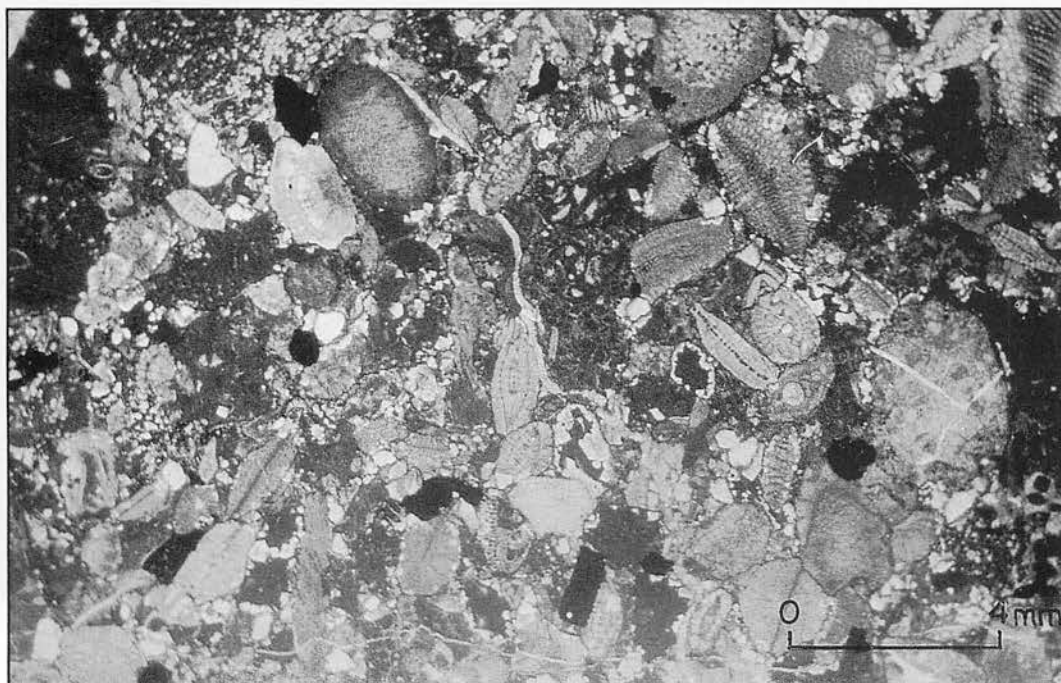


Figure 4: Photomicrograph of the limestone.

PERTEMUAN PERSATUAN
Meetings of the Society

STRATIGRAPHY AND SEDIMENTOLOGY STUDY GROUP

FIELD EXCURSION TO JERAM AND BATU ARANG,

6 OCTOBER 1991

The Study Group successfully organized a day-trip to Jeram and Batu Arang on 6 October 1991. Twenty-two participants from universities and oil companies joined the trip, which enabled them to observe a modern intertidal mudflat at Jeram and a Tertiary coal-bearing sequence at Batu Arang. The excursion was led by Dr. Azhar Hj Hussin of Universiti Malaya.

The chartered coach left the Geology Department (UM) at about 9.30 a.m. and arrived at Jeram at about 11.00 a.m. Low tide enabled the group to walk on the mudflat and observe some interesting sedimentary features. The origin of shell beds beneath the thick mud was discussed. Participants were also shown the remains of an old village which is now in the middle of the tidal flat, purported to be the result of a heavy storm around 1920. The participants, however, could not find the reef-like mounds built by sabellarid worms, as seen during the last visit of the Study Group on 3 April 1988 (*Warta Geologi*, v. 14, no. 2, p. 79-81). This suggests that the biohermal structures are ephemeral features which may not be preserved in the rock record.

The group had an early lunch at about 12.00 p.m. and left for Batu Arang soon after. A brief stop along the road leading to Batu Arang allowed the participants to look at the 'boulder beds' which lie above the coal-bearing Tertiary sequence. We arrived at the quarry to find that much of it is under water. However, the group was able to observe exposures of cross-bedded pebbly sandstones (braided stream deposits). Mining Engineer of Associated Pan Malaysian Cement Sdn. Bhd., En Mohd Azizi Mohammad, was kind enough to show the group around, and brought us to a new quarry face where thinly bedded mudrocks (lacustrine deposits) are exposed. The participants had an interesting discussion on the palaeoenvironment and hydrocarbon source-rock potential of these deposits. Fossil enthusiasts among the participants were excited to find beautifully preserved leaf imprints on shale partings.

The group left Batu Arang at about 4.30 p.m. after a drink at a local coffee shop..

It was a pleasant and educational trip for everyone. The Society would like to thank Dr. Azhar Hj Hussin for guiding the group, and the management of APMC for granting permission to visit the quarry at Batu Arang.

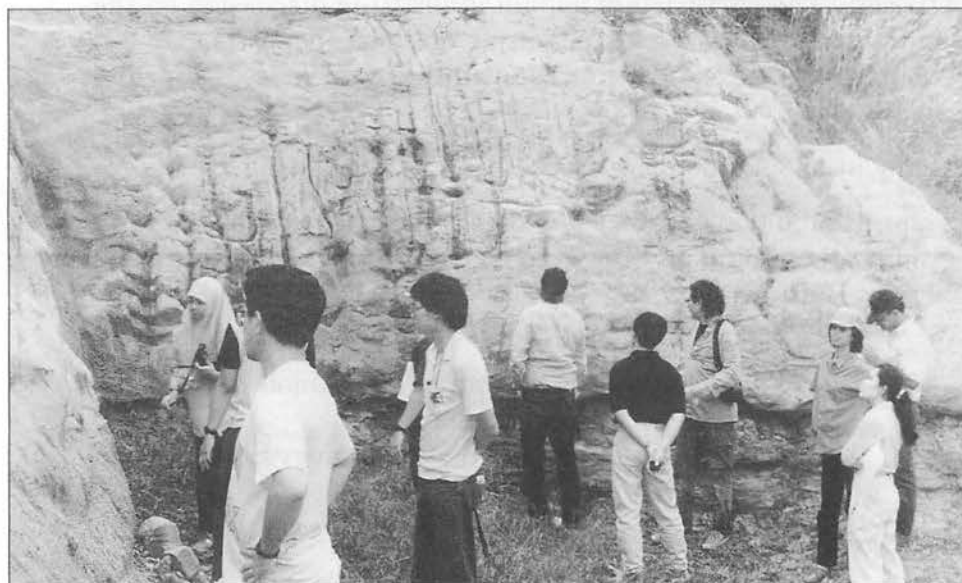
Mazlan B. Hj. Madon
 Chairman
 Stratigraphy and Sedimentology Study Group

