

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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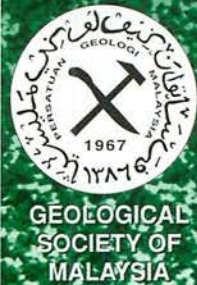
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The Society was founded in 1967 with the aim of promoting the advancement of earth sciences particularly in Malaysia and the Southeast Asian region.

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

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Seismic mapping of Quaternary deposit at Tanjung Selangor, Pekan, Pahang

UMAR HAMZAH, IBRAHIM ABDULLAH, CHE AZIZ ALI, AHMAD JANTAN
AND LEE BENG HUAT
Jabatan Geologi
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Bangi, Selangor D.E.

Abstract: An unmigrated stacked seismic section of approximately one kilometre length obtained from a high resolution seismic survey at Tanjung Selangor, Pekan, Pahang delineates the 100–180 m thickness of Quaternary deposit overlying the granite bedrock. The deposit consists of approximately 30 m of Holocene greenish marine clay and 70 to 150 m thickness of Pleistocene fluvial sediments. Numerous high-angle and listric normal faults are traced in the Pleistocene sediments. These faults are formed due to the irregularity of the granite bedrock and the resulting differential compaction of sediments deposited on top of the granite body. Seismically, the fluvial deposits are characterized by strong amplitude, high frequency and parallel reflection sequence. Free reflection zones from 180 m depth and below on the other hand represents the granite bedrock. No information is obtained from depth shallower than about 20 m.

Abstrak: Endapan Kuaterner setebal 100–180 m menindih batu dasar granit telah dapat dikesan pada keratan rentas seismos tanpa migrasi sepanjang hampir satu kilometer yang diperolehi dari satu survei seismos beresolusi tinggi di Tanjung Selangor, Pekan, Pahang. Endapan tersebut terdiri dari lempung lautan berwarna kehijauan setebal hampir 30 m yang berusia Holosen dan sedimen sungai berusia Pleistosen setebal 70 hingga 150 m. Dalam sedimen Pleistosen didapati banyak sesar normal berjenis listrik dan curam. Sesar-sesar tersebut terbentuk disebabkan oleh permukaan granit yang tidak seragam dan mampatan kerbedan sedimen yang terenap dibahagian atasnya. Ciri-ciri seismos yang ditunjukkan oleh endapan sungai tersebut ialah jujukan pantulan yang beramplitud besar, berfrekuensi tinggi dan selari. Zon-zon yang tidak menunjukkan pantulan selari atau yang tidak menunjukkan sebarang pola adalah mewakili jasad granit. Tidak ada sebarang maklumat diperolehi dari kedalaman lebih cetek dari 20 m.

SEISMIC SURVEY

Seismic reflection surveys have been very successful in delineating deep subsurface oil trap structures since nearly seventy years ago. The technique has recently been used to image shallow structures for application in environmental studies (Miller *et al.*, 1994), shallow stratigraphy (Miller *et al.*, 1995) and geoenvironmental engineering (Umar *et al.*, 1998). This short note reports the application

of the same technique in mapping a Quaternary deposit at Tanjung Selangor, Pekan, Pahang (Fig. 1). Explosive sources (Emulex 150 and electric detonators), 24 low-frequency geophones and ABEM MK 3 seismograph were used to acquire data in the field. The common midpoint (CMP) (Mayne, 1962) or roll-along technique was used for the source-geophones arrangement. Shot was moved at every 10 m spacing and geophones spacing was fixed at 5 m. This configuration produced 12-fold CMPs. The one-

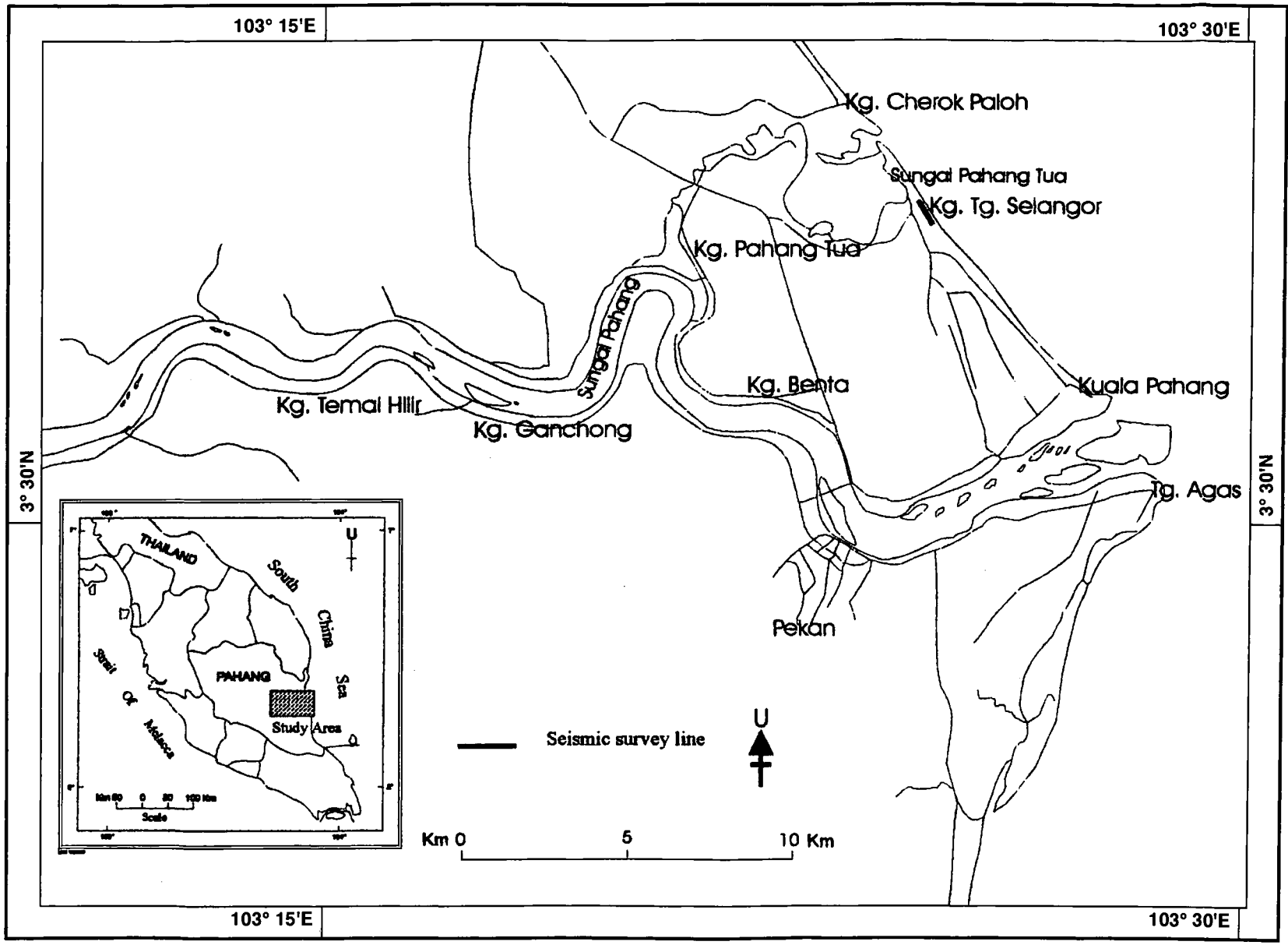


Figure 1. Location of the seismic survey line.

second record length data was conventionally processed to produce an unmigrated stacked seismic section.

QUATERNARY DEPOSITS

The Quaternary sediments underlying the delta plain can be divided into two sequences, namely the Holocene sediments and the older Pleistocene sediments. Recent sediments are those deposited by the present day processes and systems that are operating onland and nearshore. These include sediments of the present day beachridges, beaches, strand plain, river-mouth spits, lagoons, river channels, levees and flood plains. Most of these sediments are still exposed on the surface and extend down to about 25 m below the surface. The sediments consist of various facies ranging from mud to coarse sands and contain abundant carbonaceous material, shells, and plant debris. The younger sedimentary succession is unconformably underlain by Pleistocene and older sediments. The Pleistocene and older sediments are made up of basically two facies, namely very thick to thick intervals of gravels and very coarse to coarse angular sand ranging from 5 to 15 m thick passing up or alternating with thin, less than 1 to 3 m thick, white kaolinitic clay intervals. Several intervals of reddish mottled clay representing horizons of subaerial exposures occurred at depths of 40 m and 100 m within the sequence.

SEISMIC INTERPRETATION

Figure 2 shows the final seismic section from a N-S survey in the study area. The data shows parallel alignments of reflection (layered facies) from approximately at 50 to 300 milliseconds with some breaks and distortion at the middle of the section. Below this layered pattern is a reflection-free facies. These two facies suggest that there are only two types of deposits occurring in the study area. For detail interpretations, an existing borehole (Fig. 3) near the seismic line is referred to. Interpretation for the near surface material is based solely on the borehole data since information on the seismic section only starts from depths of approximately 20 m. Prior to the interpretation, the seismic section is

converted to depth section and compared with the borehole data (Fig. 4). Depth from the surface to about 30 m is interpreted as marine clay sediment of Holocene age. This is not observed in the seismic section as mentioned earlier since the section only starts at about 20 m depth. Materials at depths deeper than 30 m to approximately 160 m to the southern end and about 200 m to the northern end is interpreted as fluvial deposits of Pleistocene age. The seismic section shows intense faulting in the fluvial deposits with most of the faults of high angle and listric in shape, representing normal faults. Faulting is believed to be due to the irregularity of the granitic bedrock and differential compaction of the sands.

CONCLUSION

Seismic-reflection data at this site have the potential to detect stratigraphic and structural features of the Pleistocene fluvial sediments deposited on top of the older granite body. The vertical separation of the layering in the fluvial deposits is around 8 m representing approximately a wavelength of the sound energy used in the survey. Numerous dipping faults and irregular form of the granite surface could be clearly visualized in the stacked seismic section. However, the presence of the Holocene marine sediments at depth shallower than 30 m could not be detected in the seismic section.

ACKNOWLEDGEMENT

The authors wish to thank the government of Malaysia for providing the research fund under the IRPA 02-02-02-0004, The Mines Research Institute for the explosive source handling and finally to the department research assistants and technician for their help in the field and data processing.

