

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

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GEOLOGICAL SOCIETY
OF MALAYSIA

DIKELUARKAN DWIBULANAN
ISSUED BIMONTHLY

PERSATUAN GEOLOGI MALAYSIA

Geological Society of Malaysia

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1992-93

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Yeap Cheng Hock

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 occurrence of bryozoan bed in the Singa Formation, Bukit Durian Perangin, Langkawi

BASIR JASIN, WAN FUAD WAN HASSAN & MOHD. SHAFEEA LEMAN
Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi.

Abstract: A bryozoan bed was discovered at Bukit Durian Perangin, Langkawi. The bed is located at the top of the Singa Formation. It is probably a passage bed that represents a transition sedimentation from clastic of Singa Formation to carbonate of Chuping Limestone. The bryozoa genera are composed of *Fenestella*, *Polypora*, *Dyscritella*, and *Streblascopora*. This assemblage indicates that the age of the bed is Artinskian, Early Permian.

INTRODUCTION

The Singa Formation is composed mainly of mudstone interbedded with sandstone. Some mudstone beds contain gravel and pebble-sized clasts of glacio-marine origin (Stauffer and Lee, 1986). The formation was divided into four members. The oldest member is the Rebak Member followed by the Kentut Member, the Ular Member and the youngest is the Selang Member (Ahmad Jantan, 1973). All the members were established based on outcrops in Pulau Rebak, Pulau Kentut, Pulau Ular and Pulau Selang. In the Langkawi main island, the Singa Formation cannot be differentiated into members. To date no pebbly mudstone bed has been reported from here.

Recently, a bryozoan bed has been discovered in a quarry at Bukit Durian Perangin, about 14 km north of Kuah Town (Fig. 1). The outcrop is located at an extensive excavation site of an earth quarry.

GEOLOGICAL SETTING

The outcrop exposed at the excavation site of the quarry was more than 200 meters long. The lower part of the exposure consists of mainly medium to thickly bedded sandstone,

and the top part comprises interbedded mudstone, siltstone and sandstone. The rocks have been gently tilted. The strike of the beds varies from 325° to 350°. The dip of the beds ranges from 35° to 45°. The bryozoan bed is located at the boundary between the sandstone and the mudstone (Fig. 2). The rocks in this area have been slightly metamorphosed by the intrusion of Gunung Raya granite in the late Triassic. At Bukit Belanga Pechah the Singa Formation is conformably overlain by the highly sheared Chuping Limestone.

The bryozoan bed is approximately 1 m thick with strike and dip about 330°/35° and is only found in this area (Fig. 2). It is probably a thin lense of limestone. The bed consists mainly of numerous laminated bryozoa, crinoid stems and some smaller brachiopods all together being cemented by calcite. The bryozoa essentially form laminations in the bed. The bed is exposed at the slope of the first terrace (Fig. 3) and at the slope of the second terrace (Fig. 4). The first exposure is strongly weathered and the bryozoan bed appears like fissile shale showing thin laminations. The bryozoa are preserved as moulds. At the second exposure the bryozoan bed is more consolidated and fresh. The bed is composed of thinly bedded bryozoan limestone layers interbed with calcite-cemented

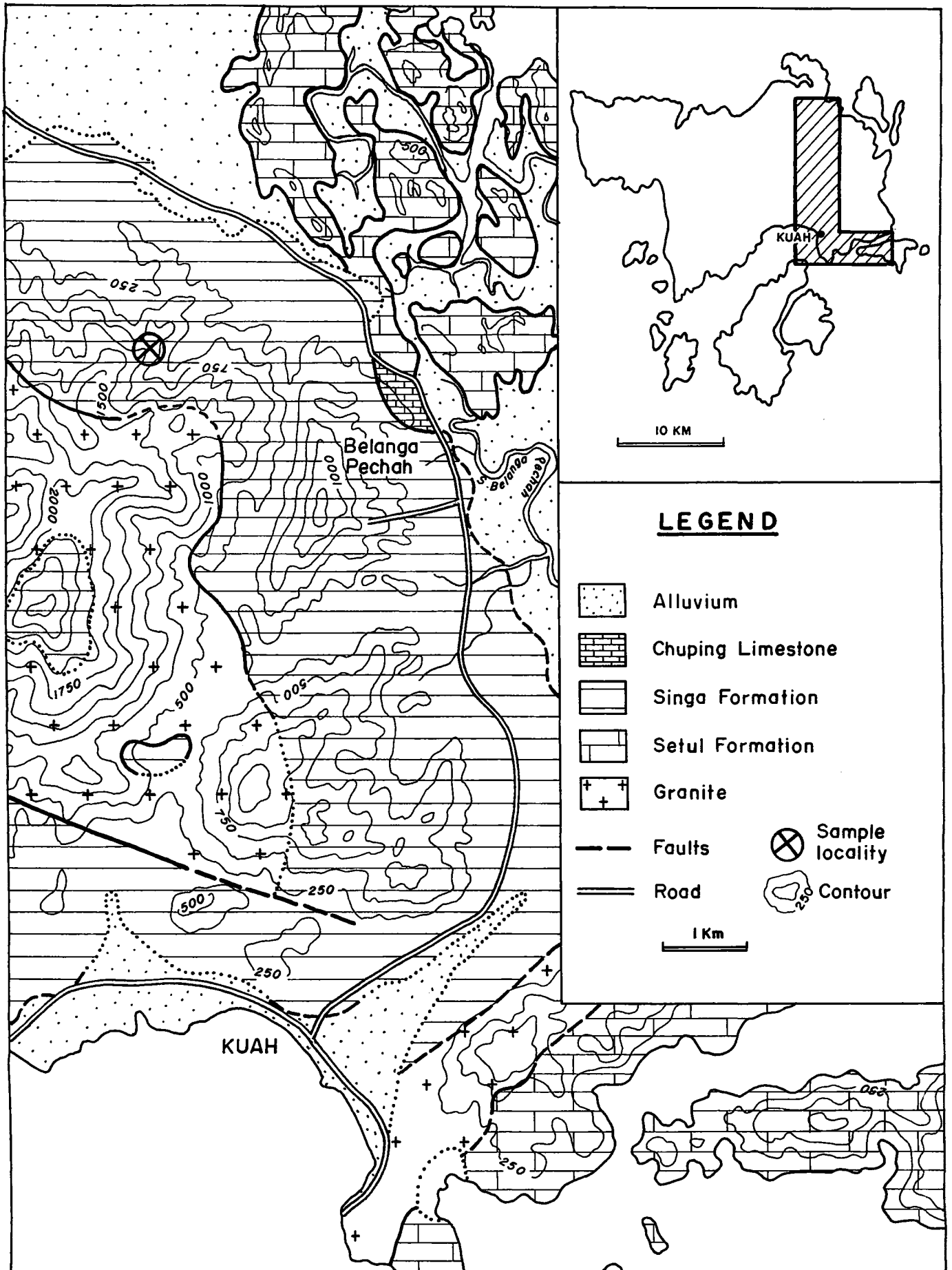


Figure 1. Map showing the location of outcrop.

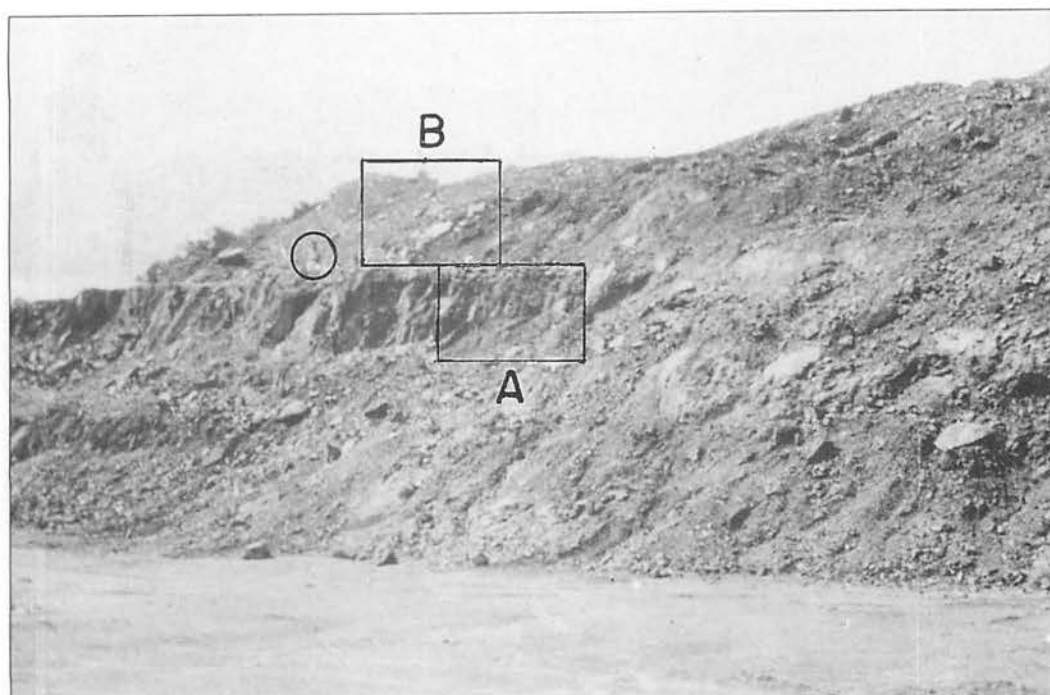


Figure 2. Photograph of the outcrop.



Figure 3. Enlarged section A (Fig.2) showing weathered bryozoan bed.



Figure 4. Enlarged section B (Fig.2) showing more consolidated bryozoan bed.