**STRATIGRAPHY AND SEDIMENTOLOGY STUDY GROUP
FIELD EXCURSION TO JERAM AND BATU ARANG**



A scene at Pantai Jeram at low tide

Remains of ground-water well in a village which once stood there before the 1920's storm. Pantai Jeram



Participants examining braided stream deposits at APMC Pit, Batu Arang

**STRATIGRAPHY AND SEDIMENTOLOGY STUDY GROUP
FIELD EXCURSION TO JERAM AND BATU ARANG**



Discussion at Batu Arang quarry. Thrust fault or coal seam split ?



Discussion on lacustrine mudrocks, which are being excavated for cement production (background)

Kenneth J. Hsü : Tectonics of South China - Keystone between Southeast Asia & West Pacific**Laporan (Report)**

Professor Kenneth J. Hsü of the Swiss Geological Institute (ETH Zurich) presented the above talk to audience of about 30 on the 9 October 1991, Department of Geology, University of Malaya.

Professor Hsü began his talk by emphasising that South China is post-Caledonian platform, but a composite of orogenic belt. This late Proterozoic/Mesozoic orogen is a collage of three continental fragments. The three blocks are Yangzi, Huanan, and Dongnanya, and they are separated by the Banxi-Nanpanjiang (formerly Xianggangzhe) and Gunanhai Suture zones (Fig. 1).

Yangzi was separated from Gondwanaland during Late Precambrian when an open ocean, called Banxi, was present between the two continents. Tectonic processes at an active margin during Sinian and Early Paleozoic time led to the genesis of an accretionary wedge complex, the Banxi Melange and the Huanan Flysch Nappes, on the northern margin of Huanan, which was then the northern margin of the Gondwana Continent. Recorganization of plates during the Devonian suspended subduction at the Huanan active margin. Huanan was uplifted and unconformably overlain by transgressive deposits of Devonian and/or Carboniferous age. A remnant ocean, the Nanpanjiang Sea, still existed between Yangzi and Huanan, and deep-water sedimentation continued both at the southern margin of Yangzi and at the northwestern margin of Huanan. The latter again became an active margin during Late Paleozoic, when Permian and Triassic flysch sediments were deposited in foredeeps ahead of advancing nappes. Huanan and Yangzi collided during the Triassic, and resulted in the deformation of the passive margin of the latter to form the Yangzi Deformed Belt.

Huanan was separated from a more southerly continent, Dongnanya, in the Devonian by seafloor spreading which created a Late Paleozoic and early Mesozoic ocean (Gunanhai Ocean). A continuously deposited sequence, ranging in age from Devonian to Triassic, was laid down on the southern passive margin of Huanan. On the other side of the ocean, the Dongnanya Permian strata include glacial marine deposits of Gondwanaland affinity. Dongnanya became separated from Gondwanaland during the Late Permian, when it marched northward to be reunited with Huanan. The Huanan passive margin sequence was deformed by folding and overthrusting after the late Mesozoic collision of Huanan and Dongnanya. Scattered outcrops of the Suture melange resulting from this collision occur at a few localities in coastal Fujian.

Dongnanya, was the Mesozoic continent of Southeast Asia, peripheral to mainland Asia. This may or may not have been the eastern continuation of the microcontinent Sibumasu [Siam (Thailand)-Burma-Malaysia-Sumatra]. The collision of Dongnanya and Asia gave rise not only to the Gunanhai Melange of coastal Fujian, but also to the ophiolite melanges, parts of which are present in Taiwan (Tailuko), the Philippines and western Malaysia.