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- MILLER, R.D., ANDERSON, N.L., FELDMAN, H.R. AND

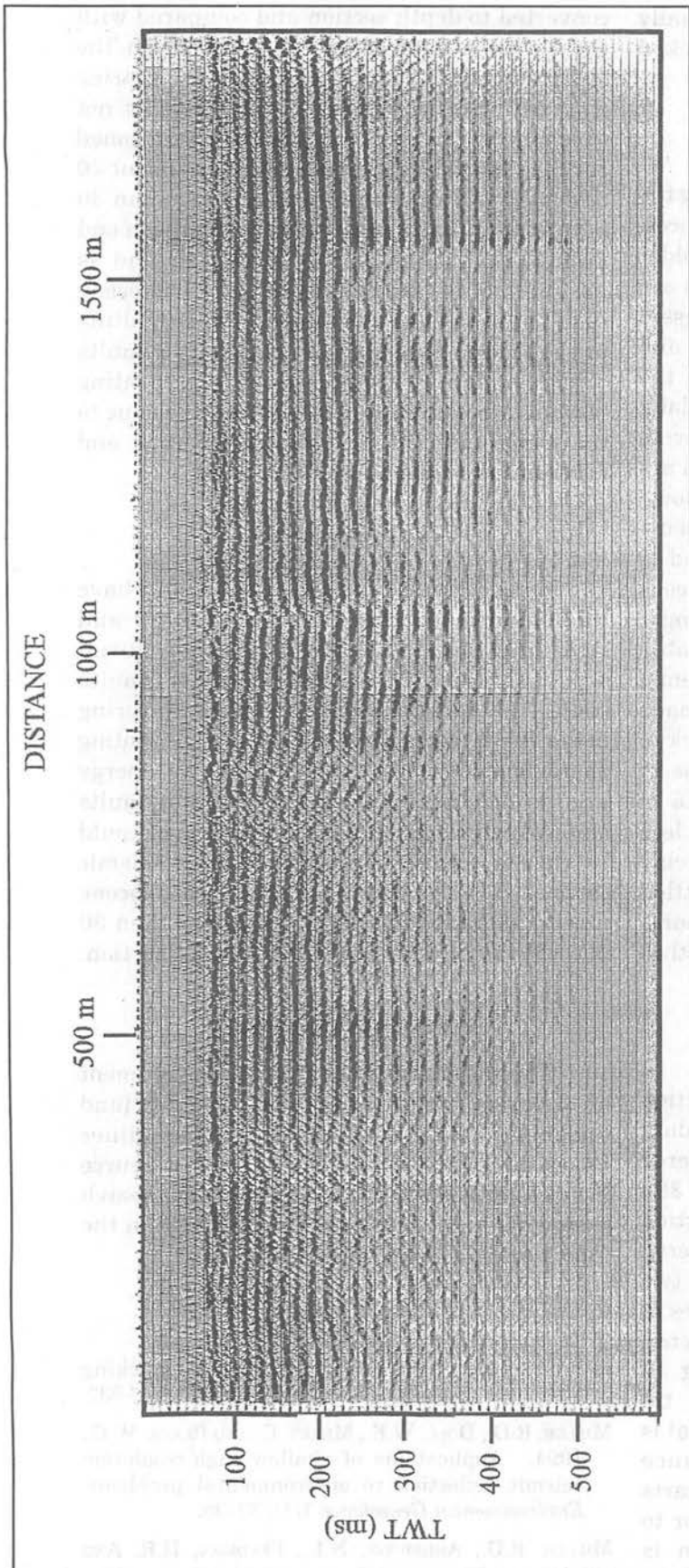


Figure 2. Final stacked seismic section.

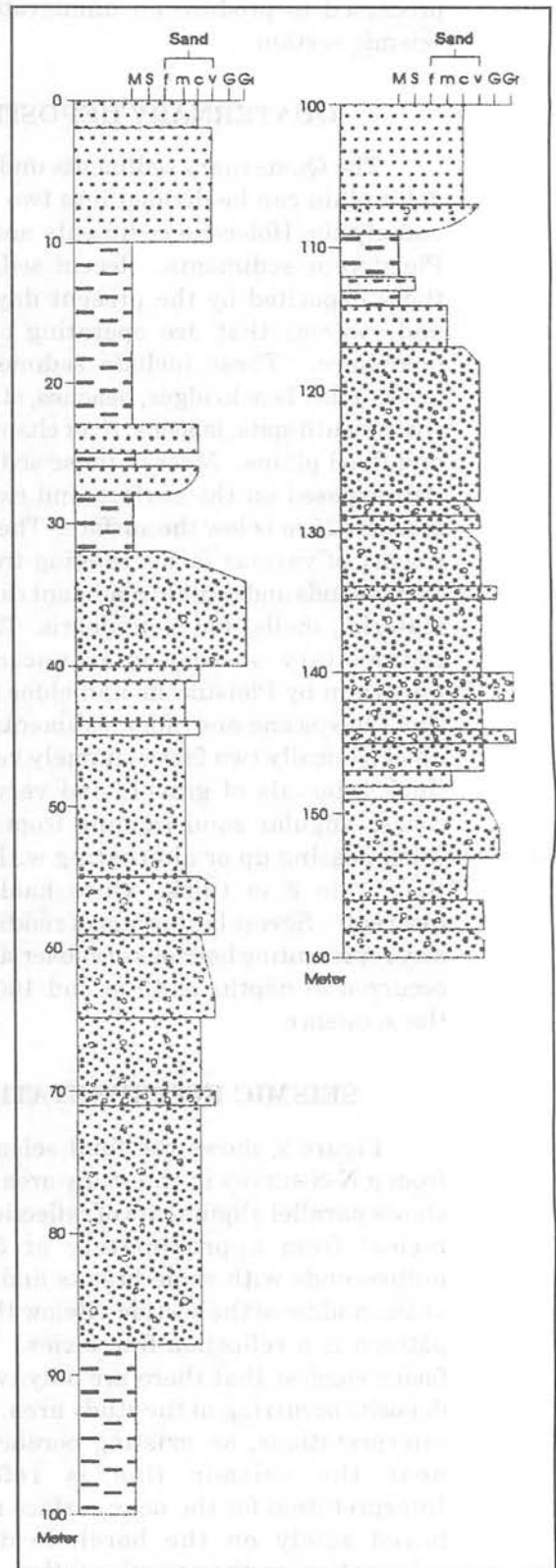


Figure 3. Borehole lithologic log.

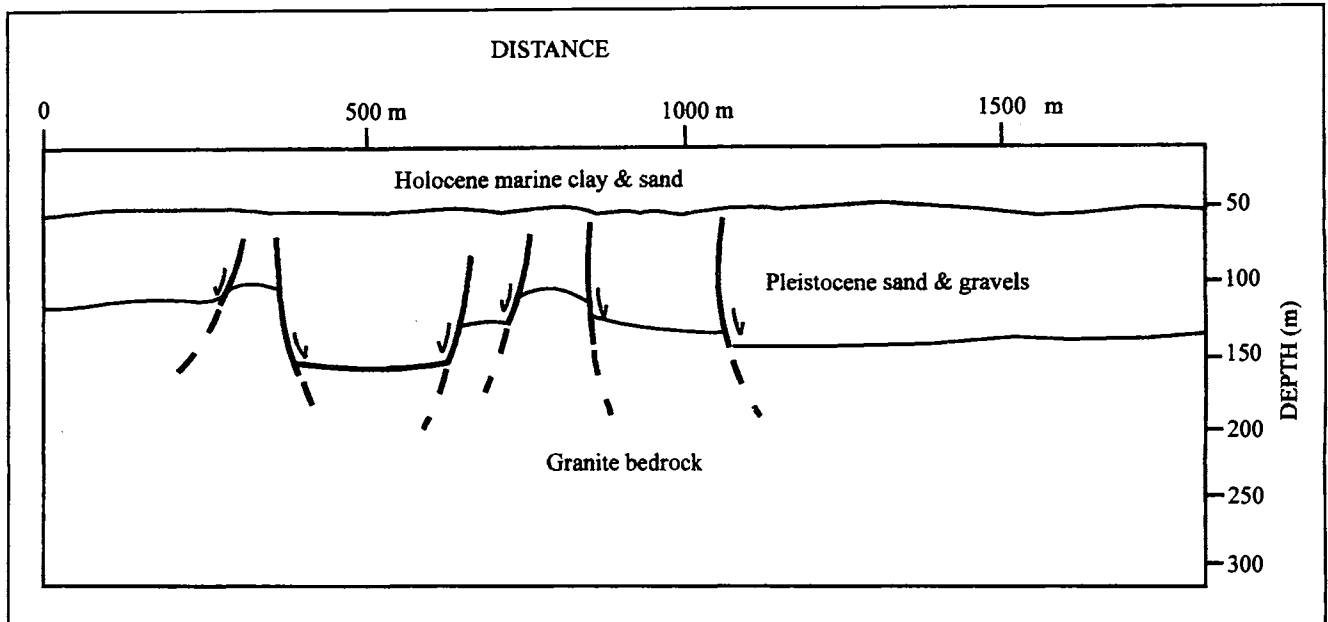


Figure 4. Geological interpretation based on seismic & borehole.

FRANSEN, E.K., 1995. Vertical resolution of a seismic survey in stratigraphic sequences less than 100 m deep in southern Kansas. *Geophysics*, 60(2), 423–430.

UMAR HAMZAH, ABDUL RAHIM SAMSUDIN DAN ABDUL GHANI

RAFEK, 1998. Application of shallow seismic reflection in geoenvironment and geoengineering mapping. *Proceeding of abstracts, Ninth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia, Kuala Lumpur*, 66–68.

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8, 43300 Seri Kembangan.</p> | <p>3. Roger Higgs
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berkunci 2073, 88739 K. Kinabalu.</p> |
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Associate Member

1. Mohd Pakari Yusoff
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GSM

PETUKARAN ALAMAT (Change of Address)

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- | | |
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Singapore, 069536 4. Maarof Seman
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CURRENT ADDRESSES WANTED

The GSM is seeking the addresses of the following members. Anyone knowing the new addresses please inform the Society.

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Lutong, Sarawak. | <ol style="list-style-type: none"> 3. Huw Evans
Premier Oil Pacific Ltd., 1 Scotts Road,
#21-01/03 Shaw Centre, Singapore 228208. |
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PERTAMBAHAN BAHARU PERPUSTAKAAN (New Library Additions)

The Society has received the following publications:

1. SOPAC, vol. 15, nos. 1, 2 and 3, 1998.
2. Geoscience, vol. 12, nos. 1-3, 1998.
3. Earth Science Frontiers, vol. 5, nos. 1-3, 1998.
4. Geological Literature of Russia: bibliographical yearbook for 1992 year (1998).
5. Episodes, vol. 21, no. 4, 1998.
6. AAPG Explorer, Jan & Feb 1999 and Dec 1998.
7. AAPG Bulletin, vol. 82/12, 1998.
8. Geoscience Journal, vol. 2, no. 3, 1998.
9. Geological Survey of Japan, Bulletin, vol. 49, nos. 4-7, 1998.
10. Monthly statistics on mining industry in Malaysia, Oct 1998.
11. Quarterly Notes: Geological Survey of New South Wales, no. 107, 1998.
12. USGS Professional Paper: 1998: No. 1409-A; 1997: Nos. 1546, 1580, 1579.
13. U.S. Geological Survey: Bulletin 1997: Nos. 2094-A, 2159.
14. U.S. Geological Survey: Circular 1997: No. 1140.

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BERITA-BERITA LAIN Other News

Local News

EIA report for construction of Jas dam approved

The State Department of Environment has approved the Environmental Impact Assessment report for the construction of the RM150 million Jas dam in Selangor, Jasin.

Its director Ahmad Kamarulnajib Che Ibrahim said the approval was given to the State Government, through the Malacca Water Corporation, recently.

However, he said, the department's enforcement officers would continue to monitor the project to ensure compliance by both the corporation and company which would undertake the project.

The dam will encompass about 800 hectares of the degazetted forests in Bukit Sedanan.

Chief Minister Datuk Seri Abu Zahar Isnin had said the project was one of the State's long-term measures to ensure adequate water supply.

Abu Zahar had said construction of the dam must not be delayed in anticipation of a water shortage in the State by 2001.

Water demand in the State last year stood at

275 million litres per day and would increase to 294 million litres this year.

"By 2000, a total of 314 million litres will be needed daily and 360 million litres in 2001," Abu Zahar had said.

By 2002, the daily demand would be 406 million litres, 2003 (451 million), 2004 (497 million), 2005 (543 million), 2006 (592 million) and 2007 (641 million).