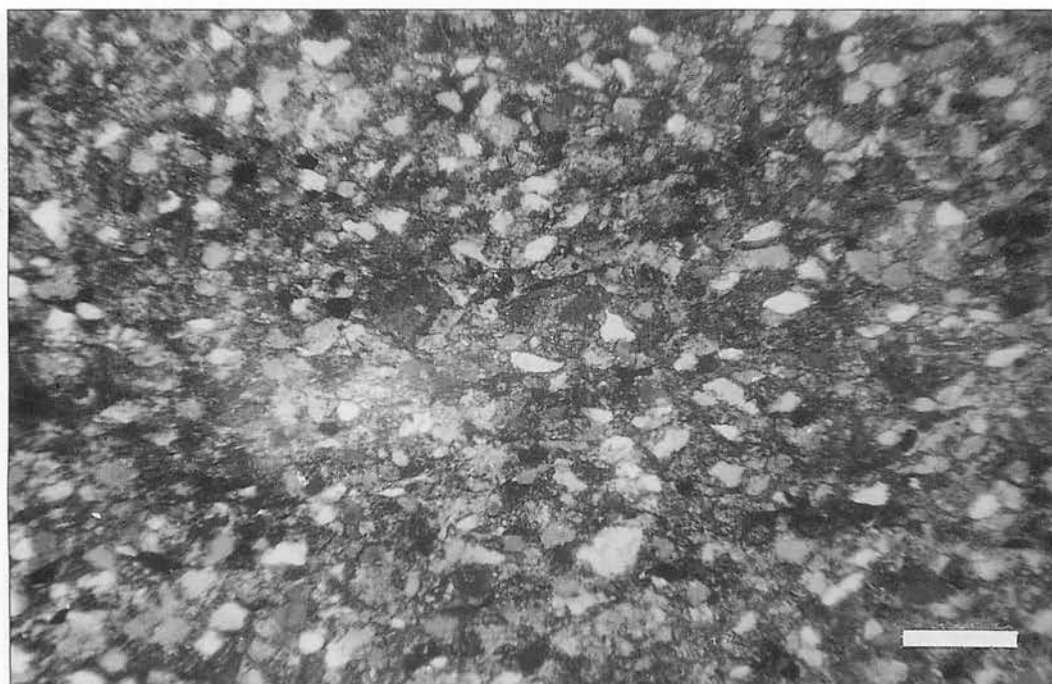


Figure 5. Photomicrograph of fine sandstone (scale bar = 0.3 mm)

fine to very fine sandstone. The thickness of the bryozoan limestone layers ranges from a few mm to 5 cm.

PETROGRAPHY OF THE BRYOZOAN BED

The calcite cemented sandstone bed is composed of very fine, angular quartz grains cemented by calcite (Fig. 5). The bed also contains fragments of crystallised crinoid stems and bryozoan skeletons. This rock is slightly metamorphosed. The bryozoan skeletons are commonly oriented parallel to the bedding.

The bryozoan limestone layers consist of numerous bryozoan skeletons which form multiple laminae parallel to the bedding. The most abundant bryozoa consist of *Fenestella* and *Polypora*. In cross section the rock appears to be laminated (Figure 6). This rock is classified as biomicrosparite (Folk, 1974) or packstone (Dunham, 1962). The bryozoans skeletons are cemented by minute crystal of calcite.

ENVIRONMENT OF DEPOSITION

The bryozoa is usually found in a shallow marine environment. The state of preservation

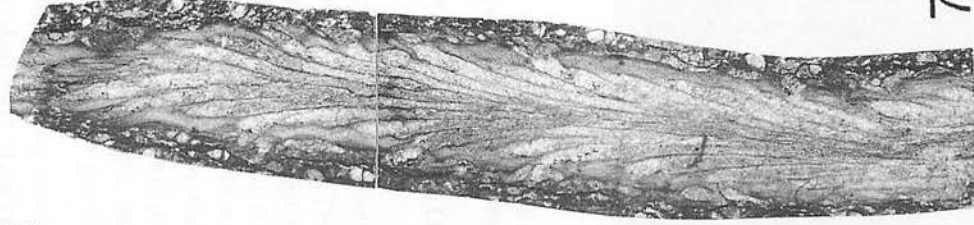
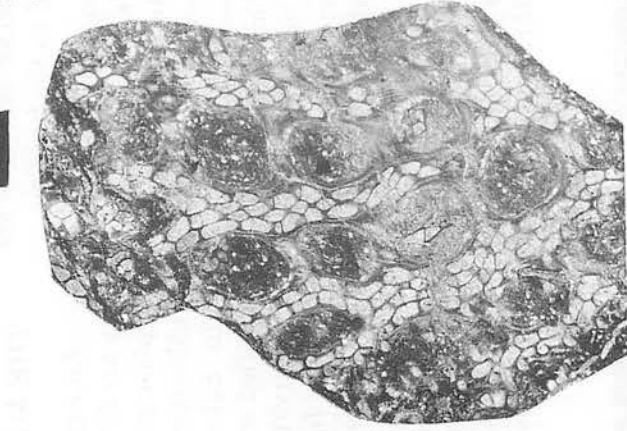
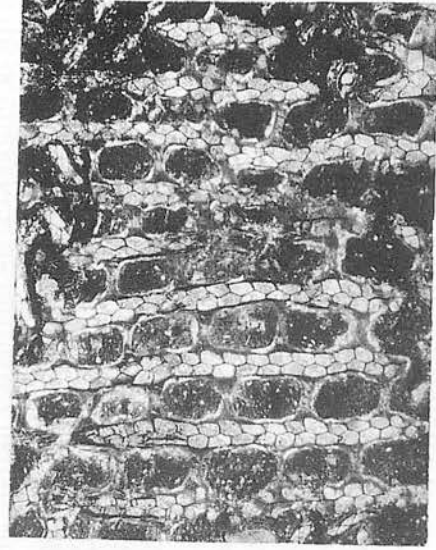
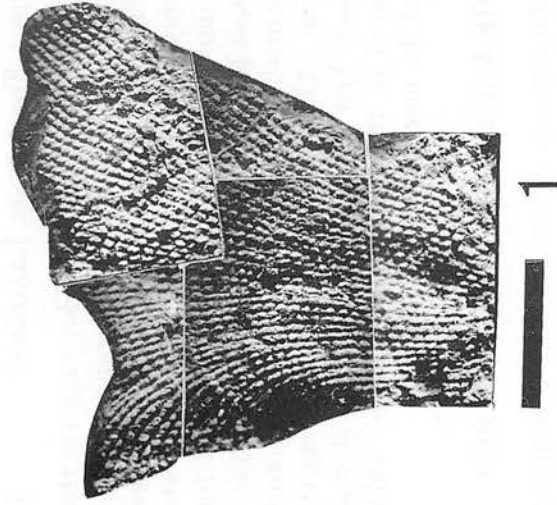
of the present bryozoa samples suggests that this bryozoan assemblage represents a biocoenosis. This bryozoan assemblage was probably living in a less turbulent clear water environment where a slow deposition of fine sand took place. During this period, the bryozoa had flourished. This bed represents a bryozoan bioherm. Thick mudstone bed overlying the bryozoan bed suggests that supply of mud increased in the top part of the bed which caused the mortality of bryozoa.

THE AGE OF THE BRYOZOAN BED

Four genera of bryozoa were recognised. They are *Fenestella*, *Polypora*, *Dyscritella* and *Streblascopora* (Plate 1). Only one species of *Streblascopora* was identified as *Streblascopora exillis* Sakagami. Other species cannot be identified with certainty due to very poor state of preservation and difficulty in finding good sections. In Southeast Asia, many species of these bryozoa were recorded from the Artinskian, late Early Permian (Sakagami, 1976). *Streblascopora exillis* was first described by Sakagami (1970) from the Late Artinskian of Ko Muk Island, Thailand. The present bryozoan assemblage is considered similar in



Figure 6. Photomicrograph of bryozoan limestone (scale bar = 0.1 mm)



age to those of Ko Muk Island which is slightly older than those of Pulau Jong, Langkawi (Sakagami, 1963).

Sibumasu Block. The changing of paleoclimate implies that the Sibumasu Block was drifted northwards from the polar Gondwana region towards equatorial region during Early Permian.

CONCLUSION

At Bukit Durian Perangin the bryozoan bed is overlain by clastic sedimentary rocks viz. siltstone, mudstone and sandstone. The bed is found near the top of the undifferentiated Singa Formation. This bed is considered as a passage bed which represents a transitional stage of depositional history from the clastic sediments of the Singa Formation to the Chuping Limestone. It is probably older than the bryozoan bed at the base of Chuping Formation in Pulau Jong.

Elsewhere, the lower part of the Singa Formation consists of diamictite of glacial origin (Stauffer and Lee, 1986). The occurrence of bryozoan bed near the top of Singa Formation can be correlated with the changing of paleoclimate from cold to warm. The same trend was shown by other fossils from the

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* * * * *

Manuscript received 28 February 1992

Caption to plate 1

1. *Fenestella* sp.
(scale bar = 1 mm)
2. *Fenestella* sp. longitudinal section
(from a thin section; scale bar = 0.1 mm)
3. *Polypora* sp.
(scale bar = 1 mm)
4. *Polypora* sp. longitudinal section
(from a thin section; scale bar = 0.1 mm)
5. *Polypora* sp. longitudinal section
(from a thin section; scale bar = 0.1 mm)
6. *Dyscritella* sp. longitudinal section
(scale bar = 0.1 mm)
7. *Streblascopora exilis* Sakagami, longitudinal section
(scale bar = 0.1 mm)
8. *Streblascopora exilis* Sakagami, cross section
(scale bar = 0.1mm).

PERTEMUAN PERSATUAN
Meetings of the Society

Minutes of the 25th Annual General Meeting

Minutes of the 25th Annual General Meeting held at the National Productivity Centre Hotel (NPC), Petaling Jaya at 5.30 pm on 30 March 1991 (Saturday).

Present:

Ahmad Said (Chairman)	Paramaswaran Suppiah
Fateh Chand	Abdullah b. Khalid
C.S. Hutchison	A. Aziz Hussin
Choo Mun Keong	Lee Chai Peng
Andrew Spykerman	Hamzah Mohamad
Abdul Ghani Rafek	Selvarajah Marimutu
Ahmad Tajuddin Ibrahim	Ibrahim Komoo
N.S. Haile	David Wong
Teh Guan Hoe	Azhar Hussin
Tan Teong Hing	John K. Raj
Jimmy Khoo (Secretary)	

1. Confirmation of the minutes of the previous AGM for 1990

The minutes of the 24th AGM were passed without amendments on the proposal of En. Fateh Chand and seconded by Dr. Hutchison.