G.H. Teh

Sep-Oct 1991

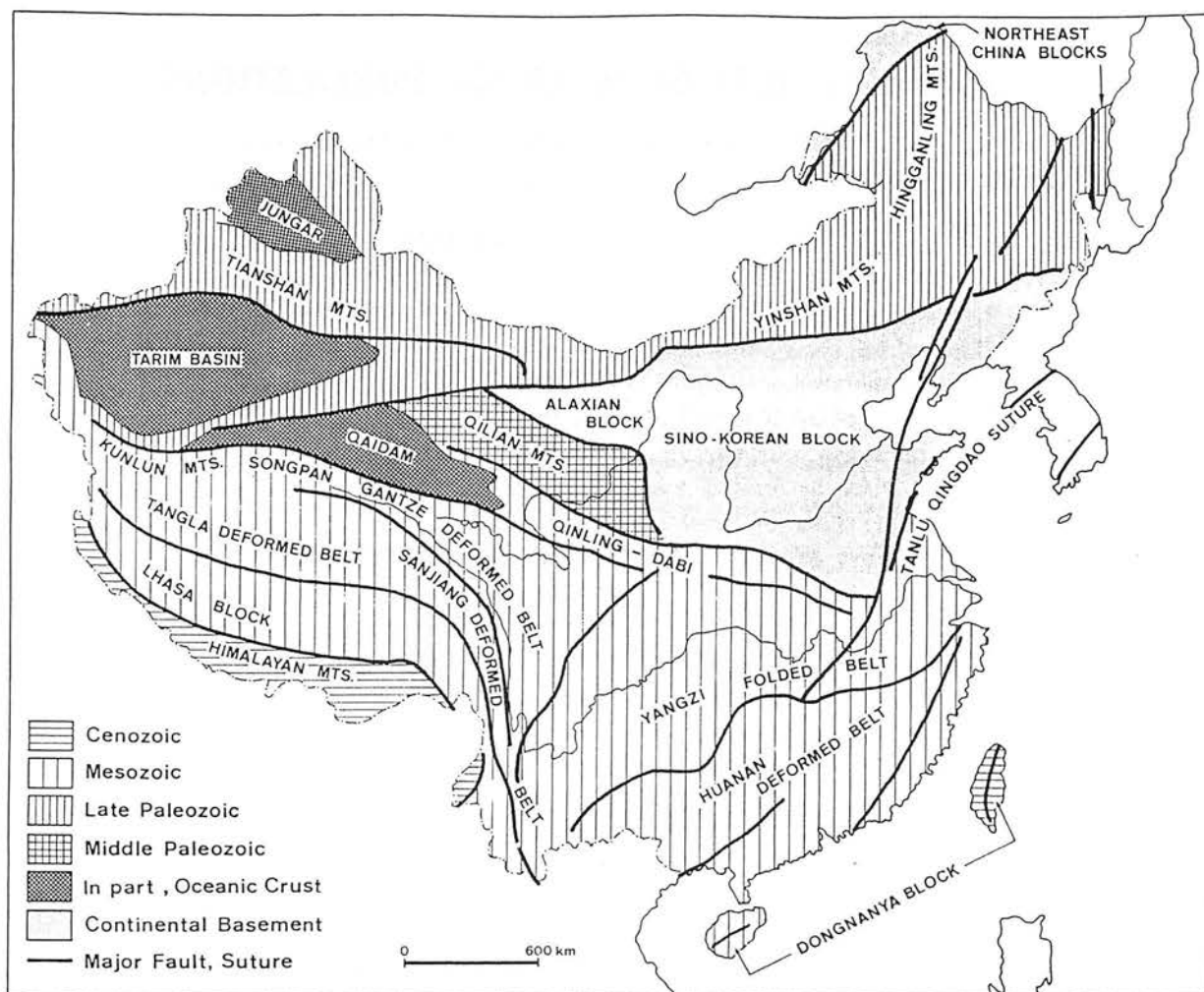


Fig. 1. Tectonic subdivisions of China and some notable tectonic features. This map shows that China is a collage of orogenic belts. The Yangzi Block is separated from Sino-Korean Block by the Qinling-Dabi Mountains and by the Tanlu-Qingdao Suture. Yangzi is also separated from Songpan-Kantze and from Huanan by suture zones.

Kenneth J. Hsü



GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

BULLETIN OF THE GEOLOGICAL SOCIETY OF MALAYSIA
 WARTA GEOLOGI - NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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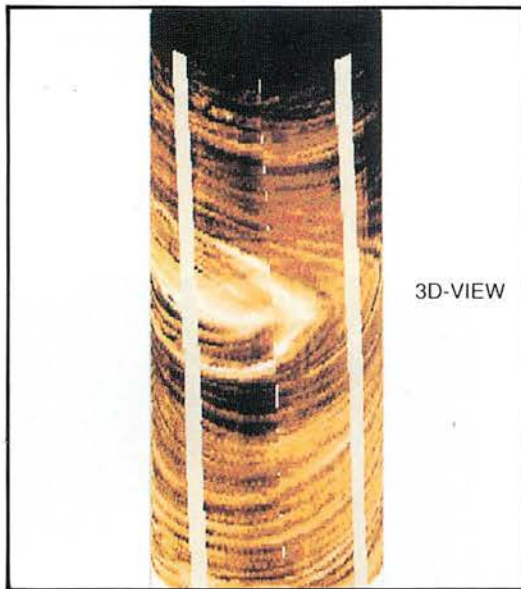
Fullbore Micro Imager*

Formation imaging using microelectrical arrays has benefited the oil industry since its introduction in the mid-80s. The FMI*, Fullbore Formation MicroImager tool, is the latest-generation electrical imaging device. It belongs to the family of imaging services provided by the MAXIS 500* system with its digital telemetry capability.

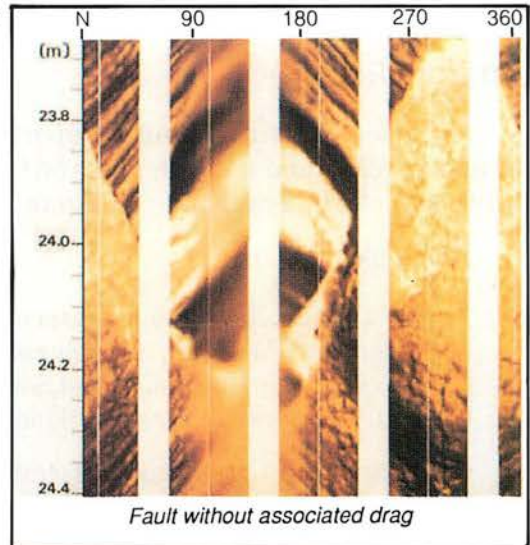
The FMI log, in conductive muds, provides electrical images almost insensitive to borehole conditions and offers quantitative information, in particular for analysis of fractures.

The FMI tool combines high-resolution measurements with almost fullbore coverage in standard diameter boreholes, thus assuring that virtually no features are missed along the borehole wall. Fully processed images and dip data are provided in real time on the MAXIS 500 imaging system.

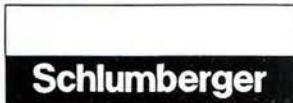
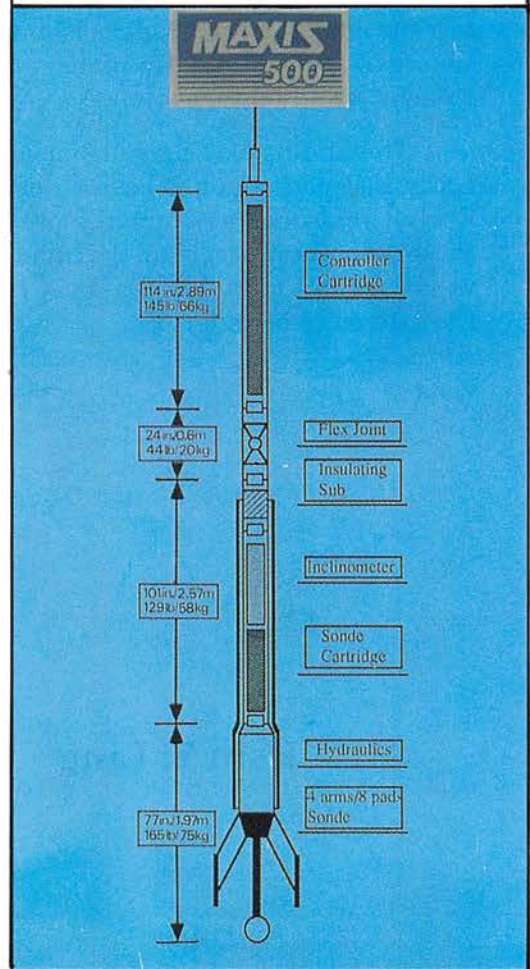
The tool's multiple logging modes allow wellsite customization of results to satisfy client needs without compromising efficiency.