Other projects being carried out to ensure sufficient supply include the expansion of the Bertam Baru treatment centre (24 million litres daily), the Chinchin treatment centre (1.7 million litres daily), the Gadek treatment centre (55 million litres daily) and the Kampung Lancang treatment centre (110 million litres daily).

Ahmad Kamarulnajib said the authorities and developers involved must follow all the recommendations and conditions contained in the report, failing which action would be taken.

The dam will take between two and 2 1/2 years to complete.

NST, 6.1.1999

La Nina to have little impact on weather

The *La Nina* weather phenomenon was not as serious as originally forecast and the phenomenon will have little impact on our weather from now on, Science, Technology and Environment Minister Datuk Law Hieng Ding said.

"I can quite safely say that our weather is quite normal and there will not be any major unwelcome weather changes," he said yesterday at his ministry after the weekly Cabinet meeting.

He said the phenomenon which was earlier expected to cause wetter than normal conditions

in the region was no longer "a threat".

"It is not officially over but it did not develop according to what we had forecast."

"It does not matter now how much longer it lasts because the major part of it is over and we are now in the tail-end of it," he said.

The Meteorological Services Department said the above average monthly rainfall in December caused by active monsoon conditions indicates some impact of *La Nina* in the country.

However, it said *La Nina* was expected to be in its dying stage from mid-February to March,

and its impact on rainfall would be insignificant.

To a question, Law said the detailed terms and conditions of the department's planned privatisation was still being negotiated between the Economic Planning Unit and the local company set to take over.

Law said the Cabinet also agreed yesterday for the ministry to expedite the tendering of equipment for the Malaysian Centre for Remote Sensing (Macres)'s ground receiving station in Temerloh, Pahang.

The Cabinet last week directed Macres to use satellite images to monitor all water catchments, forest reserves, highland development sites, wildlife parks and highly

sensitive coastal areas.

However, Law said because Malaysia was presently buying satellite data from Thailand, Indonesia, the US and Europe, the ministry could not always get images of the areas it wanted.

"We hope to conduct the satellite imaging exercises of these areas three to four times a year," he said.

The ground station will receive satellite data for immediate processing from Spot (French-owned), Radarsat (Canada), IRS-IC (India) and NOAA (US).

It will be linked with the Macres headquarters here via fibre optics.

Star, 14.1.1999

Dam to flood 600 ha in Kuala Kubu Baru

A dam which will flood 600 ha of mostly state land has been proposed for Sungai Selangor in Kuala Kubu Baru.

It is learnt that the Government, in a letter dated Sept 20, granted permission to the dam project's proponent, Consortium TSWA-Gamuda-KDEB, to carry out a feasibility study and an environmental impact assessment (EIA) for the project.

According to a preliminary feasibility report by the consortium, the dam, to be located at the 66.5 km point of the Kuala Kubu Baru-Fraser's Hill road, would be used for water supply.

The report said the proposed dam, measuring 115 m in height and with a catchment area of 197 sq km, would inundate some private land, two Temuan orang asli settlements and ancestral land, and a 5 km stretch of the existing Federal Route 55 from Kuala Kubu Baru to Fraser's Hill which would need to be realigned.

It is learnt that about 600 orang asli from two villages would have to move from their ancestral land, which although identified as orang asli reserves, have yet to be gazetted.

Concerned groups say the Temuan subsist almost totally off the land. Flooding would destroy their durian and other fruit trees, *petai* trees, bamboo, rotan and all the other jungle produce they economically depend on.

They said the Temuan's ancestral graves would also be submerged.

Works Minister Datuk Seri S. Samy Vellu had in November said a RM1.4 bil dam with a capacity to supply one million litres of treated water daily would be constructed in Kuala Kubu Baru, but he had declined to reveal the dam's location then.

The proposed dam would also have an impact on eco and adventure tourism in the area because it would flood six picnic sites.

Star, 18.1.1999

Petronas signs PSCs with another US firm

National oil company Petrolia Nasional Bhd. (Petronas) yesterday signed three production sharing contracts (PSCs) with US-based Murphy Oil Corp (MOC) which will spend at least US\$29 mil in exploring for oil and gas off Sabah and Sarawak.

MOC is the fourth foreign company to undertake oil and gas exploration in Malaysia in the past year, leading Petronas president Tan Sri Mohd Hassan Marican to remark:

"The optimism shown by these companies in Malaysia's oil and gas industry certainly goes a

long way in reflecting foreign investors' confidence in the long-term prospects of the industry and the country, despite the economic slowdown faced by the region."

The MOC contracts, the first to be awarded this year, are for Blocks SK309 and SK311 offshore Sarawak and Deepwater Block K offshore Sabah.

Speaking at the signing ceremony in Kuala Lumpur, Hassan said the entry of MOC had brought to four the number of new players in Malaysia's upstream sector over the past year.

The other new players are US-based Amerada Hess and Santa Fe which came in February and July 1998 respectively, and YPF of Argentina in November.

According to Hassan, MOC would hold 85% interest each in Blocks SK309 and SK311, with Petronas owning the remaining interest in the two blocks.

As for Deepwater Block K, MOC would hold an 80% in it and Petronas the remaining 20%.

The ventures will be undertaken by Petronas subsidiary Petronas Carigali Sdn. Bhd. and MOC subsidiary Murphy Exploration & Production Co.

"MOC, which will operate the three blocks, has committed a combined minimum capital investment of US\$29 mil for the three blocks,"

Hassan said.

Of the US\$29 mil, about US\$8 mil would be invested in Block SK309, US\$7 mil for Block SK311 and US\$14 mil in Deepwater Block K.

The PSCs for blocks SK309 and SK311 are the 11th and 12th to be signed under the revenue-over-cost scheme introduced by Petronas in 1997.

As for the PSC for Block K, it is the ninth to be signed since Petronas introduced its Deepwater PSC terms in 1993.

Hassan noted that blocks SK309 and SK311, covering 9,800 sq km, had previously been explored by Sarawak Shell Sdn. Bhd. in the early 1970s and, more recently, by Overseas Petroleum & Investment Corp and Agip Petroleum Co. Inc.

"The moderate exploration activities involving 28 exploratory wells have resulted in some small hydro-carbon discoveries in both blocks," he said.

Hassan added that Deepwater Block K, covering 16,500 sq km and located about 140 km northeast of Kota Kinabalu, was Petronas' largest deepwater block.

"Even though this Block K has not been explored, recent discoveries in the vicinity of the area has upgraded the hydrocarbon potential in the block," he said.

Star, 28.1.1999

Petronas not cutting back production, says president

Petroleum Nasional Bhd. (Petronas) is not cutting back its oil production despite the fall in oil prices worldwide, said president Tan Sri Mohd Hassan Marican.

He pointed out that Malaysia was producing only about 630,000 barrels of crude oil a day, of which about 400,000 barrels were exported and the balance sold locally.

"As far as the world market is concerned, 400,000 barrels is a small quantity. As a country, we are a small player in the marketplace," he added.

Hassan said Malaysia's crude oil, which is of high quality, was able to command prices slightly higher than that produced in other parts of the world.

"So, while the price is at its historic low level now, we are still able to export and generate revenue. And the PSC (production sharing

contract) contractors are also able to maintain their profitability," he said.

"For the moment, therefore, we are not considering any reduction in the production level. However, we will continue to monitor the price level."

Hassan, who was speaking at a press conference after signing three PSCs with Murphy Oil Corp of the United States in Kuala Lumpur yesterday, was commenting on the Prime Minister's recent statement that Malaysia could cut or even stop its oil production if prices dropped too low.

Hassan said that when oil prices were down, there would be some areas in the world where exploration activities would decline, and this would mainly be the high-cost areas.

"Malaysia, fortunately, is not considered a high-cost area," he said.

Star, 28.1.1999

Cement demand better after 2000

The local cement industry is expected to bottom out by next year when the industry utilisation rate falls to about 38% from a peak of 83% in 1997.

In a recent industry update, stockbroking firm KAF Seagroatt & Campbell Securities Sdn. Bhd. said cement demand in 1998 was estimated to have declined by 37.4% to 11 million tonnes, from growth rates of 15% in 1997 and almost 30% in 1996.

However, the start-up of government projects intended to stimulate the economy and the building of more low- to medium-cost houses is expected to increase demand for cement by 5% next year.

However, *"relief is not in sight this year unless the government mandates the use of cement for the construction of roads,"* the report added.

Assuming the mandate does not materialise, the stockbroking company has forecast another drop of about 15% in cement sales this year.

Private sector construction, which contributed up to 70% of cement companies' sales during the good times, would remain depressed, it said.

"Building and other projects initiated during the boom years of 1996 and 1997 will be completed this year and few new projects will take off," the KAF report said.

The presence of excess capacity in the property sector totalling some RM70bil is seen as not helping matters.

Another concern is that the last of the cement plants built during the boom years would be completed only by early next year.

"As such, capacities will continue to rise this year and into the year 2000," the research report noted.

According to the report, cement producers are facing tougher times in the current recession compared with the last one in the mid-1980s.

"In the last recession, cement utilisation rates were between 40% and 50%, higher than the 38% expected next year," it said.

The survival of new cement companies or plants would be a concern, it said, adding that

these new players in the industry might continue selling cement at lower prices to gain market share.

KAF warned that another price war could occur unless some arrangement was initiated to distribute market shares among industry players.

As the report noted, there are now 14 cement producers in the country compared with only a handful in the 1980s recession.

On the other hand, a more positive move would be for the industry to consolidate, and to this end, KAF said more mergers and acquisitions could be expected.

Assuming a utilisation growth rate of between 10% and 15% per year from 2001, the stock broking firm expects the industry to return to a 50% utilisation rate by 2003, at which point cement producers would break even and return to profitability.

In this scenario, the next cyclical cement shortage would occur in 2007, the report said.

On the acquisition of cement assets by Malayan Cement Bhd., the report said the move was necessary to consolidate the position of the company's British parent, Blue Circle plc.

"Blue Circle is committed to having a bigger presence in this region; otherwise it would lose out to international competitors," the stockbroking company said.

It noted that Holderbank Financiere Glaris of Switzerland and Cemex of Mexico had recently strengthened their respective positions in this region by buying various cement concerns in the Philippines, Thailand, Indonesia as well as Malaysia.

Following its acquisition of Union Cement, the largest cement producer in the Philippines, and Siam City, the second largest in Thailand, Holderbank early this month also acquired a 70% equity stake in Tenggara Cement Manufacturing Sdn. Bhd. for RM112mil.

Cemex, for its part, has acquired a strategic stake in Indonesia's largest cement producer, Semen Gresik, in addition to purchasing the Philippines' Apo Cement for US\$400 mil recently.