2. Matter arising

- a) The President elaborated on Item 2(e) that advanced copies of the AGM minutes and accompanying reports were available to members one week before this AGM.
- b) On Item 3, the President mentioned that the setting up of a "GEOSEA HQ" will be discussed during the coming GEOSEA meeting in Bangkok in November 1991.
- c) On Item 6, the President explained that the Council had decided that the Society will continue to give its members copies of bulletins as they are published.

3. President' Report

Encik Ahmad Said presented his report for the 1990/91 session. He mentioned that:

- a) The Society's two main events i.e. the Annual Geological Conference and the Petroleum Geology Seminar were well-attended and thanked the Organizing Chairmen Dr. Teh Guan Hoe and Tn. Hj. Abu Samad Nordin respectively.

- b) the technical workshop on "Stratigraphic Framework of Offshore Malaysian Basins" jointly organised with CoreLab was successfully held and thanked Dr. Nik Ramli for the organization.
- c) the Society is gearing up to run the Circum Pacific Energy and Mineral Resources (CPEMR) Symposium in November 1992 and the AAPG International Conference to be held in August/September 1994.
- d) the Registration of Geologists Act is being finalized by a committee led by Encik Fateh Chand and the committee's work is scheduled for completion within the year.

To an observation by Dr. Hutchison that the IGCP symposium usually involves high costs and high registration fees and that the Society members should be subsidized, the President replied that the new Council will pursue the matter with the IGCP organisers.

Dr. Hutchison also reminded those present that the 1994 AAPG which the Society is co-hosting in Kuala Lumpur may coincide with the GEOSEA event in the Philippines.

The President's report was passed on the proposal of Encik Fateh Chand and seconded by Encik Choo Mun Keong.

4. Secretary Report

Encik Jimmy Khoo presented his report for the 1990/91 session. He mentioned that the Council met 12 times during the year, conducted 12 technical talks as well as the Annual Petroleum Geology Seminar, Annual Geological Conference and one technical meeting jointly with CoreLab. In addition, on pre-conference and one post-conference fieldtrips were held.

He gave attachments to show the membership status, publication sales, Society's activities and a list of institutions currently on a publications exchange basis with the Society.

The Secretary's report was passed on the proposal of Dr. Haile and seconded by Encik Paramaswaran.

5. Editor's Report

Dr. Teh Guan Hoe presented his report for the 1990/91 session. He mentioned that the initial problems of computerization through desktop publishing for *Warta Geologi* had largely been overcome. One Bulletin, no. 27, was published and distributed during the Petroleum Geology Seminar 1990 and Bulletin no. 26 containing 14 papers should be ready by April 1991. Also scheduled for publication in mid-1991 is Bulletin 28. He thanked the advertisers who took up advertisement pages in the *Warta* and *Bulletin* series.

Dr. Abdul Ghani proposed that the Editor's report be passed and this was seconded by Dr. Azhar.

6. Treasurer's and Honorary Auditor's Reports

The Treasurer's report was presented by Dr. Lee Chai Peng who reported a significant growth in the Society's net assets to RM461,992.20 in 1990. He thanked the generous donors to the Society made mostly during the Petroleum Geology Seminar 1990 and the Honorary Auditor for his help and advice with the Society's accounts.

He also clarified on Dr. Hutchison's query of 1989/90 that the items on "Miscellaneous" and "Sundries" have been combined.

Dr. Hutchison mentioned that especially for international meetings like GEOSEA, the students should be subsidized to encourage them to attend.

Dr. Abdul Ghani suggested that authors for papers accepted for international conferences be subsidized to attend. Dr. Hutchison reiterated that this may not be a good idea as it would open the floodgates to a deluge of applications.

Dr. John Kuna Raj asked whether there are plans to make use of the fixed deposits. The President explained that there are no plans to the moment but the Society planned to publish a map of Borneo, give book prizes and medals for best achievements in geology for the 3 universities locally and to print fossil, mineral and rock posters for distribution to secondary schools in the country. The President welcomes further suggestions from members on how to use the funds.

Dr. Abdul Ghani seek clarification on the item "Speakers' Account". The president clarified that this is the amount incurred for some speakers' lodgings and inviting the speakers for dinner, etc.

Dr. John Kuna Raj suggested that the Society sponsor students to publish a map of the Kuala Lumpur area.

Dr. John Kuna Raj suggested that the ceiling of RM300 for the student loan fund be raised.

Encik Fateh Chand suggested that future AGM's report include a section on how the funds are utilised.

The President mentioned that the new Council could also consider publishing field guide books.

The Treasurer's report was passed on the proposal of Dr. John Kuna Raj and seconded by Dr. Hamzah Mohamad.

The Honorary Auditor's report was passed on the proposal of Mr. David Wong and seconded by John Kuna Raj.

7. Election of Honorary Auditor for 1991/92

The Treasurer recorded the Society's thanks to the Honorary Auditor for 1990/91 and proposed that Mr. Peter Chew be appointed again as the Society's auditor for 1991/92. This was seconded by Dr. Hutchison with a vote of thanks from all members present.

8. Other business

- 1) Dr. Haile suggested that a publications exchange be arranged between the Society and the Indonesia Petroleum Association. Dr. Hutchison suggested that this be done in person by those going to Indonesia as the IPA is likely to send publications by post.
- 2) Encik Paramaswaran suggested that the Society put up geological exhibitions and organise training schools/courses. The President replied that this was already being done in respect of training courses. The Society will look into organising specialist course in future.
- 3) Dr. Haile proposed a photographic competition for the best geological photograph in conjunction with the Society's silver anniversary year.
- 4) Mr. Choo Mun Keong suggested that the Society do a series of exhibitions, photographic competitions, etc. through the year 1991 in conjunction with the Society's silver anniversary.

9. Announcement of New Council 1991/92

The President announced the new Council for 1991/92 as follows:

President	:	Ahmad Said (Petronas)
Vice-President	:	Khalid Ngah (PRI)
Hon. Secretary	:	Jimmy Khoo (Geological Survey)
Hon. Assist. Secretary	:	Ahmad Tajuddin Ibrahim (U.M.)
Hon. Treasurer	:	Lee Chai Peng (U.M.)
Hon. Editor	:	Teh Guan Hoe (U.M.)
Councillors (2-years)	:	Abdul Ghani Rafek (UKM) Nik Ramli Nik Hassan (FORAD) Tan Teong Hing (UKM) Mazlan Madon (PRI)
Councillors (1-year)	:	Chin Lik Suan (Contractor) Andrew Spykerman (Petronas) Fateh Chand (Geological Survey) Cheang Kok Keong (Consultant)
Immediate Past President	:	Hamzah Mohamad

The President thanked the Council for their services rendered during 1990/91. The meeting also recorded a vote of thanks to the outgoing council members. The 25th AGM of the Geological Society of Malaysia ended at 6.30 p.m.

Jimmy Khoo

13 April 1991

PRESIDENT'S REPORT

During the 1991/92, the Society continued to be active in its efforts in advancement of the geological sciences, through its publication, conferences and technical workshops and fieldtrips. The Society also continued to grow in terms of membership and financial strength.

The Society's two main events, i.e. the Annual Geological Conference and the Petroleum Geology Seminar were again successfully held with excellent papers and attendances. The Annual Conference was held in Kuching and this was an outstanding success. We had 146 participants and 4 fieldtrips were held in conjunction with the conference. Our thanks again go to Dr. Teh Guan Hoe and his organizing committee, who are already working again on the next conference to be held this time in Kuantan on May 9-10, 1992.

The traditional big event, the Petroleum Geology Seminar held in November 1991 attracted over 400 participants. our thanks go to Dr. Khalid Ngah, the Organizing Chairman and his team, and also to all the organizations which provided generous financial support.

Apart from organizing these two main conferences, the Council continued preparation for two major conferences to be hosted by the Society in 1992 and 1994, i.e. the Circum Pacific Energy and Mineral Resources Council Symposium to be held in November 1992 in lieu of the Annual Petroleum Geology Seminar, and also the AAPG International Conference to be held in August/September 1994. These are major events and members of the Society are again strongly urged to continue to lend their full support to ensure their success.

The Society also co-hosted a one-day technical workshop on "Advances in Geochemistry in Malaysia and South East Asia" with CoreLab. This was a successful meeting with over 30 participants and our thanks go to Dr. Nik Ramli for the organization.

A total of 11 technical talks were also held during the past year. The Society also organized a photography competition. Selected photographs from this competition will be published in a special volume to commemorate the Society's 25th Anniversary.

The Society also continued its publication efforts with Bulletin 28 being published and 3 other bulletins in final preparation.

The Society's financial position continued to improve. The Council is indeed trying its best to optimize the usage of funds. It is planned for more funds to be utilized for advancement of geological sciences and members' suggestion are most welcome here.

On behalf of the Society, I would like to thank every one present here today for their kind attendance. I would also, like to thank Heads of the Department of Geology of Universiti Malaya and Universiti Kebangsaan Malaysia and the Director-General of the Geological Survey for all their kind support they have always given the Society and also the many other individuals and organizations who continue to be active supporters of the Society's activities.