"Bullseye" structure



Fault without associated drag



Hsin Yi Ling : Significance of Radiolaria in the South and Southeast Asian Ophiolite sequence

Laporan (Report)

Professor Hsin Yi Ling of Department of Geology, Northern Illinois University, gave the above talk to about 25 members on the 24th October, 1991 at the Department of Geology, University of Malaya, Kuala Lumpur.

Abstrak (Abstract)

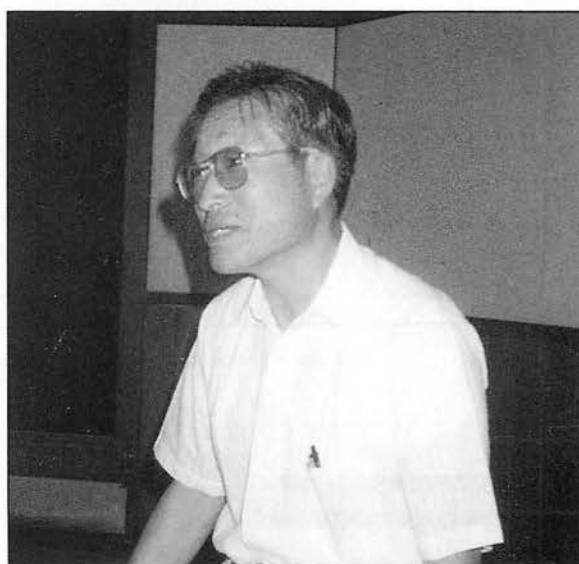
With the collaboration of international scientists from England, India, Indonesia, Malaysia, and Pakistan, intensive ongoing research on Radiolaria from the ophiolitic sequence throughout South and Southeast Asia is in progress to apply this group of siliceous microfossils to regional biostratigraphy control and tectonic interpretation.

Early and Late Eocene assemblage have been recognized from Waigeo Island, suggesting there were at least two accretional episodes. Recovery of Mesozoic faunas, in addition to Eocene forms similar to those from Waigeo samples, indicates multiple terrane amalgamation for the island as reflected in the complicated surface geology. Whether Waigeo and Halmahers Islands belong to the same geological tectonic element awaits future study.

The finding of these radiolarians is significant in view of the fact that a similar Early Eocene fauna has been observed from Andaman-Nicobar Island of India and Early Cretaceous assemblages are being documented from Pakistan. Altogether, these data would ascertain the timing of a mega-suture which extends from Indonesia westward to the Middle East via Himalayas, and represents the Indo-Austral vs. Eurasia plate boundary.

* * * * *

Hsin Yi Ling



BERITA-BERITA PERSATUAN News of the Society

Perlantikan Pengerusi Jawatankuasa Peralunan (Chairman Nomination Committee)

The council in its September meeting nominated Encik Fateh Chand as Chairman of the Nomination Committee to draw up the slate of the Council for the Session 1991/92.

Keahlian (Membership)

The following applications for membership were approved:

Full Members

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Kee Hwa Lim
22 Jalan SS2/20, 47300 Petaling Jaya. 2. Hans P. Hazebroek
SSB., SB-1, 98100 Lutong, Sarawak. 3. P.J. Clews
Core Lab., Lot 10B, Jalan 51A/223,
46100 Petaling Jaya. 4. Menno Wiebe
Hall Houston Malaysia, 18th Floor,
UBN Tower, Jalan Sultan Ismail, Kuala
Lumpur. 5. Eddy Lim
Teca Sdn. Bhd., 137, Yun Onn Building,
Jalan Ban Hock, Kuching, Sarawak. | <ol style="list-style-type: none"> 3. P. Prema Devi
School of Physics, 11800 USM, Pulau
Pinang. 4. Zaidi Bidin, School of Physics
11800 USM, Pulau Pinang. 5. Ahmad Nazim Ahmad Radzi
School of Physics, 11800 USM, Pulau
Pinang. 6. Md. Azhari Md. Sairi
School of Physics, 11800 USM, Pulau
Pinang. 7. Lim Chi Choy
School of Physics, 11800 USM, Pulau
Pinang. 8. S.B. Vickneswaren
School of Physics, 11800 USM, Pulau
Pinang. 9. R. Kumaran
School of Physics, 11800 USM, Pulau
Pinang. 10. Rozilan Mohammad
School of Physics, 11800 USM, Pulau
Pinang. |
|---|---|

Student Members

1. Zaililah Mohd. Tahir
School of Physics, 11800 USM, Pulau
Pinang.
2. Intan Zahara Supian
School of Physics, 11800 USM, Pulau
Pinang.

11. Foo Siang Kiat
School of Physics, 11800 USM, Pulau Pinang.
12. Khor Thai Hong
School of Physics, 11800 USM, Pulau Pinang.
13. Faridah Abdul Hamid
School of Physics, 11800 USM, Pulau Pinang.
14. Lee Kie Huat
School of Physics, 11800 USM, Pulau Pinang.
15. Tan Kah Yau
School of Physics, 11800 USM, Pulau Pinang.
16. Wong Chan
School of Physics, 11800 USM, Pulau Pinang.
17. S. Sukesh
School of Physics, 11800 USM, Pulau Pinang.
18. Nasarudin H. Abdul Aziz
School of Physics, 11800 USM, Pulau Pinang.
19. Mohd. Anuar Md. Razali
School of Physics, 11800 USM, Pulau Pinang.
20. Ahmad Sharifuddin Jaafar
School of Physics, 11800 USM, Pulau Pinang.
21. Mohamad Khatta Daem
School of Physics, 11800 USM, Pulau Pinang.
22. Burhanuddin Sapuan
School of Physics, 11800 USM, Pulau Pinang.
23. Ting Tai Ming
School of Physics, 11800 USM, Pulau Pinang.
24. Yew Soo Lee
School of Physics, 11800 USM, Pulau Pinang.
25. Zainal Abidin Hasan
School of Physics, 11800 USM, Pulau Pinang.
26. Mohd. Fauzi Abdul Kadir
Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi.
27. S. Ruben Raj
Jabatan Geologi, Universiti Kebangsaan Malaysia, 43600 Bangi.
28. Wong Chun Ken
Jabatan Geologi, Universiti Malaya, 59100 Kuala Lumpur.