Star, 22.2.1999

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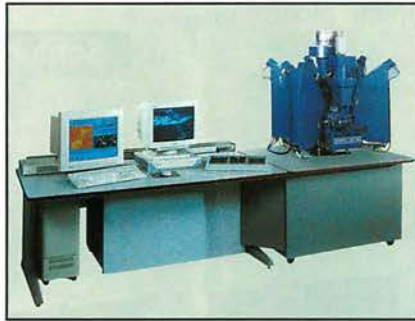
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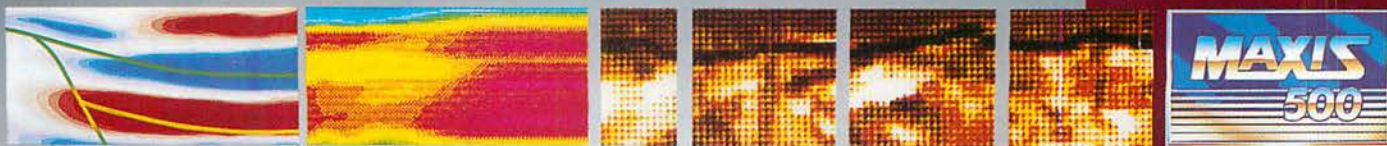
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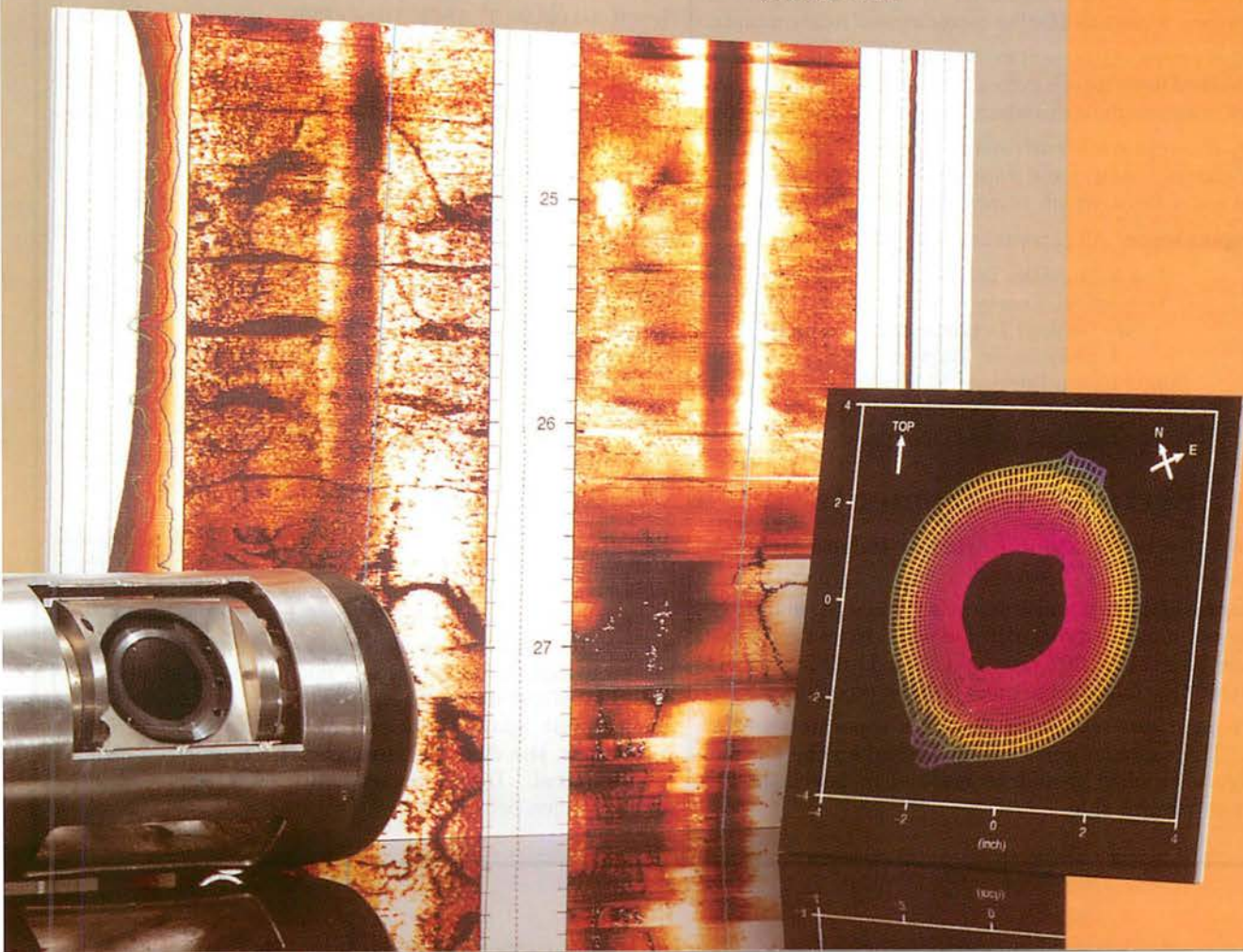
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GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

General Information

Papers should be as concise as possible. However, there is no fixed limit as to the length and number of illustrations. Normally, the whole paper should not exceed 30 printed pages. The page size will be 204 x 280 mm (8 x 11 inches).

The final decision regarding the size of the illustrations, sections of the text to be in small type and other matters relating to printing rests with the Editor.

The final decision of any paper submitted for publication rests with the Editor who is aided by a Special Editorial Advisory Board. The Editor may send any paper submitted for review by one or more reviewers. Authors can also include other reviewers' comments of their papers. Scripts of papers found to be unsuitable for publication may not be returned to the authors but reasons for the rejection will be given. The authors of papers found to be unsuitable for publication may appeal only to the Editor for reconsideration if they do not agree with the reasons for rejection. The Editor will consider the appeal together with the Special Editorial Advisory Board.

Unless with the consent of the Editor, papers which have been published before should not be submitted for consideration.

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Script Requirements

Scripts must be written in English or Bahasa Malaysia (Malay).

Two copies of the text and illustrations must be submitted. The scripts must be typewritten double-spaced on paper not exceeding 210 x 297 mm (or 8.27 x 11.69 inches, A4 size). One side of the page must only be typed on.

Figure captions must be typed on a separate sheet of paper. The captions must not be drafted on the figures. The figure number should be marked in pencil on the margin or reverse side.

Original maps and illustrations or as glossy prints should ideally be submitted with sufficiently bold and large lettering to permit reduction to 18 x 25 cm: fold-outs and large maps will be considered only under special circumstances.

Photographs should be of good quality, sharp and with contrast. For each photograph, submit two glossy prints, at least 8 x 12.5 cm and preferably larger. Use of metric system of measurements (SI) is strongly urged wherever possible.

An abstract in English which is concise and informative is required for each paper.

References cited in the text should be listed at the end of the paper and arranged in alphabetical order and typed double-spaced. The name of the book or journal must be in *italics*. The references should be quoted in the following manner:

HAMILTON, W., 1979. Tectonics of the Indonesian region. *U.S. Geological Survey Professional Paper* 1078, 345p.

HOSKING, K.F.G., 1973. Primary mineral deposits. In: Gobbett, D.J. and Hutchison, C.S. (Eds.), *Geology of the Malay Peninsula (West Malaysia and Singapore)*. Wiley-Interscience, New York, 335-390.

HUTCHISON, C.S., 1989. *Geological Evolution of South-east Asia*. Clarendon Press, Oxford, 368p.

SUNTHARALINGAM, T., 1968. Upper Paleozoic stratigraphy of the area west of Kampar, Perak. *Geol. Soc. Malaysia Bull.* 1, 1-15.

TAYLOR, B., AND HAYES, D.E., 1980. The tectonic evolution of the South China Sea basin. In: D.E. Hayes (Ed.), *The Tectonic and Geologic Evolution of Southeast Asian Sea and Islands, Part 2. Am. Geophy. Union Monograph* 23, 89-104.

Submission of electronic text. In order to publish the paper as quickly as possible after acceptance, authors are requested to submit the final text also on a 3.5" diskette. Both Macintosh and PC (DOS/Windows) platforms are supported. Main text, tables and illustrations should be stored in separate files with clearly identifiable names. Text made with most word processors can be readily processed but authors are advised to provide an additional copy of the text file in ASCII format. Preferred format for illustration is Encapsulated PostScript (EPS) but authors may submit graphic files in their native form. It is essential that the name and version of softwares used is clearly indicated. The final manuscript may contain parts (e.g. formulae, complex tables) or last-minute corrections which are not included in the electronic text on the diskette; however, this should be clearly marked in an additional hardcopy of the manuscript. Authors are encouraged to ensure that apart from any such small last-minute corrections, **the disk version and the hardcopy must be identical**. Discrepancies can lead to proofs of the wrong version being made.

EPMI begins production from Tapis E platform

Esso Production Malaysia Inc. (EPMI) has begun production from the Tapis E oil platform sited 200 km off the coast of Terengganu in a depth of 65 m.

The company said in a statement that production from Tapis E was expected to reach a peak annual average rate of 25,000 barrels a day.

EPMI, an affiliate of Exxon Corp, is developing the Tapis field under a production sharing contract entered into by Petronas with EPMI and Petronas Carigali Sdn. Bhd.

EPMI and Petronas Carigali have contractors' participation interests of 78% and 22% respectively.

EPMI said that Tapis E was the fifth platform in the field development programme and developed the western and southern areas of the field.

It said commercial production from these areas was made possible through the application of Exxon's state-of-the-art sub-surface seismic imaging and formation evaluation technologies. Tapis E was designed and constructed by Malaysian designers and fabricators.

The drilling programme on the 19 development wells off Tapis E started in December last year and the first well was successfully drilled and completed in January this year.

Star, 25.2.1999

GeoEng2000

An International Conference on Geotechnical & Geological Engineering

19–24 November 2000

**Melbourne Convention Centre
Melbourne
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Call For Abstracts

About GeoEng2000

As we approach the third millennium it is instructive to reflect on the advances in the geotechnical sciences which have occurred over the past 50 or 60 years. The disciplines of soil mechanics, rock mechanics, engineering geology and geotechnical engineering have come of age. Although we have three international societies generally representing these disciplines, together with a number of more specialist international groups, all have a common goal — to foster and facilitate the practice and knowledge relating to our disciplines. There is however much synergy between the interests of these societies and groups, and therefore there are many areas in which we can learn from one another. GeoEng2000 aims to provide a forum for practitioners and researchers from all of these diverse fields to meet and discuss both formally and informally issues relevant to the current states-of-practice as well as future directions.

GeoEng2000 is sponsored by the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), the International Association of Engineering Geology and the Environment (IAEG), the International Society for Rock Mechanics (ISRM).

Conference Format

The Conference will concentrate on six themes that are of common interest.

The mornings of the conference will be dedicated to invited and keynote lectures covering a broad range of topics relevant to soil and rock mechanics and engineering geology. This will include two keynote lectures each for the first five themes. These lectures will be expanded in the early afternoon through three issues lectures for each theme. The lectures will be presented by eminent practitioners, researchers and recent achievers from the fields of soil and rock mechanics and engineering geology.

There will also be a special session dedicated to the presentation of important recent case histories. Up to twelve submitted papers will be selected for formal presentation during the morning sessions with the best three being recognised by an award and presented in a full plenary session.

The afternoon sessions will be dedicated to the six themes of the conference and consist of invited issues lectures, discussion sessions/workshops, selected paper presentations and poster sessions. Submitted papers may also be selected for presentation in the Workshop/Discussion Sessions, as well as for presentation in formal poster sessions, to be held on four evenings. There will also be opportunities for other papers to be presented in Poster Format and viewed during the day, including morning and afternoon tea and lunch.

Immediately prior to the conference, a number of specialist symposia, sponsored by the technical committees of the three major International Societies will be held.

Themes

Abstracts are invited for all topics related to the following themes.

- Geotechnical Earthquake Engineering
- Underground Works
- Stability of Natural and Excavated Slopes
- Environmental Geotechnics
- Ground Improvement and Ground Support
- Geoengineering Education

The Organising Committee would particularly like to receive abstracts of papers that are multi-disciplinary, covering aspects related to soil mechanics, rock mechanics and engineering geology and well-documented case histories.

Abstract Submissions

Abstracts can be submitted electronically through the world wide web or by hard copy and floppy disk mailed to the secretariat.

To electronically submit an abstract, please refer to the conference web page at <http://www.icms.com.au/geoeng2000> for submission details. All sections of the form must be completed.