HONORARY SECRETARY'S REPORT

1. The Council

Members of the Council of the Geological Society of Malaysia for the period 30th March 1991 to 25th April 1992 are as follows:

- President : Ahmad Said (Petronas)
- Vice-President : Khalid Ngah (Petronas)
- Hon. Secretary : Jimmy K.K. Khoo (Geological Survey Malaysia)
- Hon. Assistant Secretary : Ahmad Tajuddin Ibrahim (Universiti Malaya)
- Hon. Treasurer : Lee Chai Peng (Universiti Malaya)
- Hon. Editor : Teh Guan Hoe (Universiti Malaya)
- Councillors (2 Years) : Abdul Ghani Rafek (UKM)
Nik Ramli Nik Hassan (FORAD)
Tan Teong Hing (UKM)
Mazlan Madon (Petronas)
- Councillors (1 Year) : Chin Lik Suan (Contractor)
Andrew Spykerman (Petronas)
Fateh Chand (Geological Survey Malaysia)
Cheang Kok Keong (Consultant)
- Immediate Past-President : Hamzah Mohamad (UKM)

2. Council Meetings

Council meetings were held normally on the first Friday of every month through the 1991/92 session. A total of 12 Council meetings have been held.

Several committee and working groups were established and have contributed tremendously to the activities of the Society.

3. Membership

The total membership of the Society as at 31st December 1991 is 545. There are 143 foreign memberships as compared to 402 local memberships. Details of the various classes of memberships and their geographical distribution are shown in Appendix 1.

4. Society Activities

During the year one conference and two seminars were held. The Annual Geological Conference 1991 was held at the Holiday inn, Kuching from 4th to 5th May 1991. It was preceded by a 1-day field trip in the Bau goldmining district as well as a stratigraphic fieldtrip in the Kuching-Bau area. This was followed by two post-conference field trips in the Kuching-Sibu-Miri and the Batu Gading area. The Conference was well attended with 146 registered participants.

The other highlight of the year was the Petroleum Geology Seminar 1991 held at the Shangri-La Hotel, Kuala Lumpur from 26th to 27th November 1991. It was attended by 404 participants.

A 1/2 day seminar on "Groundwater Contamination — The Hidden Problem" was jointly held by the Society and the Geology Department, University of Malaya on 16th January 1992.

A technical meeting jointly hosted by the Society and CoreLab on "Advances in Geochemistry in Malaysia and Southeast Asia" was held at the Ming Court Hotel on 27th July 1991. It recorded a full-house attendance of 37 participants.

Two field excursions were organised for the members of the Society to the Endau-Rompin area, Johor (27-30th June, 1991) and the Jeram/Batu Arang area, Selangor (6th October 1991).

A photo competition was organised by the Society entitled "Fascinating Malaysian Geology" with cash prizes totalling RM3,250 to celebrate the Silver Jubilee of the Society.

Eleven technical talks were held during the 1991/92 session. Details of the Society's activities are shown in Appendix 2.

5. Publication Sales

Publication sales remained steady as in previous years. The remaining stock and sales made during 1991 is as shown in Appendix 3. The Society continued to maintain a publication exchange list with various professional bodies and libraries as shown in Appendix 4.

6. Young Geoscientist Award

No nomination was received for the year.

7. Acknowledgements

The Society would like to acknowledge with thanks the cooperation received from local and overseas professional societies, universities and institutes; the Head of the Geology Department, University of Malaya where the Society is housed and the numerous individuals and Councillors who have contributed in one way or another to the Society's activities.

Appendix 1

MEMBERSHIP OF THE SOCIETY							
Country	Full	Associate	Student	Institutional	Honorary	Life	Total
Australia	22			5		3	30
Brunei						1	1
Canada	5						5
Europe	14		2	5		4	25
Hong Kong	2						2
Indonesia	9	1		1	1		12
Japan	6			1	1		8
New Zealand	2						2
Philippines						1	1
Singapore	19			5		1	25
Sultanate of Oman	1						1
Thailand	2			1		1	4
Turkey	2						2
United Arab Emirates	1			1			2
United States of America	20		2		1	23	
Malaysia	260	10	82	19	4	27	402
Total	365	11	84	40	6	39	545

Appendix 2

SOCIETY ACTIVITIES (1991/91)	
Date	Event/Venue
1 3 May 1991	: Pre-Conference Fieldtrip: a) Bau Goldmining; b) Kuching-Bau Stratigraphy, Sarawak
2 4-5 May 1991	: Annual Geological Conference '91, Kuching Sarawak
3 6-8 May 1991	: Post-Conference Fieldtrip 1 — Kuching-Sibu-Bintulu-Miri, Sarawak
4 9-10 May 1991	: Post-Conference Fieldtrip 2 — Batu Gading area, Sarawak
5 31 May 1991	: Technical Talk: Geological Aspects of Horizontal Wells by Dr. John Shelton @ PRI, Ulu Kelang, Selangor
6 14 June 1991	: Technical Talk: The Design & Construction of Continuously Reinforced Concrete Pavement (CRCP) Between Ayer Keroh and Tangkak (19km) - Some Engineering and Soil Mechanic Aspects by Dr. V. Nadarajah @ University of Malaya, Kuala Lumpur

- | | | |
|----|---------------------|---|
| 7 | 27-30 June 1991 | : Endau-Rompin Fieldtrip, Johor by GSM Structural Geology & Tectonics Study Group |
| 8 | 27 July 1991 | : Technical Meeting: Advances in Petroleum Geochemistry in Malaysia and Southeast Asia by GSM/CoreLab @ Ming Court Hotel, Kuala Lumpur |
| 9 | 23 August 1991 | : Technical Talk: Glacial Facies - Their Sedimentology, Distribution & Hydrocarbon Potential by Dr. Jonathan Redfern @ University of Malaya, Kuala Lumpur |
| 10 | 6 October 1991 | : Field Excursion to Jeram and Batu Arang, Selangor by GSM Stratigraphy & Sedimentology Study Group |
| 11 | 9 October 1991 | : Technical Talk: Tectonics of South China - Keystone between Southeast Asia & West Pacific by Prof. Kenneth J. Hsu @ University of Malaya, Kuala Lumpur |
| 12 | 24 October 1991 | : Technical Talk: Significance of Radiolaria in the South and Southeast Asian Ophiolite Sequence by Prof. Hsin Yi Ling @ University of Malaya, Kuala Lumpur |
| 13 | 26-27 November 1991 | : Petroleum Geology Seminar @ Shangri-La Hotel, Kuala Lumpur |
| 14 | 11 December 1991 | : Technical Talk: Behaviour of Gold in Stream Sediments a) Thailand b) Canada by Prof. Dr. W.K. Fletcher @ University of Malaya, Kuala Lumpur |
| 15 | 16 January 1992 | : Seminar: Groundwater Contamination - The Hidden Problem by Prof. Dale J. Bray @ University of Malaya, Kuala Lumpur |
| 16 | 19 February 1992 | : Technical Talk: The New Role of Petroleum Geochemistry in Oil and Gas Exploration by Dr. Jim Brookes @ University of Malaya, Kuala Lumpur |
| 17 | 20 February 1992 | : Technical Talk: The Origin of Life - Religious and Scientific Considerations by Dr. Jim Brooks @ University of Malaya, Kuala Lumpur |
| 18 | 27 March 1992 | : Technical Talk: Origin of Stress in the Lithosphere and Plate Boundary Forces by Prof. M.H.P. Bott @ University of Malaya, Kuala Lumpur |
| 19 | 31 March 1992 | : Technical Talk: Metallogeny and Mineral Exploration by Prof. Dr. David Strong @ University of Malaya, Kuala Lumpur |
| 20 | 10 April 1992 | : Technical Talk: The relationship between religion and Science by Prof. M.H.P. Bott @ University of Malaya, Kuala Lumpur |

Appendix 3

STOCK OF PUBLICATIONS		
Bulletin No.	Sales 1991	Stock Remaining
2	7	337
3	7	348
4	7	206
5	9	109
6	9	693
7	7	416
8	6	63
10	10	39
11	6	137
12	7	58
13	4	188
14	7	48
15	2	88
16	3	130
17	3	177
18	10	177
19	14	707
20	41	564
21	10	288
22	17	360
23	18	347
24	17	527
25	23	304
26	650*	402
27	87	357
28	589*	461
Field Guide 1	0	27
Abstracts (Bulletin 6)	0	6
Stratigraphic Correlation	14	499
<i>*inclusive of free copies distributed to Members</i>		

Appendix 4

LIST OF INSTITUTIONS ON EXCHANGE

1. Akademie der Wissenschaften der DDR, Zentralinstitut für Physik der Erde, WIB B 689, Telegrafenberg, Potsdam, DDR-1561, East Germany.
2. Director of All Union Geological Library, Sredny pr. 74, 199026 Leningrad V-26, USSR.
3. American Museum of Natural History, Serials Unit, Library, Central Park West at 79th Street, New York, N.Y. 10024-5192, USA.
4. AGID, Attn: The Editor, Dr. D.A.V. Stow, Dept. of Geology, University of Nottingham, Nottingham NG7 2RD, England.
5. Bureau de Recherche Geologique et Minieres, Dept. Documentation, Section echanges, Boite Postale 6009, 45060 Orleans Cedex, France.
6. CICESE Library, Gifts & Exchange Unit, P.O. Box 434803, San Ysidra, Ca. 92143-4803, USA.
7. Commonwealth Science Council, Marlborough House, Pall Mall, London SW1Y 5HX, England.
8. Dewan Bahasa & Pustaka, Ketua Perpustakaan, Peti Surat 10803, Kuala Lumpur.
9. Elf Aquitaine (P), F-31360 Boussens, France.
10. Suomalainen Tiedeakatemia-Academia Scientiarum Fennica, Rauhankatu 15B, 00170 Helsinki 17, Finland.
11. Central Geological Survey, Ministry of Economic Affairs, P.O. Box 968, Taipei, Taiwan, ROC.
12. Freie Universität Berlin, Geologisch-Palaontologisches Institut, Altensteinstrasse 34a, 1000 Berlin 33, Germany.
13. The Library, Geological Research & Development Centre, Jalan Diponegoro 57, Bandung, Indonesia.
14. Geological Society of Korea, Dr. Yong Ahn Park, Dept. of Geological Sciences, Seoul National University, Seoul 151, Korea.
15. The Secretary, Geological Society of Thailand, c/o Dept. of Mineral Resources, Rama VI Road, Bangkok 10400, Thailand.
16. Geological Survey of Malaysia, P.O. Box 1015, 30820 Ipoh, Perak.
17. Geological Survey of Malaysia, P.O. Box 560, 93712 Kuching, Sarawak.
18. Geological Survey of Malaysia, Locked Bag no. 2042, 88999 Kota Kinabalu, Sabah.
19. Dr. L.A. Goldenberg, Chief of Information Dept., Institute of Geology of Foreign Countries, 2nd Novotikhvinskaya 12/22, Moscow, USSR.
20. Librarian, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, England.
21. Kementerian Hal Ehwal Dalam Negeri Malaysia (Bahagian Penerbitan), P.O. Box 10382, Kuala Lumpur.
22. The Editor, Malaysian Journal of Tropical Geography, c/o Dept. of Geography, Universiti Malaya, Kuala Lumpur.
23. Prof. Dr. A. Bolewski, Mineralogical Society of Poland, 30-059 Krakow, al. Michiewiczka 30, Poland.
24. Nanking Institute of Geology and Palaeontology, Academia Sinica, Chi-Ming-Ssu, Nanking, People's Republic of China.
25. The National Geological Library, Kan Kia Ko, Fu Wai, Peking, People's Republic of China.
26. National Geophysical Research Institute, Uppal Road, Hyderabad 500 007, India.