Pertukaran Alamat (Change of Address)

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

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Geoffrey Pang Vui Kiong
XGR/22, SSB Lutong, 98100 Lutong,
Sarawak. 2. Che Noorliza Lat
P.O. Box 1362, Golden, CO 80402-1362,
U.S.A. 3. Abd. Hanan B. Ahmad Nadzeri
Trenngo Minerals Sdn. Bhd., P.O. Box
159, 20710 Kuala Terengganu. | <ol style="list-style-type: none"> 4. Ho Chee Kwong
Hall-Houston (M), Letter Box 82, 18
Floor, UBN Tower, 10 Jalan P. Ramli,
50250 Kuala Lumpur. 5. Jimmy Ting
Sarawak Shell Berhad, XGP/23, Locked
Bag No. 1, 98009 Miri, Sarawak. 6. Bernie S. Hodges
c/o Amdel Core Services (Thailand) Pty.
Ltd., P.O. Box 52, Songkhla 90000,
Thailand. |
|---|---|

Pertambahan Baru Perpustakaan (New Library Additions)

The Society has received the following publications:

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Journal of Hebei College of Geology,
vol. 13, no. 4, 1990. 2. Annual Report: Chinese Academy of
Geological Sciences, 1989. 3. Natural History Research, vol. 1, no. 2,
1998. 4. Journal of the Natural History Museum
& Institute, Chiba, vol. 1, no. 2, 1991. 5. IMM Bulletin 1001 & 1002, 1991. 6. Geosurvey Newsletter, v. 23, nos. 2-9,
1991. 7. Bulletin of the Geological Research &
Development Centre, nos. 13 (1989) &
14 (1990). 8. Earthquakes & Volcanoes, vol. 22, no. 3
& 4, 1990. | <ol style="list-style-type: none"> 9. AGID News, no. 66, 1991. 10. Bulletin of the Central Geological
Survey, no. 6, 1990. 11. Santana Fossils: an illustrated atlas
edited by John G. Maisey, 1991. 12. Seatrad Centre, annual report 1990. 13. Journal of Geosciences, vol. 34, 1991. 14. Bulletin of the Geological Survey of
Japan, vol. 42, nos. 5 & 6/7, 1991. 15. Transactions of the Institution of
Mining & Metallurgy, Section A, vol.
100, A51-114, 1991. 16. Belgium Geological Survey,
Professional paper nos. 246, 247 & 248,
1991. 17. AAPG Explorer, Sept. 1991. |
|--|---|

BERITA-BERITA LAIN
Other News

Institute of Geology Malaysia – Inaugural General Meeting

The Inaugural General Meeting of the Institute was held on the 18th of May, 1991. During this meeting, the First Council of the Institute was elected and comprises the following:-

President	– Mr. Yin Ee Heng
Vice President	– Mr. Fateh Chand
Hon. Secretary	– Dr. John Kuna Raj
Hon. Treasurer	– Dr. Azhar Haji Hussin
Ordinary Members	– Dr. Syed Sheikh Almashoor
	Mr. Ahmad Said
	Dr. Hamzah Mohamad
	Mr. Chong Foo Shin
	Mr. Choo Mun Keong
	Mr. Abdul Aziz Bin Hussin
	Mr. Albert Loh Thiam Hock

A number of regional representatives have been appointed by the First Council and these presently include:-

Mr. Chen Shick Pei, Geological Survey of Malaysia, Sarawak.

Dr. Leong Lap Sau, Universiti Sains Penang.

En. Yunus Abd. Razak, Geological Survey of Malaysia, Ipoh.

It is to be noted that the said Institute has been set up with the primary aim of establishing an Act of Parliament that will regulate as well as uphold the dignity, standing and reputation of the profession of

geology in Malaysia. The Institute as such **will not** take over the primary role of the Geological Society of Malaysia which is the promotion of the advancement of the geological sciences in the country and other neighbouring areas.

It is furthermore, to be noted that a final draft of the proposed Act of Parliament is now ready and needs to be presented to the Minister of Primary Industries together with all other information relevant to the establishment of the Act. In connection with this, it is to be noted that the total membership of the Institute of Geology Malaysia has to be of a considerable number in order to justify the establishment of the Act.

Arising from the above, the Council implores that as many local geologists as possible apply for admission to membership of the Institute of Geology Malaysia in order that the establishment of the Act be justified.

Applications forms for membership of the Institute of Geology Malaysia can be obtained from any of the Regional Representatives, or from its office at Jabatan Geologi, Universiti Malaya, Lembah Pantai, 59100 Kuala Lumpur.

J.K. Raj

BERITA-BERITA LAIN
Other News

10th International Clay Conference
University of Adelaide
18-23 July 1993

Under the auspices of
The Association Internationale pour l'Etude des Argiles (AIPEA)
Commission VII of the International Society of Soil Science
The Australian Clay Minerals Society Inc.
Incorporating the 13th Australian Clay Mineral Conference

"Clays Control the Environment"

**SCIENTIFIC PROGRAM
OF THE 10TH ICC**

**Program Co-ordinator: Dr. Jock
Churchman**

THEMATIC SESSIONS

Theme A. Soil Mineralogy

Convenor: Professor Robert Gilkes, Australia

Keynote Speaker: Dr. Keith Norrish, Australia

Scope of Theme:

All aspects of clay minerals in soils, including their identification, processes involved in their formation and transformation, relationships between clay mineral composition and soil properties, and the role of clay mineralogy in soil classification.

Theme B. Clays in Industry and the Environment

Convenor: Dr Ahmad Shayan, Australia

Keynote Speaker: Professor Haydn Murray, U.S.A.

Scope of Theme:

The application of clay minerals in industrial products and processes; the extraction, refining and modification of natural clays for industry; criteria for the suitability of clay-based

products in industrial application; colloidal and surface properties and their influence on the applications of clay; and clay as barriers for the prevention of pollution and environment degradation.

Theme C. Clays in Geology

Convenor: Dr Ian Mackinnon, Australia

Keynote Speaker: Professor David Veblen, U.S.A.