All abstracts will be reviewed by a technical sub-committee comprising leading practitioners and researchers. Final papers will be peer-reviewed by relevant specialists selected by the technical sub-committee. Accepted papers will be published in the proceedings.

Proceedings

The proceedings will consist of 2 hard-bound volumes and a CD. Volume I will contain all of the invited papers including keynote lectures, invited lectures and issues lectures. Volume 2 will contain one page extended abstracts for all submitted papers. The final full-length papers will be published on CD. The extended abstracts must be submitted at the same time as the full papers. Papers and extended abstracts received after the due date will not be included in the proceedings.

Critical Dates

Paper and Extended Abstract Deadline _____	November 19, 1999
Return of Papers _____	March 31, 2000
Final version of Papers and Extended Abstracts to be received by Secretariat _____	July 1, 2000

Further Information

Secretariat
GeoEng2000
 C/-ICMS Pty Ltd
 84 Queensbridge Street
 Southbank VIC 3006 Australia
 Phone: + 61 3 9682 0244 Fax: + 61 3 9682 0288
 e-mail: geoeng2000@icms.com.au
 Website <http://www.icms.com.au/geoeng2000>

KALENDAR (CALENDAR)

1999

March 1-2

ORGANISM-ENVIRONMENT FEEDBACKS IN CARBONATE PLATFORMS AND REEFS (1999 Lyell International Meeting), Longon, UK (Contact: Enzo Insalaco, School of Earth Sciences, The University of Birmingham, Edgbaston, B15 2TT, UK. E-mail: e.insalaco@bham.ac.uk)

March 1-3

THIRTEENTH INTERNATIONAL CONFERENCE AND WORKSHOPS ON APPLIED GEOLOGIC REMOTE SENSING: Integrated Solutions for Real-World Problems. Hotel Vancouver, Vancouver, British Columbia, Canada. Organized by ERIM with sponsors that include NASA, U.S. DOE Nevada Operations Office and Remote Sensing Lab, and USGS. (Contact: ERIM Geologic Conferences, Box 134008, Ann Arbor, MI 48113-4008 USA. Tel: +1 734 994 1200, ext. 3234; Fax: +1 734 994 5123; E-mail: wallman@erim.int.com; Website: <http://www.erim-int.com/CONF/conf.html>)

March 1-4

SOCIETY FOR MINING, METALLURGY, AND EXPLORATION (Annual Meeting), Denver, Colorado, USA. (Contact: SME, 8307 Shaffer Parkway, P.O. Box 625002, Littleton, CO 80162-5002, USA. Tel: 1 303 973 9550; E-mail: smenet@aol.com; Website: http://www.smenet.org/annual_meeting/index.html)

March 1-4

SOCIETY OF ECONOMIC GEOLOGISTS, Denver, Colorado, USA. SEG sponsors technical sessions at the SME Annual Meeting. (Information: <http://www.mines.utah.edu/~wmgg/SEG.html>)

March 9-11

INTERNATIONAL CONFERENCE ON PANGAEA AND THE PALEOZOIC-MESOZOIC TRANSITION, Wuhan, Hubei, China. (Contact: Dr. Tong Jinan, Faculty of Earth Science, China University of Geosciences, Wuhan, Hubei 430074, China. Tel: +86-27-7482031; Fax: +86-27-7801763; E-mail: jntong@dns.cug.edu.cn)

March 14-17

APPLICATION OF GEOPHYSICS TO ENGINEERING AND ENVIRONMENTAL PROBLEMS (Symposium), Oakland, California, USA. (Contact: SAGEEP, 7632E, Costilla Ave., Englewood, Colorado, USA 80112. Tel: +1 303 771 2000; Fax: +303 843 6232; Website: <http://www.sageep.com>)

March 15-19

LUNAR AND PLANETARY SCIENCE (30th International Conference), Houston, Texas, USA. (Contact: LeBecca Simmons, Conference Administrator, LPI Publications and Program Services Department, 3600 Bay Area Boulevard, Houston, TX 77058-1113, USA. Tel: 1 281 486 2158; Fax: 1 281 486 2160; E-mail: simmons@lpi.jsc.nasa.gov; Website: <http://cass.jsc.nasa.gov/meetings/LPSC99/home.html>; abstract deadlines: January 8, 1999 (hard copy); January 15, 1999 (electronic)

March 24-26

14TH HIMALAYA-KARAKORUM-TIBET WORKSHOP, Kloster Ettal, Germany. (Contact: Lothar Ratschbacher, Institut für Geologie, Universität Würzburg, Pleicherwall 1, D-97070, Würzburg, Germany. Tel: +49 931 312580; Fax: +49 931 312378; E-mail: lothar@geologie.uni-wuerzburg.de; Website: <http://www.geologie.de>)

March 25-28

NATIONAL EARTH SCIENCE TEACHERS ASSOCIATION (Annual Meeting), Boston, Mass, USA. (Contact: NESTA, 2000 Florida Ave., N.W., Washington, D.C. 20009, USA. Tel: +1 202 462 6910; Fax: +1 202 328 0566; E-mail: fireton@kosmos.agu.org)

March 25-31

MID-CRETACEOUS TO RECENT PLATE BOUNDARY PROCESSES IN THE SOUTHWEST PACIFIC (Penrose Conference of Geological Society of America), Canterbury, New Zealand (Contact: S. Baldwin, Geosciences Department, University of Arizona, UA PO Box 210077, Tucson, Arizona 85721, USA. Tel: +1 520 621 9688; Fax: +1 520 621 2672; E-mail: baldwin@geo.arizona.edu)

April 10-14

7TH MULTIDISCIPLINARY CONFERENCE ON SINKHOLES & THE ENGINEERING AND ENVIRONMENTAL IMPACTS OF KARST with an introductory course on applied karst hydrogeology, Harrisburg, Pennsylvania, USA. (Contact: Ms. Gayle Herring, P.E. LaMoreaux and Associates, Inc. (PELA), 106 Administration Rd., Oak Ridge, TN 37830 USA. Tel: 423-483-7639; E-mail: pelaor@usit.net; URL: <http://www.uakron.edu/geology/karstwaters/7th.html>)

April 11-14

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), San Antonio, Texas, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

April 11-16

ASSOCIATION OF EXPLORATION GEOCHEMISTS — "Exploration Geochemistry into the 21st Century" (International Conference), Vancouver, British Columbia, Canada. (Contact: Venue West Conference Services Ltd. Tel: +1 604 681 5226; Fax 604 681 2503; E-mail: Venue West Conference Services Ltd.)

April 11-16

SOCIETY OF ECONOMIC GEOLOGISTS, Vancouver, British Columbia, Canada. SEG sponsors technical sessions at the meeting of the Association of Exploration Geochemists. (Information: <http://www.mines.utah.edu/~wmgg/SEG.html> and <http://www.aeg.org/>)

April 22-24

PETROLEUM GEOLOGY (2nd International Symposium), Zagreb, Croatia. (Contact: Zdenko Kristafor, Faculty of Mining, Geology, and Petroleum Engineering, Pierottijeva 6, 10000 Zagreb, Croatia. Tel: +385-1 4605 201; Fax: +385-1 4836 074)

April 26-28

THRUSTTECTONICS 99 (International Conference), Egham, Surrey, UK. (Contact: April Harper, Dept. of Geology, Royal Holloway University of London, Egham, Surrey TW20 0EX, UK. Tel: +44 1784 443618; Fax: +44 1784 438925)

May 3-4

ASSESSMENT AND REMEDIATION OF CONTAMINATED SITES IN ARCTIC AND COLD CLIMATES (International Conference), Edmonton, Alberta, Canada. (Contact: ARCSACC Conference — Edmonton '99, Room 303 CEB, Dept. of Civil and Environmental Engineering, University of Alberta, Edmonton, Alberta T6G 2G7, Canada. Tel: +1 403 497 3862; Fax: +1 403 497 3842; E-mail: kwbiggar@civil.ualberta.ca; or nahirm@pwgsc.gc.ca)

May 3-5

SEISMOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Seattle, Washington, USA. (Contact: S. Malone, Geophysics Program, Box 351650, University of Washington, Seattle, Washington 98195-1650, USA. Tel: +1 206 685 3811; Fax: +1 206 543 0489; E-mail: ssa99@geophys.washington.edu; Website: <http://www.geophys.washington.edu/SEIS/SSA99>; abstract deadline: February 5, 1999)

May 3-6

31ST OFFSHORE TECHNOLOGY CONFERENCE, Houston, USA. (Contact: OTC Meetings and Exhibits Unit, P.O. Box 833868, Richardson, TX 75083-3868, USA. Tel: 1 972 952-9494; Fax: 1 972 952-9435; E-mail: dweaver@spelink.spe.org)

May 6-7

GEOVISION '99: IMAGING APPLICATION IN GEOLOGY, Liège, Belgium. (Contact: Geovision '99, Université de Liège, Campus du Sart Tilman, Géologie de l'Ingénieur-Bât B19, 4000 Liège, Belgium. Tel: 32 4366-2216; Fax: 32 4366-2817; E-mail: fcheslet@ac.be)

May 24-26

WATER POLLUTION 99, Modelling, Measuring and Prediction (Fifth International Conference), Lemnos, Greece. Organized by: Wessex Institute of Technology, UK and Aristotle University of Thessaloniki, Greece. (Contact: Clare Duggan, Conference Secretariat Water Pollution 99, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK. Tel: 44 (0) 1703 293223; Fax: 44 (0) 1703 292853; E-mail: cduggan@wessex.ac.uk)

May 26-28

GEOLOGICAL ASSOCIATION OF CANADA-MINERALOGICAL ASSOCIATION OF CANADA, JOINT ANNUAL MEETING, Sudbury, Ontario. (Contact: Dr. P. Copper, Dept. of Earth Sciences, Laurentian University, Sudbury, Ontario P3E 2C6, Canada. Tel: (705) 657-1151 ext. 2267; Fax: (705) 675-4898; E-mail: gacmac99@nickel.laurentian.ca)

May 31 - June 2

SECOND INTERNATIONAL CONFERENCE ON ECOSYSTEMS AND SUSTAINABLE DEVELOPMENT, Lemnos, Greece. Organised by: Wessex Institute of Technology, UK and Universitat Jaume I, Spain. (Contact: Clare Duggan, Conference Secretariat-ECOSUD 99, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK. E-mail: cduggan@wessex.ac.uk)

May 31 - June 4

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Boston, Massachusetts, USA. (Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA. Tel: +1 202 462 6900; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>)

June 5-9

CLIMATIC, BIOTIC, AND TECTONIC CORING TRANSECT OF TRIASSIC-JURASSIC PANGAEA (International Workshop), Wolfville, Nova Scotia, Canada. (Contact: Paul Olsen, Lamont Doherty Earth Observatory, Rt. 9W, Palisades, New York 10964, USA. Tel: +1 914 365 8491; Fax: +1 914 365 2312; E-mail: polsen@ldeo.columbia.edu; Website: <http://www.ldeo.columbia.edu>)

June 6-9

VAIL ROCK 99 (Symposium), Vail, Colorado, USA, by American Rock Mechanics Association. (Contact: Expomasters. Tel: +1 303 771 2000; Fax: +1 303 843 6212; E-mail: mcramer@expomasters.com)]

June 15-17

ERES 99 (Second International Symposium on Earthquake Resistant Engineering Structures), Catania, Italy. Organized by: University of Catania, Italy and Wessex Institute of Technology, UK. (Contact: Liz Kerr, Symposium Secretariat, ERES 99, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA UK. Tel: +44 (0) 1703 293223; Fax: +44 (0) 1703 292853; E-mail: Liz@wessex.ac.uk)