27. The National Library, Stamford Road, Singapore 0617. Attn: Gifts & Exchange Section (Serials).
28. Library, National Science Museum, Ueno Park, Tokyo, Japan.
29. Editorial Board, Natural History Museum & Institute, Chiba, 955-2 Soba-cho, Chiba 280, Japan.
30. The Librarian, New South Wales Dept. of Mineral Resources, GPO Box 5288, Sydney, NSW 2001, Australia.
31. Acquisitions, Library, Oklahoma Geological Survey. The University of Oklahoma, 830 Van Vleet Oval, Room 163, Norman, Oklahoma 73069, USA.
32. Peking Graduate School, Peking College of Geology, Xueyuan Road, Peking, China.
33. Perpustakaan Negara Malaysia, (Bhg. Penyerahan Akta & Hadiah & Pertukaran), Tkt. Bawah, Lot no. G1 & G2, Blok A, Kompleks Bukit Naga, Damansara Heights, 50572 Kuala Lumpur.
34. The Librarian, Petronas, P.O. Box 12444, 50778 Kuala Lumpur.
35. Library, exchange, Scripta Geologica, P.O. Box 9517, 2300 RA Leiden, The Netherlands.
36. The Director, SEATRAD Centre, Jalan Sultan Azlan Shah, 31400 Ipoh, Perak.
37. Mrs. Molly Lee-Joe, UN Offshore Mineral Prospecting, c/o Mineral Resources Dept. Private Mail Bag, Suva, Fiji.
38. U.S.G.S. Library, Mail Stop 955, 345 Middlefield Road, Menlo Park, Ca. 94025, USA.
39. U.S.G.S. Library (Exchange & Gift), National Center - Mail Stop 950, 12201 Sunrise Valley Drive, Reston, VA. 22092, USA.
40. Cawangan Hadiah & Pertukaran, Perpustakaan Tun Seri Lanang, Universiti Kebangsaan Malaysia, Bangi.
41. Ketua, Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi.
42. University of Kansas Libraries, Serials/Exchange, Lawrence, Ka. 66045, USA.
43. The Librarian, University of Malaya, Kuala Lumpur.
44. Perpustakaan, Universiti Sains Malaysia, 31750 Tronoh, Perak.
45. The Librarian, Institute of Geoscience, University of Tsukuba, Tsukuba-City, Ibaraki-Pref 305, Japan.
46. Bahagian Bahan-bahan Bersiri dan Dokumen, Perpustakaan, Universiti Sains Malaysia, P. Pinang.
47. Editor, Episodes, P.O. Box 919, Herndon, Va. 22070, USA.
48. Librarian, AAPG, P.O. Box 979, Tulsa, Okla. 74101, USA.
49. Petromin Pub. Co. 24 Peck Seah Street, 03-00 Nelsons Bldg. Singapore 0207.
50. Gift Section, The Library of Congress, Representative, American Embassy, P.O. Box 10035, Kuala Lumpur.
51. AAPG House of Delegates Representative, 444, 17th St., Suite 728, Denver, Co. 80202, USA.
52. Geological Survey of Japan, Library, 1-3 Higashi 1-chome, Tsukuba-shi, Ibaraki-ken, 305 Japan.
53. Natural History Museum and Institute, China.

EDITOR'S REPORT 1991/92

Two volumes of the Society's Bulletin series, namely **Bulletin 26** and **Bulletin 26** were published in 1991. **Bulletin 26** contains 15 papers, the majority from the Annual Geological Conference '89; while **Bulletin 28** which is the Special Issue on Petroleum Geology Vol. VI contain 9 papers. (**Bulletin 27** was published in December 1990).

Three other Bulletins, Bulletin 29, 30 and 31 are in the final stages of preparation. **Bulletin 29** is an "Annotated Bibliography of the Geology of the South China Sea and adjacent parts of Borneo"; **Bulletin 30** has 10 papers, the majority from the Annual Geological Conference '90; while **Bulletin 31** has 11 papers, the majority from the Annual Geological Conference '91.

The Society's newsletter, **Warta Geologi**, for 1990, should be ready soon. The unforeseen delay is largely due to plans to produce it by DTP (Desktop Publishing).

The Contributions of our donors, proof-readers and reviewers are greatly appreciated.

G.H. Teh

Editor

TREASURER'S REPORT 1991

The Society's finances continue to be in a healthy state with nett assets valued at RM454,622.35. We have RM391,901.17 in fixed deposits and an excess of income over expenditure of RM44,354.89 for the past year despite spending more to promote the activities of the Society, e.g. on technical talks, fieldtrips by study groups and having the annual conference in Kuching.

As in previous years the generous donation from the petroleum and other companies towards our Petroleum Geology Seminar and Annual Conference accounts for the bulk of the income for the Society. Many thanks to these companies for their continued support and to the various members of the Society for their hard work in soliciting the funds.

The Society would once again wish to thank Mr. Peter Chew, our Honorary Auditor for auditing our accounts.

Lee Chai Peng

13 March 1992

PERSATUAN GEOLOGI MALAYSIA
Geological Society of Malaysia

INCOME AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED 31 December 1991

INCOME	1991	1990
Entrance fee	\$992.28	\$960.00
Subscriptions	\$25,422.67	\$22,343.63
Fixed deposits interest	\$16,943.39	\$18,968.03
Sales of publications	\$10,058.71	\$16,631.93
PGS '89 - Donations	\$61,019.51	\$29,359.67
Xerox	\$421.76	\$1,112.26
Short Course	—	\$3,985.95
Stratigraphic Workshop	—	\$87.05
	\$114,858.32	\$93,448.52

LESS EXPENDITURE	1991	1990
Bank charges	\$1,169.10	\$759.58
Depreciation of office equipment	\$1,799.87	\$3,355.00
Honorarium	\$5,274.00	\$4,482.00
Postage	\$3,388.92	\$6,789.52
Printing & Stationary:		
Miscellaneous	\$2,885.90	\$2,076.70
Newsletters	\$8,915.00	\$6,685.90
Bulletin 20/23	\$22,267.99	\$47,592.00
Refreshments	\$1,242.93	\$430.70
Subscription to professional bodies	\$172.29	\$272.26
Sundry expenses	\$2,837.15	\$687.86
Annual General Meeting	—	\$18.20
Telephone expenses	\$640.56	\$474.73
Speakers' account	\$1,739.38	\$1,108.58
Annual Dinner	\$1,080.00	\$434.50
Annual Conference	\$13,832.38	\$2,126.73
National Mineral Policy	\$646.90	\$2,724.60
Telefax expenses	\$421.53	—
Study Groups	\$2,189.53	\$716.50
	\$70,503.43	\$80,735.36

EXCESS OF INCOME OVER EXPENDITURE:

Transfer to capital fund.	\$44,354.89	\$12,713.16
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PERSATUAN GEOLOGI MALAYSIA
Geological Society of Malaysia

BALANCE SHEET AS AT 31 DECEMBER 1991

FIXED ASSETS	1991	1990
Office equipment	\$33,559.87	\$33,559.87
Less: Accumulated depreciation	\$33,558.87	\$31,759.00
	\$1.00	\$1,800.87

CURRENT ASSETS		
Fixed Deposits	\$391,901.17	\$324,693.95
Cash at bank	\$45,380.87	\$134,492.79
Petty cash	\$1,179.11	\$401.89
Expenses prepaid:		
Telephone deposit	\$300.00	\$300.00
Institute Geologist Malaysia	\$389.70	\$302.70
CPCEMR Symposium	\$15,170.50	—
Telefax deposit	\$300.00	—
	\$454,621.35	\$460,191.33
	\$454,622.35	\$461,992.20

Represented by:

CAPITAL FUND		
Balance as at 1.1.91	\$391,442.96	\$378,729.80
Add: excess of income over expenditure	\$44,354.89	\$12,713.16
	\$435,797.85	\$391,442.96
Student Loan Fund	\$6,654.91	\$6,804.91
PGS 91 (donations)	\$8,856.91	\$60,477.61
Young Geoscientist Award	\$ 3,313.04	\$3,049.21
EGITT	—	\$217.51
	\$454,622.35	\$461,992.20

REPORT OF THE AUDITORS TO THE MEMBERS OF THE GEOLOGICAL SOCIETY OF MALAYSIA

To

The Members of the
Geological Society of Malaysia

We have obtained all the information and explanations necessary for the purpose of this audit and in our opinion, the accounts for the year ended 31st December 1991 give a true and fair view of the state of the Society's financial affairs.