Scope of Theme:

The origins and occurrence of clay mineral in terrestrial and extraterrestrial environments. The influence of geologic processes on clays, particularly diagenesis, catagenesis, low grade metamorphism, hydrothermal alteration and weathering. This theme may include discussion on alteration processes in (i) marine and non-marine source rocks, (ii) surface rocks in tropical and temperate (or more extreme) climates or (iii) localized, regional or continental-scale metamorphic terrains. Discussion is also invited on the use of clay mineralogy as a fingerprint for sedimentary processes or as an indicator of key planetary-scale events in the geologic record (e.g. the Pre-Cambrian; the Cretaceous-Tertiary).

Theme D. Surface and Interlayer Reactions

Convenor: Dr Benny Theng, New Zealand
 Keynote Speaker: Professor Gerhard Lagaly, Germany

Scope of Theme:

Reactions of clay and clay minerals with organic compounds; formation and properties of clay-organic complexes; sorption mechanism; conversion and transformation of organic compounds at clay surfaces.

Theme E. Structure, Chemistry and Nomenclature

Convenor: Professor Stephen Guggenheim, U.S.A.

Keynote Speaker: Professor Robert Reynolds, U.S.A.

Scope of Theme:

Crystal structure; crystal chemistry; surface and properties; polytypism; trace elements and isotopes; kinetics; diffusion; thermodynamics; nomenclature; structural changes accompanying reactions such as dehydration, dehydroxylation etc.

SYMPOSIA

Symposium 1. Poorly Crystalline Clays

Convenor: Dr Cyril Childs, New Zealand
 Keynote Speaker: Professor Koji Wada, Japan

Scope of Symposium

All aspects of poorly crystalline clays, taken to include 'non-crystalline' and 'short-range order' minerals; formation; structure; identification and analysis; properties; synthetic studies; natural occurrences including biomineralisation

Symposium 2. Clay Minerals of Gondwanaland

Convenor: Dr Dieter Bühmann, South Africa & Dr Fred Loughnan, Australia

Keynote Speaker: Dr Allan Chivas, Australia

Scope of Symposium

Clay mineralogical work on Gondwanaland: Clay mineralogical work on Gondwanaland rocks, especially sedimentary rocks. The symposium will be aimed at understanding

the evolution of Gondwana sedimentary basins spanning a number of continents. It might become a starting point for an International Geological Correlation Project.

Symposium 3. Methods

Convenor: Dr Clay Cardile, Australia
 Keynote Speaker: Professor Frank Berry, U.K.

Scope of Symposium

All methods and techniques relating to the isolation and characterization of clay minerals. These could include physical and chemical methods for the separation of clays from soils and other media and their subsequent purification. They could also include various applications of computer modelling to clay science and its applications, as well as the use of any instrumental, chemical or thermal analysis methods in clay studies.

Symposium 4. Teaching

Convenor: Professor Joe Dixon, U.S.A.

Keynote Speaker: Professor Udo Schwertmann, Germany & Dr Reg Taylor, Australia

Scope of Symposium

Concepts, methods and demonstrations relevant to the teaching of clay mineralogy

Public Symposium. Clay and the Environment

Speakers to include: Professor Yves Tardy, France & Professor John Webb, Australia

Chair: Robyn Williams, AO

FINANCIAL AID

The Organising Committee hopes to be able to provide partial financial support for a limited number of delegates from developing countries. This support will consist of a waiver of fees for registration and accommodation on a bed and breakfast basis in University Student Housing. It may also be possible to include a contribution towards living expenses. If you wish to be considered for such support please write to Elliservice Convention Management before November 1st 1992. Persons who have already written requesting assistance will be

considered automatically and no further application is necessary. Successful applicants will be notified by March 1st 1993.

LETTERS OF INVITATION

The General Secretary of the Australia and New Zealand Organising Committee is willing to send, on request, a personal invitation to attend the Conference. Such an invitation is only to help raise travel funds or to obtain visa, and is not a commitment on the part of the organisers to provide and financial support.

IMPORTANT DATES

November 1st 1992

- Last date for receipt of applications for financial aid
- Abstracts to be received
- Registration fee at the discounted rate ceases
- Field Trips deposit to be paid

March 1st 1993

- Field Trip details accompany confirmation
- Notification of acceptance of abstract
- Third Circular is mailed to respondents to Second Circular and Registrants

June 1st 1993

- Balance due on Field Trips and Optional Tourist Trips to be paid

July 18th 1993

- 10th ICC commences
- Final date for submission of manuscripts for inclusion in Proceedings

INSTRUCTION FOR PREPARATION ABSTRACTS

Abstracts should be written in the style set out in the following example, but at A4 size.

Example: *Soil structure and water flow in a semi-arid region of Australia*

The Organising Committee may reject abstracts if they are not sufficiently informative, or do not contain new material, or are outside the scope of the Conference.

Abstracts must be submitted before November 1992

CONTRIBUTED PAPERS

The language of the Conference will be English. Papers will be presented in three concurrent sessions. Authors should indicate their preference for an oral or poster presentation. Presentation in either form will require the presence of an author.

Oral presentations will be 15 minutes duration with 5 additional minutes for questions.

Poster presentations include the opportunity for a 3 minute oral presentation. An area of 2m x 1m (approximately 6ft x 3ft3ins) will be provided for each poster display.

PROCEEDINGS

Contributed papers may be published following peer review after the Conference. Authors wishing to have their papers included in the Proceedings must bring the completed manuscript to the Conference, or send it in advance to the General Secretary. Papers may be no more than 8 pages including figures, tables and references. The Proceedings will be sent to all delegates.

CORRESPONDENCE ADDRESSES

Concerning scientific aspects of the Conference:

Dr. Rob Fitzpatrick
 General Secretary 10th ICC
 CSIRO Division of Soils
 Private Bag No. 2, P.O.
 Glen Osmond,
 South Australia 5064
 Australia

International Telephone: +618 274 9230
 International Facsimile: +618 338 1636
 National Telephone: 08 274 9230
 National Facsimile: 08 338 1636

XVI IUCr CONGRESS
XVI CONGRESS AND GENERAL ASSEMBLY
INTERNATIONAL UNION OF CRYSTALLOGRAPHY
 21 – 29 August 1993, Beijing, China

FIRST CIRCULAR

The XVI Congress and General Assembly of the International Union of Crystallography will be held on 21 – 29 August 1993 in Beijing, China. The Organising Committee cordially invites you to attend the Congress.