June 17-19

SEMINAR ON COASTAL ZONE OF THE ALENTEJO, Porto, Portugal. (Contact: ASSOCIAÇÃO EUROCOAST-PORTUGAL, a/c Instituto de Hidráulica e Recursos Hídricos, Faculdade de Engenharia de Porto, Rua dos Braga, 4099 Porto Codex-Portugal. Tel: 351-2-2050870; Fax: 351-2-2059280)

June 20-24

COASTAL SEDIMENTS 1999 (4th International Symposium on Coastal Engineering and Science of Coastal Sediment Processes), Hauppauge, New York, USA. (Contact: N. Kraus, Co-Chair, U.S. Army Engineer Waterways Experiment Station, Coastal & Hydraulics Laboratory, 3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199, USA. Tel: +1-601 634 2016; E-mail: preinfo@coastalsediments.org; Website: <http://www.coastalsediments.org>; abstract deadline: May 11, 1998)

June 21-22

THE GEOLOGY OF TODAY FOR TOMORROW (A satellite conference of the World Conference of Science), Budapest, Hungary. (Contact: János Halmi, Chairman of the Organizing Committee, Hungarian Geological Society, H-1371 Budapest, Pf. 433. Tel: 36 1 2517770; Fax: 36 1 3561215; E-mail: mail.mft@mtesz.hu; Website: <http://www.mafi.hu/mft/alap.html>)

June 21-24

FOURTH INTERNATIONAL AIRBORNE REMOTE SENSING CONFERENCE AND EXHIBITION, The Westin Hotel, Ottawa, Ontario, Canada. Organized by ERIM with sponsors that include NASA, Environment Canada, and U.S. DOE Nevada Operations Office and Remote Sensing Laboratory. (Contact: ERIM Airborne Conferences, Box 134008, Ann Arbor, MI 48113-4008 USA. Tel: +1 734 994 1200, ext. 3234; Fax: +1 734 994 8123; E-mail: wallman@erim.int.com; Website: <http://www.erim-int.com/CONF/conf.html>)

June 21-24

INTERNATIONAL GEOMOLOGICAL SYMPOSIUM. San Diego, California, USA. (Contact: Dona Dirlam, Gemological Institute of America, 5345 Armada Dr., Carlsbad, California 92008, USA. Tel: +1 760 603 4154; Fax: +1 760 603 4256; E-mail: ddirlam@gia.edu; abstract (poster) deadline: October 1, 1998)

June 21-25

SECOND INTERNATIONAL CONFERENCE ON EARTHQUAKE GEOTECHNICAL ENGINEERING, Lisbon, Portugal. (Contact: Pedro S. Sêco e Pinto, chairman for SICEGE, Laboratório Nacional de Engenharia Civil, Av. do Brasil, 101, 1799 Lisboa cedex, Portugal. Fax: (351) 847 81 87; E-mail: SICEGE@lnec.pt)

June 21-27

TERRANE ACCRETION ALONG THE WESTERN CORDILLERAN MARGIN: CONSTRAINTS ON TIMING AND DISPLACEMENT (Geological Society of America Penrose Conference), Seattle and Winthrop, Washington, USA. (Contact: J.B. Mahoney, Department of Geology, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin 54702-4004, USA. E-mail: mahonej@uwec.edu)

June 26 - July 1

CLAY MINERALS SOCIETY (36th Annual Meeting), Purdue University, West Lafayette, Indiana, USA. (Contact: Patricia Jo Eberl, Clay Minerals Society, P.O. Box 4416, Boulder, Colorado 80306, USA. Tel: +1 303 444 6405; Fax: +1 303 444 2260; E-mail: peberl@clays.org)

June 29 - July 2

THE 11TH INTERNATIONAL CONFERENCE OF THE GEOLOGICAL SOCIETY OF AFRICA: Earth resources for Africa, University of Cape Town, South Africa. The closing date for abstracts is the 1st of March 1999. (Contact: Congress Secretariat. Tel/Fax: +27 (21) 619547; E-mail: geoconf@gsal.l.co.za; Website: www.gsal.l.co.za)

July 11-14

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Regional Conference), Istanbul, Turkey. (Contact: AAPG Conventions Dept., P.O. Box 979, Tulsa, OK 74101-0979, USA. Tel: 1 918 560 2679; Fax: 1 918 560 2684)

July 12-14

ICHTNOFABRICS IN PETROLEUM GEOLOGY (International Meeting), Aberdeen, Scotland. (Contact: Stuart G. Buck, Mark J.F. Lawrence, Z&S Geology Ltd., Campus 2, Aberdeen Science and Technology Park, Balgowan Drive, Bridge of Don, Aberdeen, AB22 8GU, UK. Tel: +44 122 48 22 555; Fax: +44 122 48 23 777; E-mail: stuart.buck@zands.com or

mark.lawrence@zands.com or Nigel H. Trewin, Department of Geology & Petroleum Geology, Meston Building, King's College, University of Aberdeen, Aberdeen, AB24 3UE, UK. Tel: +44 122 42 73 448; Fax: +44 122 42 72 785; E-mail: n.trewin@geol.abdn.co.uk)

July 12-15

THE BATHURST MEETING, Cambridge, UK. (Contact: Dr. J.A.D. Dickson, Dept. of Earth Sciences, University of Cambridge, Downing St, Cambridge, CB2 3EQ, UK. Tel: +44 1223 333400; Fax: +44 1223 333450; E-mail: jaddl@esc.cam.ac.uk)

July 12-16

NATIONAL SPELEOLOGICAL SOCIETY (Convention), Filer, Idaho, USA. (Contact: David W. Kesner, P.O. Box 1334, Boise, Idaho, USA 83701. Tel: +1 208 939 0979; E-mail: drdave@micron.net)

July 15-20

ICHNOFABRICS (5th International Workshop and Field Seminar), Manchester, U.K. (Contact: John Pollard, Department of Earth Sciences, University of Manchester, Manchester, M13 9PL, UK. Tel: +44 161 27 53 817; Fax: +44 161 27 53 947; E-mail: john.pollard@man.ac.uk)

July 19-30

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS, Birmingham, UK. (Contact: IUGG99, School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK. Fax: 44 121 414 4942; E-mail: IUGG99@bham.ac.uk)

July 19-30

INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES (International Meeting), Birmingham, UK. (Contact: IUGG99, School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK. Fax: 44 121 414 4942; E-mail: IUGG99@bham.ac.uk)

July 22-25

EUROPEAN PALEONTOLOGICAL ASSOCIATION WORKSHOP, Lisboa, Portugal. (Contact: CEPUNL, Quinta da Torre, P-2825 Monte de Caparica, Portugal. Tel: 351 1 2948573; Fax: 351 1 2948556; E-mail: cepunl@mail.fct.unl.pt; Website: <http://www.si.fct.unl.pt/~w3cepunl>)

August 3-12

INTERNATIONAL UNION FOR QUATERNARY RESEARCH (INQUA) (15th Congress), "The Environmental Background to Hominid Evolution in Africa", Durban, South Africa. (Contact: Dr. D. Margaret Avery, INQUA XV CONGRESS, P.O. Box 61, South Africa Museum, Capetown 8000, South Africa. Tel: +27 21 243 330; Fax: +27 21 246 716; E-mail: mavery@samuseum.ac.za; WWW: <http://inqua.geoscience.org.za>)

August 4-12

AFRICA, CRADLE OF HUMANKIND DURING THE QUATERNARY (XVINQUA Congress), Durban, South Africa. (Contact: Prof. T.C. Partridge, Climatology Research Center, University of Witwatersrand, 13 Cluny Rd., Forest Town, Johannesburg 2193, South Africa. Tel: +27 11 646 3324; Fax: +27 11 486 1689; E-mail: 141tcp@cosmos.wits.ac.za)

August 6-11

INTERNATIONAL ASSOCIATION OF MATHEMATICAL GEOLOGISTS (Annual International Conference) and IUGS Commission on Fossil Fuels, Trondheim, Norway. (Contact: IAMG 99, c/o Stephen Lippard, Department of Geology and Mineral Resources Engineering, 7034 Trondheim, Norway. Tel: +47-73 594828; Fax: 47-73 594814; E-mail: iamg99@geo.ntnu.no)

August 9-12

SOIL DYNAMICS AND EARTHQUAKE ENGINEERING (SDEE '99) (9th International Conference), Bergen, Norway. (Contact: K. Atakan, SDEE '99 LOC, Institute of Solid Earth Physics, University of Bergen, Allegaten 41, 5007 Bergen, Norway. Tel: +47-55 583420; Fax: +47-55 589669; E-mail: sdee99@ifjf.uib.no; Website: <http://www.ifjf.uib.no/seismo/sdee99.html>; abstract deadline: January 31, 1999)

August 14-25

CARBONIFEROUS-PERMIAN (XIV International Congress), Calgary, Alberta, Canada. (Contact: Dr. Charles Henderson, Associate Professor, Department of Geology and Geophysics, The University of Calgary, N.W. Calgary, Alberta, Canada T2N 1N4. Tel: 403 220 6170; Fax: 403 285 0074; E-mail: henderson@geo.ucalgary.ca)

August 22-25

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS (SGA) (5th Biennial Meeting) and International Association on the Genesis of Mineral Deposits (IAGOD, 10th Quadrennial Meeting) (Joint Meeting), "Mineral Deposits: Processes to Processing," London, UK. Imperial College Natural History Museum. (Contact: Dr. Chris Stanley, Department of Mineralogy, Natural History Museum, Cromwell Road, London, SW7 5BD, UK. Tel: +44 171 938 9361; Fax: +44 171 938 9268; E-mail: cjs@nhm.ac.uk)

August 22-27

GOLDSCHMIDT CONFERENCE (9th Annual, International), Cambridge, Massachusetts, USA. (Contact: Stein B. Jacobsen, Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA 02138, USA. Tel: +1-617 495 5233; Fax: +1-617 496 4387; E-mail: goldschmidt@eps.harvard.edu; Website: <http://cass.jsc.nasa.gov/meetings/gold99/>)

August 24-26

SEDIMENTOLOGY (19th Regional European Meeting), Copenhagen, Denmark. (Contact: Conventum Congress Service, Carit Etlarsvej 3, DK-1814, Frederiksberg C, Denmark. Tel: +45 31 31 08 47; Fax: +45 31 31 63 99; or Lars B Clemmensen, Geological Institute, Oster Voldgade 10, DK-1350, Copenhagen K, Denmark. Tel: +45 35 32 24 49; E-mail: larsc@geo.geol.ku.dk)

September

THE CONTINENTAL PERMIAN OF THE SOUTHERN ALPS AND SARDINIA (ITALY): Regional reports and general correlations (International Field Conference), Brescia, Italy. (Contact: Prof. G. Cassinis, Dipartimento di Scienze della Terra, Università di Pavia, Via Ferrata, 1, I-27100 Pavia, Italy. Tel: 39 382 505834; Fax: 39 382 505890; E-mail: cassinis@ipv36.unipv.it)

September

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS (29th Congress), Bratislava, Slovakia. (Contact: Prof. L. Melioris, Comenius University, Mylinska Dolina, 84215 Bratislava, Slovakia. Tel/Fax: +42 7 725 446; E-mail: podzvody@fns.uniba.sk)