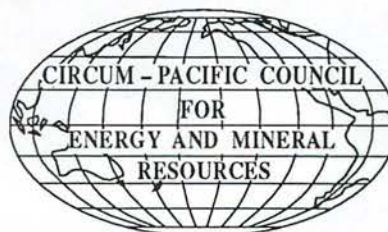
Signed

PETER CHEW & CO.
CERTIFIED PUBLIC ACCOUNTANTS
AUDITORS

Kuala Lumpur
24 March 1992

SYMPOSIUM ON TECTONIC FRAMEWORK AND ENERGY RESOURCES OF THE WESTERN MARGIN OF THE PACIFIC BASIN

Shangri-La Hotel, Kuala Lumpur, Malaysia
29 November - 2 December 1992



26th ANNUAL GENERAL MEETING



26th Annual General Meeting & Annual Dinner 1992

The 26th Annual General Meeting of the Society was held in one of the Conference Rooms at the Malaysian Petroleum Club on Saturday 25 April 1992. There were 25 members present. The AGM started at 5.45 pm and after a lively session, the meeting was adjourned at 7.20 pm.

The Society's Annual Dinner 1992 was also held on Saturday, 25th April 1992, at the Malaysian Petroleum Club, Kompleks Dayabumi, at 7.30 pm.

Besides the grand setting, the 60 participants were treated to a good buffet dinner. It was heartening to see many members bringing along their wives and some their children. There was a broad spectrum of members present, with those who have been with the Society for over 20 years mingling freely with younger members including recent graduates and student members.

In his customary speech, the President, Encik Ahmad Said spoke on the activities of the Society for the past year and thanked those who have helped in making it another eventful year.

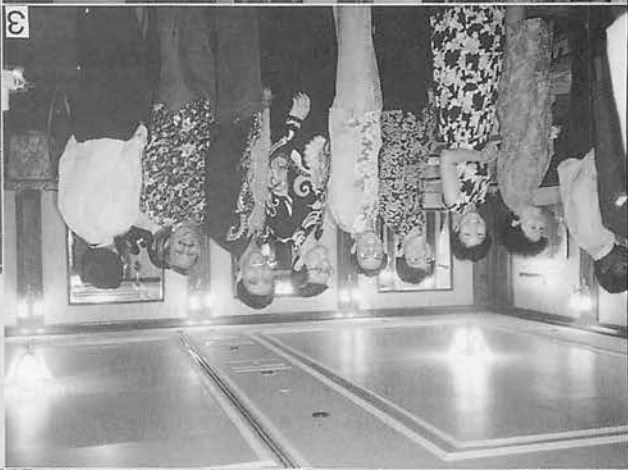
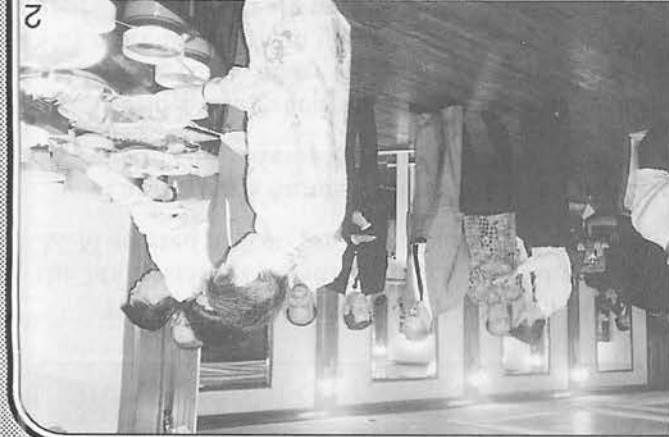
Then Dr. Neville S. Haile, the first President of the Society, was elected a Honorary Member. In presenting the citation, Professor Charles Hutchison in a light-hearted manner besides recalling the way he first met Dr. Haile and the long association with him, also touched on Dr. Haile's immense contribution to the Society and the geology of the region.

G.H. Teh

— G.S.M. —

Annual Dinner 1992 — Captions to photos

1. Food first. Ladies first!
2. Next the patient gentlemen.
3. The rest happily waiting their turn.
- 4-8. The various tables at the dinner.
9. The President goes on his round.
10. Anna goes on her round.
11. The President chatting with some guests.
- 12-13. The other tables at the dinner.
14. C.S. Hutchison with his citation for the new Honorary Member.
15. The President with his speech.
16. N.S. Haile receives his Honorary Membership from the President.
17. N.S. Haile with his acceptance speech.



ANNUAL DINNER 1992



ANNUAL DINNER 1992

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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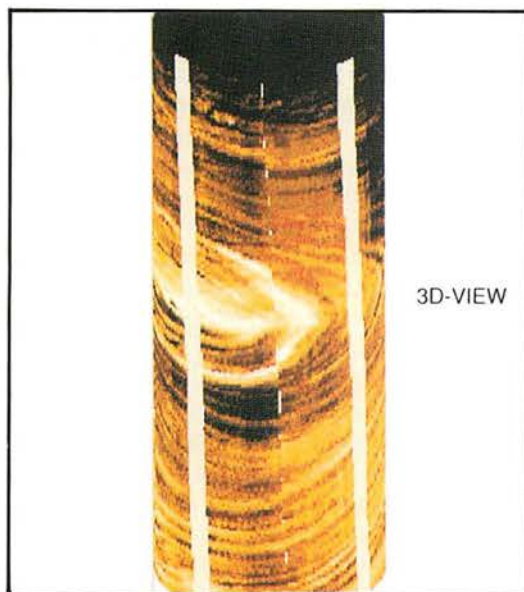
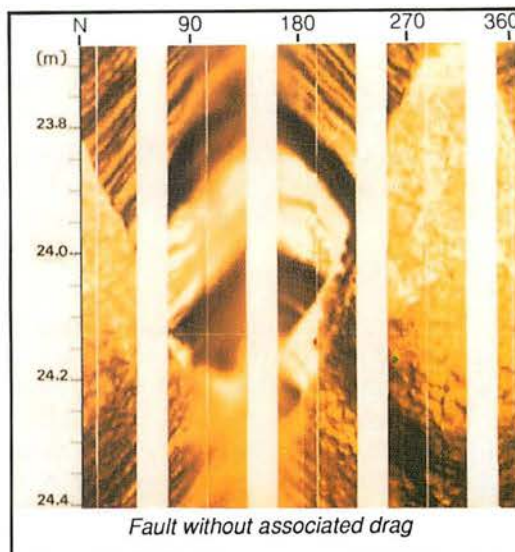
Fullbore Micro Imager*

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.

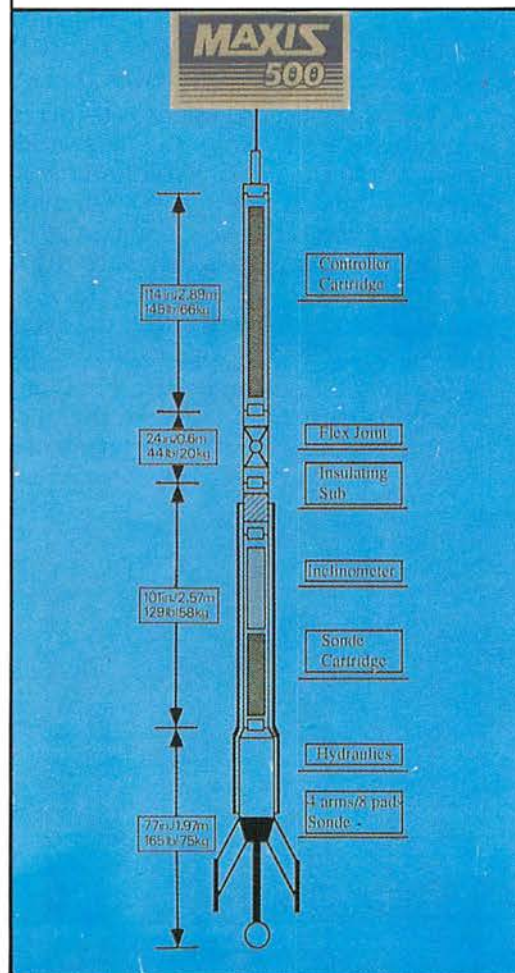
The FMI log, in conductive muds, provides electrical images almost insensitive to borehole conditions and offers quantitative information, in particular for analysis of fractures.

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



M.H.P. Bott: Origin of stress in the lithosphere and plate boundary forces

Laporan (Report)

The talk by Prof. M.H.P. Bott (Research Professor of Geophysics, University of Durham) was held on 27th March 1992 at 5.00 pm at the Geology Department, University of Malaya. Prof. Bott is currently the external examiner for Applied Geology, University of Malaya.

Abstrak (Abstract)

There are various sources of stress in the lithosphere including membrane stress, thermal stress, tidal stress (small) and stress caused by surface and subsurface loading. It is, however, loading stresses which give rise to most tectonic activity including plate motions.

Loading stresses mainly originate from major lateral variations of density within the lithosphere and asthenosphere, such as crustal roots beneath mountains, crustal transitions at continental margins, low density upper mantle beneath ocean ridges and continental plateau uplifts and dense subducting lithosphere. Such deep loads give rise to surface topography in isostatic equilibrium with the deep load. The combined surface and subsurface loading, if in local isostatic equilibrium, gives rise to equal but opposite loads acting on the intervening region. This gives rise to the loading stress between the surface and deep loads. Where flexural isostatic occurs, there will also be bending stresses.

The result of such loading is to increase the vertical principal pressure between the surface and subsurface loads by the magnitude of the load (i.e. ρgh , where ρ is the anomalous load density, h is the depth extent and g is gravity). As a result its vertical deviatoric stress is increased by $1/2 \rho gh$ and the horizontal deviatoric stress is decreased by $-1/2 \rho gh$. Such deviatoric stresses persist until the loading has been dissipated by tectonic processes and erosion. Loading stresses concentrate upwards into the upper strong elastic part of the lithosphere, so that the thinner the elastic layer the bigger the stress in it. Another important feature of loading stress is that the deeper the subsurface loading, the larger the loading stress (provided the load is wide compared to its depth).