SCIENTIFIC PROGRAMME

The scientific programme will include invited lectures, microsymbiosia and poster sessions. In addition, some discussion sessions will be organized in certain cases. The list of topics and categories for submission of papers is being revised and will include the microsymbiosia topics.

PROGRAMME COMMITTEE

Chairman: Xiao-jie Xu (China)

Members:

- A. Authier (France)
- W.L. Duax (USA)
- J.R. Helliwell (UK)
- W.G.J. Hol (The Netherlands)
- Y. Katsube (Japan)
- F. Liebau (Germany)
- Y. Le Page (Canada)
- V.I. Simonov (USSR)
- J.W. White (Australia)

Secretary: Lu-hua Lai

ORGANIZING COMMITTEE

Chairman: Mei-cheng Shao

Vice-Chairmen:

- Jing-kui Liang
- Jing-ling Huang

Chief Secretaries:

- Tie-liang Wang
- Hui Liu
- Xiang-lin Jin

Hangzhou, Zhejiang 310028

Programme Chairman:
Prof. D.H. Flack

SATELLITE MEETINGS**1. Symposium on Molecular Structure**

Location: Fuzhou

Organizing Chairman:

Prof. Jin-lin Huang

Fuzhou University, Fuzhou, Fujian 350002

Programme Chairmen:

- Dr. J.A.K. Howard
- Dr. W.L. Duax

2. Synchrotron Radiation in Crystallography

Location: Beijing

Organizing Chairman:

Dr. Ding-chang Xian

Institute of High Energy Physics, 19 Yuquan Road, Beijing 100039

Programme Chairman:

Prof. J.R. Helliwell

3. Neutron Scattering

Location: Beidaihe

Organizing Chairman:

Dr. Chun-tang Ye

P.O. Box 275-30, Beijing 102413

Programme Chairman:

Dr. S.A. Mason

4. Powder Diffraction

Location: Hangzhou

Organizing Chairman:

Prof. Rong-guo Ling

Central Laboratory of Hangzhou University,

SOCIAL PROGRAMME AND TOURS

An optional social programme, including a banquet, accompanying member programme and sightseeing to the Great Wall, will be arranged. In Beijing there are many other historic sites and beautiful views, such as Ming Tombs, Forbidden City, Summer Palace, Temple of Heaven, etc. Post-Congress tours in other cities, such as Xian, Shanghai, Hangzhou, Guilin, will be available.

EXHIBITION

Commercial and non-commercial instrument, books and software demonstrations will be exhibited during the Congress.

Correspondent: Dr. Ruo-heng Zhang (Department of Chemistry, Peking University)

ADDRESS FOR CORRESPONDENCE

All correspondence should be addressed to:

Department of Chemistry
Peking University
Beijing 100871
China
Fax (861) 2564095

Kursus-kursus latihan & bengkel-bengkel (Training Courses & Workshops)

1992

November 18-22

GEOLOGY AND GEOPHYSICS FOR THE RESERVOIR ENGINEER (Rueil-Malmaison). Language: French (English, if number of participants allows).

December 2-13

WELL LOG ANALYSIS (Rueil-Malmaison). Language: French (English, if number of participants allows).

MINING MANAGEMENT (Kensington, New South Wales, Australia). Master's and graduate diploma degrees in Mining Management, as well as individual short courses. (Courses may be presented at other locations by arrangement.) For Information: Dr. Mike Katz, Associate Director, International Key Center for Mines, University of New South Wales, P.O. Box 1, Kensington NSW 2033, Australia.

PROFESSIONAL DEVELOPMENT SEMINARS IN MINERAL ENGINEERING AND MINERAL ECONOMICS. Conducted by the Department of Mining and Metallurgical Engineering, McGill University. Language: English. For Information: Lorna McFadden, Department of Mining and Metallurgical Engineering, McGill University, 3480 University Street, Montreal, Quebec H3A 2A7, Canada.

SHORT COURSES IN PETROLEUM GEOLOGY AND RELATED DISCIPLINES. Conducted by IHRDC. Language: English. For Information: IHRDC Instructional Programs, 535 Boylston Street, Boston, MA 02116, USA.

SWEDISH INTERNATIONAL UNIVERSITY CONSORTIUM (Stockholm, Sweden).

Master's degree programs lasting three semesters, including a Master's thesis project. Courses in applied Geophysics and Geochemistry at Lulea. Language: English. For Information: Dr. Bjorn Ohlander, Economic Geology, Lulea University of Technology, S-951 Lulea, Sweden.

TWAS ITALIAN AWARDS SCHEME. A series of grants for developing-country geoscientists of proven ability to work and study for periods up to 10 months at the following Italian universities: Florence, Milan, Padua, Pisa, Rome, Trieste, Turin, and CNR Pisa. For Information: Executive Secretary, Third World Academy of Sciences, International Centre for Theoretical Physics, P.O. Box 586, Strada Costiera 11, I-34100 Trieste, Italy.

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U.S. GEOLOGICAL SURVEY, Office of International Geology, Training Section, 917 National Center, Reston, Virginia 22092. USA.

KALENDAR (CALENDAR)**1992****October 17-22**

HYDROLOGY AND HYDROGEOLOGY, mtg., Portland, Ore. (American Institute of Hydrology, 3416 University Ave. S.E., Minneapolis, 55414-3328. Phone: 612/279-1030)

October 18-23

LATE PRECAMBRIAN TECTONICS AND THE DAWN OF THE PHANEROZOIC, GSA Penrose Conference, Death Valley, Calif. (Ian W.D. Dalziel, Institute for Geophysics, University of Texas, Austin, 78759-8345. Phone: 512/471-6156. Fax: 512/471-8844)

October 19-21

BIO-LEACHING MINERALS AND MINERAL-LAND RECLAMATION, mtg. and workshop, Sacramento, Calif. (Yung Sam Kim, Nevada Institute of Technology, Box 8894, Campus Station, Reno, Nev. 89507. Phone: 702/673-4466)

October 25-30

IN-SITU MINERALS RECOVERY, mtg., Santa Barbara, Calif. (Engineering Foundation, 345 E. 47th St., New York, 10117. Phone: 212/705-7835. Fax: 212/705-7441)

October 26-28

EXTRACTIVE METALLURGY OF GOLD AND BASE METALS, int'l. mtg., Kalgoorlie, Western Australia. (V.N. Misra, Kalgoorlie Metallurgical Laboratory, Box 881, Kalgoorlie, 6430, Australia. Phone: (090) 220 120. Fax: (090) 912 762) Papers invited.