September

INTERNATIONAL SOCIETY OF ROCK MECHANICS (9th International Congress), Paris, France. (Contact: Dr. S. Gentier, Secrétaire Général du CFMR, BRGM/DR/GGP, Avenue Claude Guillemin, B.P. 6009, F-45060 Orléans Cedex 2, France. Tel: +33 2 38 64 38 77; Fax: +33 2 38 64 30 62)

September 6-9

BIOGEO IMAGES 99 (International Conference sponsored by SEPM, Association de Paleontologie Française, and others), Dijon, France. (Contact: BGI 99, Biogeosciences-Dijon, UMR 5561 CNRS, 6 blvd Gabriel, 21000 Dijon, France. E-mail: BGI99@u-bourgogne.fr; Website: <http://www.u-bourgogne.fr/BIOGEOSCIENCE/BGI99.htm>)

September 6-10

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS "Hydrogeology and Land Use Management" (29th Congress), Bratislava, Slovakia. (Contact: Marian Fendek, Geological Survey of Slovak Republic, Mylinska Dolina 1, 81704 Bratislava, Slovakia. Tel: +421-7 3705355; Fax: +421-7 371940; E-mail: IAHCONG@GSSR.SK)

September 6-12

MINING AND THE ENVIRONMENT II (International Meeting), Sudbury, Ontario, Canada. (Contact: Sudbury '99, Centre in Mining and Mineral Exploration Research (CIMMER), Laurentian University, Sudbury, Ontario, P3E 2C6, Canada. Tel: +705 673 6572; Fax: +705 673 6508; E-mail:

cmosher@nickel.laurentian.ca
bevans@nickel.laurentian.ca

or

September 12-15

OIL & GAS IN THE 21ST CENTURY — DAWN OF THE THIRD AGE (AAPG International Conference and Exhibition), Birmingham, UK. (Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979, USA. Tel: 1 918 560 2679; Fax: 1 918 560 2684; E-mail: convenc@aapg.org; Website: www.aapg.org)

September 16-17

NON-VOLCANIC RIFTING OF CONTINENTAL MARGINS: A COMPARISON OF EVIDENCE FROM LAND AND SEA (International Conference of Geological Society of London), London, United Kingdom. (Contact: R.B. Whitmarsh, Challenger Division, Southampton Oceanography Centre, European Way, Southampton U.K. SO14 3ZH; Fax: +44 1703 596554; E-mail: bob.whitmarsh@soc.soton.ac.uk; Website: <http://www.soest.hawaii.edu/margins/>; abstract deadline: April 16, 1999)

September 19-24

ABRAHAM GOTTLÖB WERNER (1749-1817) AND HIS TIMES, Freiberg, Germany. Organized by TU Bergakademie Freiberg and the International Commission on the History of Geological Sciences (INHIGEO). (Contact: Dr. Peter Schmidt. Tel: +49 (0) 3731 39-3235; Fax: +49 (0) 3731 39-3289; E-mail: pschmidt@ub.tu-freiberg.de or Prof. Dr. Helmuth Albrecht. Tel: +49 (0) 3731 39-3406; Fax: +49 (0) 3731 39-3406; E-mail: halbrecht@vwl.tu-freiberg.de)

September 26 - October 2

VII INTERNATIONAL SYMPOSIUM ON MESOZOIC TERRESTRIAL ECOSYSTEMS, Buenos Aires, Argentina. (Contact: Georgina Del Fueyo, Avda. Angel Gallardo 470, 1405 Buenos Aires, República Argentina. Tel/Fax: 54-1 983-4151; E-mail: imposio@musbr.org.secyt.gov.ar)

September 26 - October 6

FIFTH INTERNATIONAL CONGRESS ON RUDISTS, Erlangen, Germany (with post-conference excursion to the Alps). (Contact: Prof. Dr. Richard Höfling, Institut für Paläontologie, Universität Erlangen-Nürnberg, Loewenichstrasse 28, D-91054 Erlangen, Germany. Tel: +49 9131-85 22 710; Fax: +49 9131-85 22 690; E-mail: richie@pal.pal.uni-erlangen.de)

September 27-30

PALEOCEANOLOGY OF REEFS AND CARBONATE PLATFORMS: MIOCENE TO MODERN (International Meeting), Aix-en-Provence, France. (Contact: Gilbert F. Camoin, Cerege BP 80, F-13545, Aix-en-Provence, cedex-4, France. Tel: +33 4 42 97 15 49; E-mail: camoin@cerege.fr)

October 3-6

VII INTERNATIONAL CONGRESS ON PACIFIC NEOGENE STRATIGRAPHY, Mexico City, Mexico. (Contact: Prof. A. Molina-Cruz, Inst. Cien. Mar. y Limnol., UNAM, Ap. Post 70-305, Ciudad Universitaria, Mexoco D.F. 04510. Tel: 52-5-6225816; Fax: 52-5-6160748; E-mail: amolina@mar.icmyl.unam.mx)

October 13-17

FOSSIL ALGAE (7th International Symposium), Nanjing, China. (Contact: Mu Xi-nan, Nanjing Institute of Geology and Palaeontology, Academia Sinica, 39 East Beijing Road, Nanjing 210008, China. Fax: +86-25 335 7026; E-mail: algae@pub.jlonline.com)

October 25-28

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Denver, Colorado, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA. Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; WWW: <http://www.geosociety.org/meetings/index.htm>)

October 30 - November 4

SOIL SCIENCE SOCIETY OF AMERICA (Annual Meeting), Salt Lake City, Utah, USA. (Contact: SSSA, 677 So. Segoe Rd., Madison, WI 53711, USA. Tel: 1 608 273 8090; Fax: 1 608 273 2021; E-mail: rbarnes@agronomy.org)

November 7-10

ENVIRONMENTAL HYDROLOGY AND HYDROGEOLOGY (4th USA/CIS Joint Conference), San Francisco, California, USA. (Contact: American Institute of Hydrogeology, 2499 Rice Street, Suite 135, St. Paul, Minnesota 55113-3724, USA. Tel: +1 651 484 8169; Fax: +1 651 484 8357; E-mail: AIHydro@aol.com; Website: <http://www.aihydro.org>; abstracts deadline: February 28, 1999)

December 5-8

ADVANCED RESERVOIR CHARACTERIZATION FOR THE TWENTY-FIRST CENTURY (Research Conference sponsored by Gulf Coast Section of Society of Economic Paleontologists and Mineralogists Foundation), Houston, Texas. (Contact: GCSSEPM Foundation, 165 Pinehurst Rd., West Hartland, Conn. 06091-0065, USA. Tel: 800/436-1424; Fax: 860/738-3542; E-mail: gcssepm@mail.snet.net; WWW:<http://www.gcssepm.org>)

2000**January 24-28**

OCEAN SCIENCES (Meeting sponsored by AGU), San Antonio, Texas, USA. (Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington,

DC 20009 USA. Tel: +1 202 462 6900; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>)

March 6-9

SOCIETY FOR MINING, METALLURGY, AND EXPLORATION (Annual Meeting), Salt Lake City, Utah, USA. (Contact: SME, 8307 Shaffer Parkway, P.O. Box 625002, Littleton, CO 80162-5002, USA. Tel: 1 303 973 9550; E-mail: smenet@aol.com)

March 8-9

THE NATURE AND TECTONIC SIGNIFICANCE OF FAULT ZONE WEAKENING (International Research Meeting, sponsored by UK Tectonic Studies Group), London, UK. (Contact: R.E. Holdsworth, Department of Geological Sciences, University of Durham, Durham DH1 3LE, UK. Fax: +44 0191 374 2510; E-mail: R.E. Holdsworth@durham.ac.uk; Website: <http://www.dur.ac.uk/~dglms/reh.htm>; abstract deadline: 30 September 1999)

April 6-9

NATIONAL EARTH SCIENCE TEACHERS ASSOCIATION (Annual Meeting), Orlando, Florida, USA. (Contact: NESTA, 2000 Florida Ave., N.W., Washington, D.C. 20009, USA. Tel: +1 202 462 6910; Fax: +1 202 328 0566; E-mail: fireton@kosmos.agu.org)

April 16-19

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), New Orleans, Louisiana, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

May 7-11

SALT SYMPOSIUM, The Hague, The Netherlands. (Contact: Secretariat Organizing Committee, 8th World Salt Symposium, P.O. Box 25, 7550 GC Hengelo Ov, The Netherlands. Tel: 31 74 244 3908; Fax: 31 74 2443272; E-mail: Salt.2000@inter.NL.net)

May 15-18

GEOLOGY AND ORE DEPOSITS 2000: THE GREAT BASIN AND BEYOND (Conference), Reno-Spark, Nevada, USA. (Contact: Geological Society of Nevada, P.O. Box 12021, Reno, Nevada 89510, USA. Tel: +1-702 323 3500; Fax: +1-702 323 3599; E-mail: gsn symp@nbgm.unr.edu; Website: <http://www.seismo.unr.edu/GSN>)

May 23-25

TRACERS AND MODELLING IN CONTAMINANT HYDROLOGY (International Conference), Liege, Belgium. (Contact: TraM'2000, LGIH, University of Liege, B19 Sart-Tilman, 40000 Liege, Belgium. Tel: +32 4 366 2216; Fax: +32 4 366 2817; E-mail: adassarg@lgih.ulg.ac.be)

June 24–30

INTERNATIONAL PALYNOLOGICAL CONGRESS (10th), Nanjing, China. (Contact: Secretary of the Organizing Committee for 10th International Palynological Conference, Nanjing Institute of Geology and Palaeontology, Academis Sinica, 39 East Beijing Road, nanjing 210008, China. Website: <http://members.spreed.com/sip/spore/index.htm>)

July 16–22

APPLIED MINERALOGY — ICAM 2000 (6th International Congress), Gottingen & Hannover, Germany. (Contact: ICAM 2000 Office, P.O. Bx 510153, D-30631 Hannover, GERMANY. Tel: +49-511 643 2298; Fax: +49-511 643 3685; E-mail: ICAM2000@bgr.de; Website: www.bgr.de/ICAM2000; abstract deadline: September 1, 1999)

July 18–23

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH INTERIOR (IAVCEI) GENERAL ASSEMBLY 2000, Bandung, Indonesia. (Contact: Secretariat, Volcanological Survey of Indonesia, Jalan Diponegoro 57, Bandung 40122, Indonesia. Tel: +62-22 772606; Fax: +62-22 702761; E-mail: iavcei@vsi.dpe.go.id; Website: <http://www.vsi.dpe.go.id/iavcei.html>; abstract deadline: February 29, 2000)

July 31 – August 4

JOINT WORLD CONGRESS ON GROUNDWATER, Fortaleza, Brazil. (Contact: ABAS, Ceara Chapter, Avienda Santos Dumont, 7700 Papicu, Fortaleza, CEP 60 150-163, Brazil. Tel: +55 85 265 1288; Fax: +55 85 265 2212)

August 6–17

31st INTERNATIONAL GEOLOGICAL CONGRESS, Geology and Sustainable Development: Challenges for the Third Millennium, Rio de Janeiro, Brazil. (Contact: 31st IGC Secretariat Bureau, Av. Pasteur, 404-ANEXO 31 IGC, Urca, Rio de Janeiro RJ, CEP 22.290-240 Brazil. Tel: +55 21 295 5847; Fax: +55 21 295 8094; E-mail: 3ligc@cristal.cprm.gov.br; Website: www.3ligc.org. To request current Circular, send e-mail to <mailto:address@3ligc.org>)

September 3–8

GOLDSCHMIDT 2000 (International Conference), Oxford, UK. (Contact: P. Beattie, Cambridge Publications, Publications House, P.O. Box 27, Cambridge UK CB1 4GL. Tel: +44-1223 333438; Fax: +44-1223 333438; E-mail: Gold2000@campublic.co.uk; Website: <http://www.campublic.co.uk/science/conference/Gold2000/>)

October

INTERNATIONAL MILLENNIUM CONGRESS ON GEOENGINEERING, Melbourne, Australia. (More information soon)

October 15–18 (Provisional)

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Meeting), Bali, Indonesia. (Contact: AAPG Conventions Dept., P.O. Box 979, Tulsa, OK 74101-0979, USA. Tel: 1 918 560 2679; Fax: 1 918 560 2684)

October 23–27

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS (30th Annual Meeting), Cape Town, South Africa.