Loading stress can be effectively modelled by elastic/viscoelastic finite element analysis. Using this method, it is shown that a deep, hot region 500 km wide between 200 and 400 km depths, with an excess temperature of 100K corresponding to a density anomaly of -10 kg/m^3 gives rise to a horizontal deviatoric tension of about 100 MPa in a 20 km thick elastic layer in the upper crust above the load. Deviatoric tension originating in this way can explain continental rifting in uplifted regions such as East Africa, Baikal and the Basin and Range province of U.S.A.



When a major stress system originating in this way is intersected by a zone of weakness such as occurs at plate boundaries, the inability to withstand large shearing stress causes a major redistribution of stress within the adjacent plates. It is the modification of the stress system which also gives rise to the plate boundary forces. It is demonstrated by finite element analysis that deviatoric compression in old ocean lithosphere and the ridge push force originate in this way due to the weak zone at an ocean ridge. Similarly, it is shown that dense subducting lithosphere would give rise to local compression above it when its subduction fault is locked, but when this fault is unlocked the stresses are redistributed, giving rise to subduction pull (slab pull and trench suction) on the adjacent plates.

David F. Strong : Metallogeny and Mineral Exploration

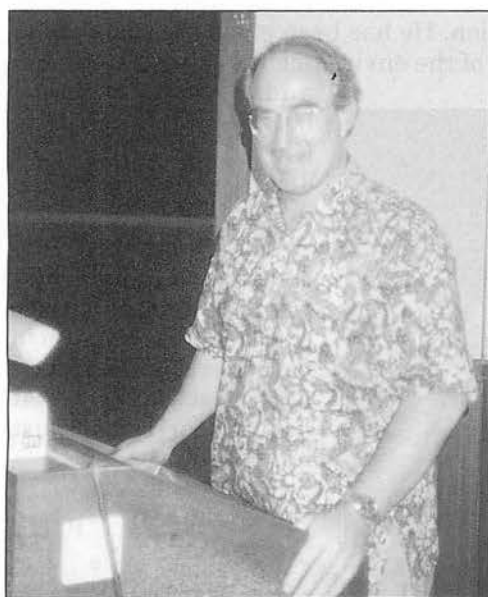
Laporan (Report)

Prof Dr. David F. Strong, presently the President and Vice-Chancellor, University of Victoria, British Columbia, Canada gave the above talk on 31st March 1992. Prof Strong began his talk by emphasizing the factors which control economically important concentrations of elements in granitoid rocks as the tectonic setting, the petrographic history and source of the rocks, and local physical-chemical environments which determine the geochemical behavior of the elements.

Most Paleozoic granitoid rocks of the northeastern Appalachians and western Europe were intruded well after the destruction of any pre-existing ocean such as Iapetus, and hence, unlike the Pacific batholiths, cannot have originated by subduction processes. They are more readily explained in terms of a "megashear" environment, which allows the simultaneous production of different granitoid types in locally different tectonic settings.

Using the Newfoundland sector of the Appalachian as an example, the granitoid rocks naturally grouped into four lithological suites. The first three are simply based on hydrous accessory minerals – muscovite, biotite or hornblende – and can be thought as representing increasing degrees of partial melting, all in compressive or shearing tectonic environments. The fourth suite – alkaline to peralkaline granites – requires a more complex petrogenetic explanation, probably tied in with this group's typical occurrence in locally extensional environments. Isotopic data indicate a variety of source rocks, with no systematic relation to rock types.

Mineral deposits associated with granitoid rocks can be thought of in terms of two extremes: from purely chalcophile porphyry Cu–Mo to purely lithophile orthomagmatic/pegmatitic deposits, with a range of vein-type deposits in between. The chalcophile type requires the operation of groundwater convection systems, which in turn require very shallow intrusion of the pluton. This in turn requires the melt to have been undersaturated in water, and presumably explains why porphyry deposits are typically associated with calc-alkaline biotite-bearing or hornblende-bearing water undersaturated melts. Subduction of oceanic crust seems to be essential to the formation of such deposits, whether it be as a source of metals or sulphur through sea-floor concentration processes, or simply as a source of chlorine, which act as a leaching and transportation agent. This presumably accounts for the scarcity of porphyry Cu–Mo type deposits in the post-subduction Appalachian–Caledonian calc-alkaline granitoid rocks, despite their being otherwise similar to mineralized ones.



The lithophile element deposits are readily concentrated in melts during differentiation or initial melting, via processes greatly enhanced by both high water content and the effect of these elements on lowering melt temperatures. Hence, these deposits are typically associated with highly silicic, water-saturated, muscovite-bearing granites that cannot rise to shallow depths and they occur within metamorphic terranes such as the Hercynian of Western Europe. Biotite granites are often neither sufficiently water-rich for such lithophile element concentrations to form, nor sufficiently water-deficient to rise to shallow enough depths for hydrothermal leaching and concentration, hence they are barren, e.g., the typical Caledonian granites of Britain. Although barren biotite granitoids are dominant in the Canadian Appalachians, there are abundant Acadian to Hercynian muscovite granites which should be a more fruitful ground for exploration.

G.H. Tèh

M.P.H. Bott : The Relationship Between Religion and Science

Laporan (Report)

This second talk by Prof. M.P.H. Bott was held on the 10th of April 1992 at the Department of Geology, University of Malaya. He started the talk by mentioning that our world consists of the natural and spiritual worlds. Science deals with the natural world but to conclude that it is the only reality is wrong. There is the spiritual in addition to the natural world and both were created by God who is above both these realms.

We can find out about the natural world by investigation but spiritual things can only be learned through revelation from God. Man was created for fellowship with God and be steward of His creation. Man can chose to deny this but that does not mean it is untrue. We have an inbuilt ability to grasp the spiritual side of things because God has given it to us. In our personal experience, many have found that it works and is true.

The apparent conflict between the creation account in the Bible and geology is because it is not a literal account but in picture form. Men used to believe that God created the world in six literal days before the great sweep of science came in and revealed the ancient nature of the earth. The days in Genesis was probably never meant to be single days. When God created day and night it meant that He created time. It also lets us know that God is outside of time. When He separated the heavens from the earth it meant He created vertical space just as He created horizontal space when He separated the waters from the land. When it said He created the sun, moon and stars it meant He created the universe. The creation account was meant to show God's greatness and that He created and sustains all things that existed.

We did not understand much about the origins of the universe of life until the last few centuries. Therefore, it would be nonsense if Genesis had attempted to give us these details. People who took Genesis too literally created a barrier between science and faith by being more concerned about how it was done rather than the truths it tried to convey. Genesis is an account of creation written in a poetic and story form.

It is not necessary to interpret that every species was created individually but they could have evolved from other species. Some schools, especially in the U.S.A. had tried to teach that science has done away with religion and force students to take sides in the creation–evolution debate but both could actually be different aspects of the same truth. Science is meant to be complimentary to revelation which shows us the purpose of creation, that is who created and what is it for but not how it was done. How things happened is for the scientists to find out.

The wonder of creation can be studied in every branch of science. Go to science to find out how it happens and to revelation to find out why.

The Bible also tells us about Man's place in God's creation. He has been given the mandate to develop and not exploit the earth but greed and destruction of the environment followed Man's fall

and a gulf developed between Man and God. Christians believe the Jesus Christ came to bridge that gap.

The probability of conditions being just right for life on earth is so small and the balance in nature is so perfect that it is most unlikely that life on earth had just happened by chance.

C.P. Lee



L.A. Frakes: Aspects of basin analysis

Laporan (Report)

The talk by Prof. L.A. Frakes (Douglas Mawson Professor and Chairman of Department of Geology & Geophysics, University of Adelaide, Adelaide, South Australia) was held on 30th April 1992 at 5.00 pm at the Geology Lecture Hall of Geology Department, University of Malaya.

Abstrak (Abstract)

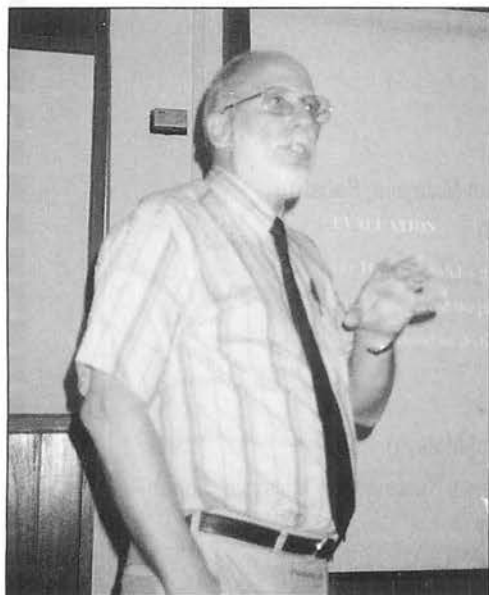
For any task in understanding a sedimentary basin, a procedure needs to be established. Such a model for basin analysis depends on what one is trying to learn about the basin; for example a study of maturation of petroleum fluids requires quite a different approach to one addressing primarily sea-level history.

Most basin studies first establish some sort of model for basin evolution. By examining the major structures seen in cross-sections or seismic sections, as well as subsidence curves from well data, the methods of formation of a basin can be determined. To reach a broader understanding of basin genesis, these results can be compared to the range of basin types separated in basin classifications, as in Dickinson (1974) and Bally and Oldow (1986). While many basins can be readily placed in such classifications, others are found to differ in important ways from all recognized types. In other words, no known basin classification can encompass all basins. For this reason Exxon Petroleum Research has now embarked on a program of treating each basin as unique; one can hope such a method will eventually lead to an all-encompassing. Classification of basins, including varieties formed in cratons, on continental margins, both active and passive, and in wrench zones.

Similarly the basin fill has been perhaps over-simplified. The coastal onlap and eustatic sea-level curves used so extensively today in petroleum exploration are based on assumptions which are not always valid. Certainly the level of the sea has varied but has it done so in the way suggested by Vail *et al* (1977) and Haq *et al* (1986)? In most such analyses, the role of sediment supply is played down, both in governing the various sedimentary facies and in contributing to further subsidence by increasing the load on the crust. The systems tract method of Postamentier and Vail (1988) is useful for depicting the history of a basin, but now explorationists are looking at even smaller subdivisions of the stratigraphic record. In this new approach, recognition of parasequences and their boundaries (maximum flooding surfaces) is important because they tell us more about the role of sedimentation in the filling of a basin.