October 26-29

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Cincinnati, Ohio, USA. (Jean Kinney, GSA Headquarters, P.O. Box 9140, Boulder, Colo. 80301, USA. Phone: (303) 447-2020).

November 8-13

WATER RESOURCES AND ENVIRONMENTAL ENGINEERING, mtg., Santa Barbara, Calif. (C.V. Freiman, Engineering Foundation, 345 E. 47th St., New York, 10017. Phone: 212/705-7835. Fax: 212/705-7441)

November 29-December 2

TECTONIC FRAMEWORK AND ENERGY RESOURCES, mtg., Kuala Lumpur, Malaysia. (Secretariat, c/o Dept. of Geology, University of Malaya, 59100 Kuala Lumpur, Malaysia)

November 30-December 3

OFFSHORE SOUTHEAST ASIA, mtg., Singapore. (Society of Petroleum Engineers, Box 833836, Richardson, Texas 75083-3836. Phone: 214/669-3377. Fax: 214/669-0135)

December 28-31

GEODYNAMICS OF THE ARABIAN LITHOSPHERE, int'l. mtg., Baghdad. (Sahil Alsinawi, Dept. of Geology, College of Science, University of Baghdad, Jadiryah, Iraq)

1993**April 17-20**

EXPLORATION AND DISCOVERY, mtg., Denver, by Society of Economic Geologists, Society of Exploration Geophysicists, and others. (J. Alan Coope, SEG Conference '93, Box 571, Golden, Colo. 80402. Phone: 303/837-5819. Fax: 303/837-5851)

April 25-28

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, ann. mtg., New Orleans. (AAPG, Box 979, Tulsa, Okla. 74101-0979. Phone: 918/584-2555. Fax: 918/584-0469)

May 16-20

ENVIRONMENTAL HYDROLOGY AND HYDROGEOLOGY, mtg., Washington, D.C. (Secretariat, American Institute of Hydrology, Second USA/USSR Conference, 3416 University Ave. S.E., Minneapolis, 55414-3328. Phone: 612/379-1030. Fax: 612/379-0169)

May 17-19

GEOLOGICAL ASSOCIATION OF CANADA/ MINERALOGICAL ASSOCIATION OF CANADA (Joint Annual Meeting), Edmonton, Alberta, Canada. (J.W. Kramers, Alberta Geological Survey, P.O. box 8330, Station F, Edmonton, Alberta T6H 5X2, Canada. Phone: (403) 438-7644; telefax: (403) 438-3644)

May 25–June 15

BASIN TECTONIC AND HYDROCARBON ACCUMULATION, mtg., Nanjing, People's Republic of China, by Nanjing University. USGS, Society of Petroleum Geology of China, and others. (David G. Howell, MS902, USGS, 345 Middlefield Road, Menlo Park, Calif. 94025. Phone: 415/329-5430. Fax: 415/354-3224)

June 1–5

GEOTECHNICAL ENGINEERING, int'l. mtg., St. Louis. (Norma R. Fleming, 119 ME Annex, University of Missouri, Rolla, 65401-0249. Phone: 314/341-6061; 800/752-5057. Fax: 314/341-4992)

June 7–11

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (55th Annual Meeting and Exhibition), Forum, Stavanger, Norway. (Evert van der Gaag, Business Manager, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, The Netherlands. Phone: (03404) 56997)

June 20–27

ZEOLITES, int'l. mtg., Boise, Idaho, by International Committee on Natural Zeolites. (F.A. Mumpton, Dept. of Earth Sciences, State University of New York, Brockport, 14420. Phone: 716/395-2635; 716/637-2324. Fax: 716/395-2416)

June 21–25

ROCK ENGINEERING, mtg. and workshop, Lisbon, Portugal, by International Society for Rock Mechanics. (Luis Ribeiro e Sousa, Portuguese Society for Geotechnique, Laboratorio Nacional de Engenharia Civil, Av. do Brasil, 101, 1799 Lisboa Codex Portugal. Phone: 848 21 31. Fax: 89 76 60)

July

ENVIRONMENTAL CONTEXT OF HUMAN EVOLUTION (International Scientific Congress and Exhibition), The Netherlands and Indonesia. (Dr. Hans Beijer, Geological Survey of The Netherlands, P.O. Box 157, NL-2000 AD Haarlem, The Netherlands. Telefax: 31 23 351614)

July 18–23

CLAY CONFERENCE (10th International Conference in conjunction with Commission VII of the International Soil Science Society), Adelaide, South Australia. (Dr. Tony Eggleton, Geology Department, ANU, GPO Box 4, Canberra, ACT 2601, Australia)

August 23–29

GEOMORPHOLOGY (3rd International Conference), Hamilton, Ontario, Canada. (3rd International Conference on Geomorphology, McMaster University, Hamilton, Ontario L8S 4K1, Canada. Phone: (416) 525-9140, ext. 4535; telefax: (416) 546-0463; telex: 061-8347)

August 23–29

COASTAL SEDIMENTOLOGY, mtg., Hamilton, Ontario. (William F. Tanner, Dept. of Geology B-160, Florida State University, Tallahassee, 32306. Phone: 904/644-3208)

September 25–October 1

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR, mtg., Canberra, Australia. (IAVCEI ACTS, GPO Box 2200, Canberra ACT 2601, Australia. Phone: 61/6/257-3299. Fax: 61/6/257-3256)

1994

June 6–10

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (56th Annual Meeting and Exhibition), Austria Center, Vienna, Austria. (Evert Van der Gaag, Business Manager, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, the Netherlands. Phone: (03404) 56997; telefax (03404) 62640; telex: 33480)

1995

May 29–June 2

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (57th Annual Meeting and Exhibition), Glasgow, UK. (Evert van der Gaag, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, The Netherlands. Phone: (03404) 56997; telefax: (03404) 62640; telex: 33480)

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