November 13–16

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Reno, Nevada, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA. Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; WWW: <http://www.geosociety.org/meetings/index.htm>)

November 19–24

GEOTECHNICAL AND GEOLOGICAL ENGINEERING — GEOENG 2000 (International Conference), Melbourne, Australia. (Contact: GeoEng2000, ICMS Pty. Ltd., 84 Queensbridge Street, Southbank, Vic 3006, Australia. Tel: +61 3 9682 0244; Fax: +61 3 9682 0288; E-mail: goeng2000@icms.com.au; Website: <http://civil-www.eng.monash.edu.au/discipl/mgg/geo2000.htm>)

2001**March 22–25**

NATIONAL EARTH SCIENCE TEACHERS ASSOCIATION (Annual Meeting), St. Louis, Missouri, USA. (Contact: NESTA, 2000 Florida Ave., N.W., Washington, D.C. 20009, USA. Tel: +1 202 462 6910; Fax: +1 202 328 0566; E-mail: fireton@kosmos.agu.org)

April 8–11

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Denver, Colorado, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

August 23–28

INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY (5th), Tokyo, Japan. (Contact: Prof. K. Kashiwaya, Dept. of Earth Sciences, Kanazawa University, Kanazawa, 920-1192 Japan. E-mail: kashi@kenroku.kanazawa-u.ac.jp)

November 5-8

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Boston, Massachusetts, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA; Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; WWW: <http://www.geosociety.org/meetings/index.htm>)

2002**March 10-13**

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Houston, Texas, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979,

USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

March 20-27

NATIONAL EARTH SCIENCE TEACHERS ASSOCIATION (Annual Meeting), San Diego, California, USA. (Contact: NESTA, 2000 Florida Ave., N.W., Washington, D.C. 20009, USA. Tel: +1 202 462 6910; Fax: +1 202 328 0566; E-mail: fireton@kosmos.agu.org)

October 28-31

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Denver, Colorado, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA; Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; WWW: <http://www.geosociety.org/meetings/index.htm>)

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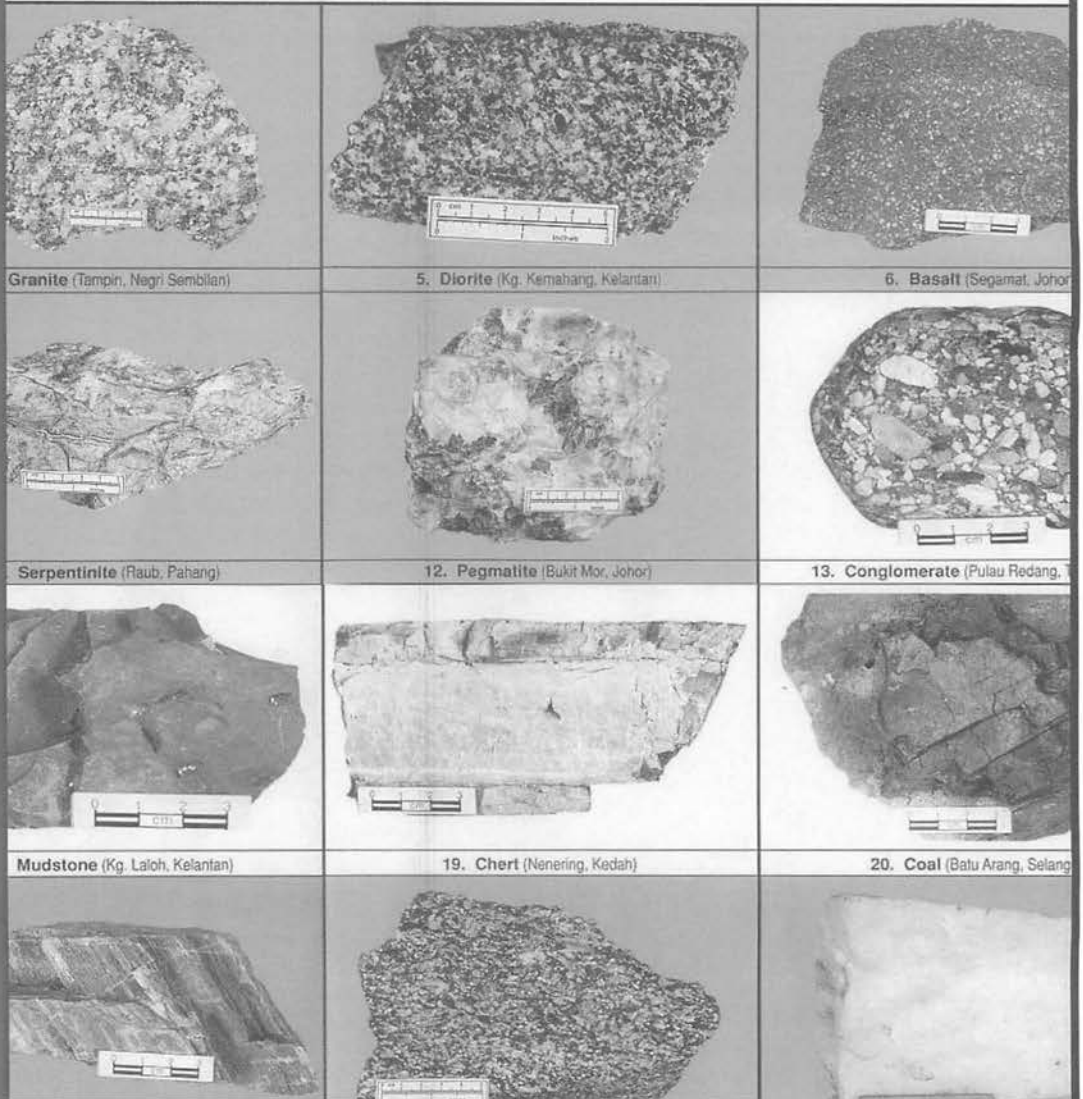
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GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

Back Issues Available

- Bulletin 1** (Feb 1968). 79 p. Studies in Malaysian Geology. Edited by P.H. Stauffer. A collection of papers presented at a meeting of the Geological Society on 31st January 1967. Price: RM3.00. **Out of Stock.**
- Bulletin 2** (Dec 1968). 152 p. Bibliography and Index of the Geology of West Malaysia and Singapore by D.J. Gobbett. Price: RM10.00 - Softcover, M\$15.00.
- Bulletin 3** (Mar 1970). 146 p. Papers in Geomorphology and Stratigraphy (with Bibliography supplement). Edited by P.H. Stauffer. Price: RM10.00.
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- Bulletin 5** (Feb 1973). 70 p. The Search for Tungsten Deposits by K.F.G. Hosking. Price: RM10.00.
- Bulletin 6** (Jul 1973). 334 p. Proceedings, Regional Conference on the Geology of Southeast Asia. A collection of papers, Kuala Lumpur, March, 1972. Edited by B.K. Tan. Price: RM22.00 - hardcover only.
- Bulletin 7** (Jun 1974). 138 p. A collection of papers on geology. Edited by B.K. Tan. Price: RM12.00.
- Bulletin 8** (Dec 1977). 158 p. A collection of papers on geology. Edited by T.T. Khoo. Price: RM12.00.
- Bulletin 9** (Nov 1977). 277 p. The relations between granitoids and associated ore deposits of the Circum-Pacific region. A collection of papers presented at the IGCP Circum-Pacific Plutonism Project Fifth Meeting. 12-13 November 1975, Kuala Lumpur, Edited by J.A. Roddick & T.T. Khoo. Price: RM25.00. **Out of stock.**
- Bulletin 10** (Dec 1978). 95 p. A collection of papers on the geology of Southeast Asia. Edited by C.H. Yeap. Price: RM10.00. **Out of stock.**
- Bulletin 11** (Dec 1979). 393 p. Geology of Tin Deposits. A collection of papers presented at the International Symposium of 'Geology of Tin Deposits', 23-25 March 1978, Kuala Lumpur. Edited by C.H. Yeap. Price: RM50.00.
- Bulletin 12** (Aug 1980). 86 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 13** (Dec 1980). 111 p. A collection of papers on geology of Malaysia and Thailand. Edited by G.H. Teh. Price: RM20.00.
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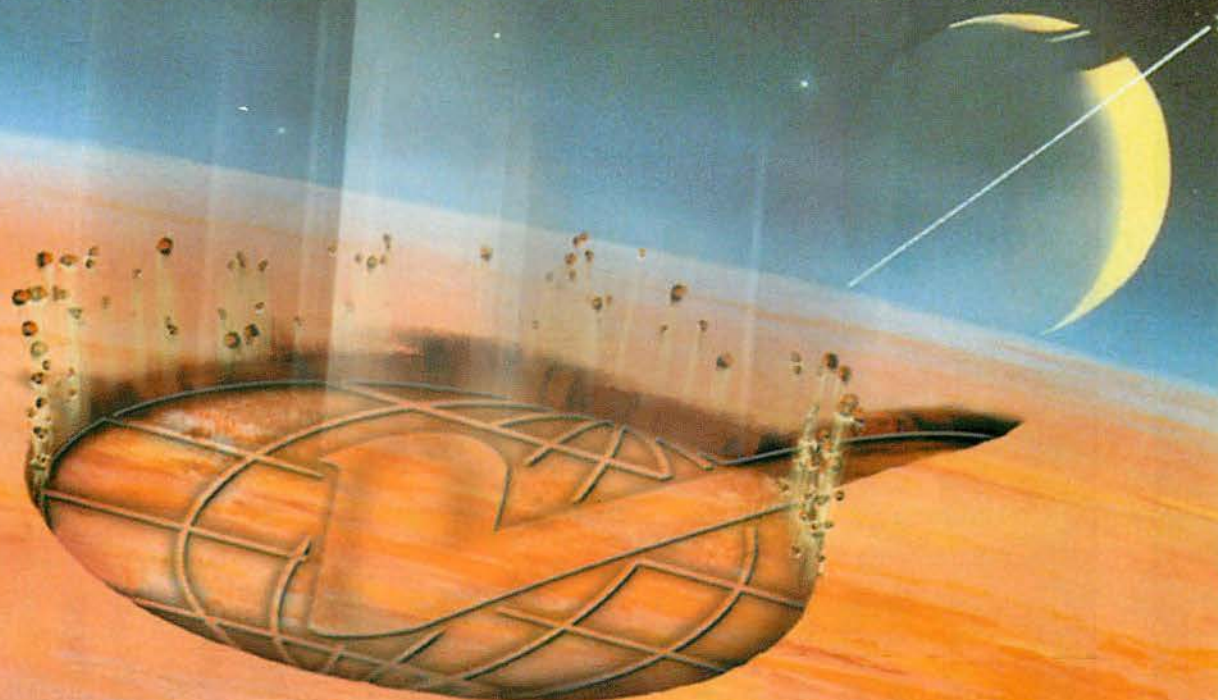
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