In summary, basin analysis is both a variable type of operation, depending on what one is trying to achieve, and a developing field. As in all science, we should not be content to use a method if new approaches are more appropriate.

Prof. L.A. Frakes



BERITA-BERITA PERSATUAN
News of the Society

FASCINATING MALAYSIAN GEOLOGY

GEOLOGICAL SOCIETY OF MALAYSIA 25th Anniversary Photography Competition

The photography competition was organized by the Geological Society of Malaysia to commemorate its 25th anniversary. The competition was launched in mid October 1991. The closing date for the competition was 31st January 1992. However, due to insufficient participants, the closing date was extended to 28th March 1992. At the end of the second closing date, a total of 75 copies of 11" x 14" prints was received for the competition.

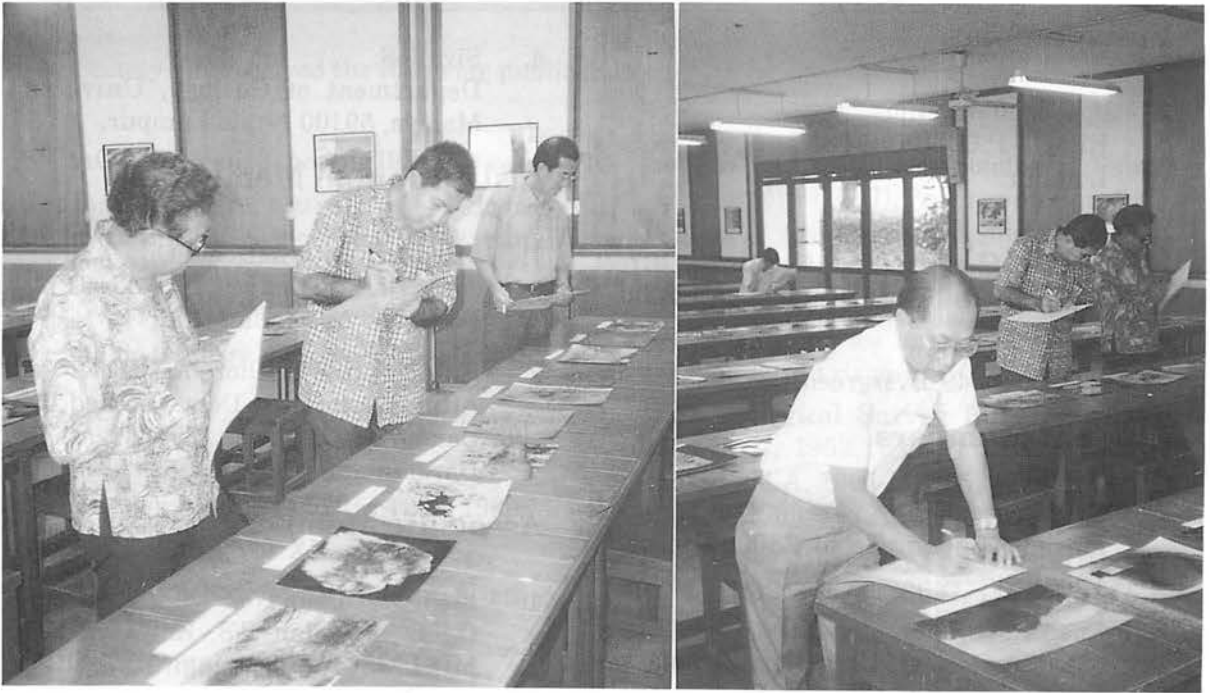
A panel of five judges were appointed by the Council of GSM to judge the competition. They are Mr. Yin Ee Heng of the Geological Survey of Malaysia, Prof. H.D. Tjia of Universiti Sains Malaysia, Mr. Chin Lik Suan, councillor of GSM, Mr. Yuen Kok Leng and Mr. Richard Cheong Koi Sang, both professional photographer.

Judging of the competition was in the afternoon of 18th April 1992. The photographs were judged on the geological interest, artistic merits and technical excellence based on a point system of 0, 1, 2, and 3 in three rounds. After round one, a total of 31 photographs were selected for round two. In round two, a point system of 1-3 for poor, 4-6 for average and 7-9 for good was used to properly segregate the good photographs from the poor. A total of 13 photographs that obtained 30 points or more were selected for the final round of judging. The photograph that obtained the highest point from round two was unanimously agreed by the judges as the winner of first prize of the competition. As the points of the other photographs are quite close, a discussion was carried out among the judges to determine the second and third placing. The final results of the judging are as follows :

- 1st prize** : Tungah B Surat (Geologist, Geological Survey Malaysia)
- 2nd prize** : Joy J. Pereira (Postgraduate, IPT, University of Malaya)
- 3rd prize** : Foo Say Boon (Student, Ipoh)
- Consolation** :
- Felix Tongkul (Lecturer, Universiti Kebangsaan Malaysia, Sabah)
 - Ho Chee Kwong (Geologist, PETRONAS PRI)
 - Ng Tham Fatt (Postgraduate, IPT, University of Malaya)
 - Foo Kok Kin (Photographer, Ipoh)
 - Foo Say Boon (Student, Ipoh)
 - Tan Han Meng (Geologist, BHP Minerals Ltd.)
 - Joy J. Pereira (Postgraduate, IPT, University of Malaya)
 - Muhamad Barzani Gasmi (Lecturer, Universiti Kebangsaan Malaysia, Sabah)
 - Ho Chee Kwong (Geologist, PETRONAS PRI)
 - Askury Bin Abd Kadir (Geologist, Geological Survey Malaysia)

Ho Chee Kwong

FASCINATING MALAYSIAN GEOLOGY



The judges busy with their judging



Competition Organiser, Ho Chee Kwong, noting down the winning entries

BERITA-BERITA LAIN
Other News

INTERNATIONAL BASIN TECTONICS
AND HYDROCARBON ACCUMULATION CONFERENCE

Nanjing University, Nanjing, People's Republic of China
25 May-15 June 1993

Sponsored By:

*Nanjing University
U.S. Geological Survey
Society of Petroleum Geology of China
Circum-Pacific Council for Energy and Mineral Resources
Natural Science Foundation of China
Academia Sinica
Bureau of Resources and Environment
American Association of Petroleum Geologists
Stanford University*

The International Basin-Formation and Hydrocarbon-Accumulation Conference will be a gathering of earth scientists from around the world meeting to discuss geodynamics of basin formation and how these processes relate to petroleum maturation, migration, and entrapment. Topics will include: basin classifications, role of plate tectonics in forming basin configurations, terranes, petroleum provinces, palinspastic reconstructions and geohistory modeling, paleothermal analysis, chemical fingerprinting of oil types, and a host of associated topics. Examples will be drawn from the global distribution of oil fields with particular emphasis on Circum-Pacific and Asian examples.

The Place. The conference will take place at Nanjing University, Nanjing, People's Republic of China. Nanjing is the ancient southern capital of six major dynasties. Ancient temples, government buildings, and statues of the Ming Dynasty still abound.

Now a modern metropolis with three million people, it lies along the right bank of the Yangtse River and is the home of Nanjing University. The university provides a newly constructed air conditioned conference facility. Foreign guests will be housed in nearby three-star hotels. In May and early June the weather is wonderfully spring-like in Nanjing.

Technical Session. Abstracts will be published in English, and English is the working language of the conference. Where required, simultaneous translations will be provided. Information on abstract format and instructions for submittal is on the reverse of this form.

Excursion. A 10 day post-meeting excursion is planned to Xinjiang, China's westernmost province and its frontier for over 2,000 years. This land of desert and high mountains, location of the famous Silk Route, provides superb exposures of complex

FASCINATING MALAYSIAN GEOLOGY



The judges busy with their judging



Competition Organiser, Ho Chee Kwong, noting down the winning entries

Keahlian (Membership)

The following applications for membership were approved:

Full Members

1. Jose M. Jaramillo
EPMI, P.O. Box 10857, 50728 Kuala Lumpur.
2. Wong Sing Lung
Western Geophysical, 1 Ang Mo Kio, Street 64, Industrial Park III, Singapore 2056.
3. Claire J. Gudim
P.O. Box 3549, Evergreen, Co., 80439, USA.

Student Members

1. Zul Mustafa
Masjid Kampung Tebal, 28000 Temerloh, Pahang
2. Tuan Rusli Tuan Mohamed
Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi.
3. Hamdan Ariffin
Department of Geology, University of Malaya, 59100 Kuala Lumpur.

4. Sivaji, S.
Department of Geology, University of Malaya, 59100 Kuala Lumpur.

Institutional Members

1. Marathon International Oil Co.
Attn: Dr. C.S. Kenyon, P.O. Box 6192, East Perth, W. Australia 6892.
2. Elf Aquitaine Offshore Asia B.V.
Attn: Exploration Dept., Locked Bag 15, Bandar Seri Begawan 1999, Negara Brunei Darussalam.

Associate Members

1. Rusli Mohamad Nor
C.S.L., 3, Jalan P/8, Kawasan Industri MIEL, 43650 B.B. Bangi.
2. Hiroshi Kawakami
c/o MMKC Co. Ltd., 10th Floor, UBN Tower, Jalan P. Ramlee, 50250 Kuala Lumpur.

Pertukaran Alamat (Change of Address)

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

1. Yeap Cheng Hock
77 Jalan Medang Tanduk, 59100 Kuala Lumpur.
2. Cheong Khai Wing
Wisma Galian, 5B-7B Jalan Awan Hijau, OUG, 5 mile Jalan Klang, 58200 Kuala Lumpur.
3. Caline Bruno
Laboratoire de Geologie, C.S.T.C.S., Avenue Laribeau, 64000 Pau, France.
4. Elton Frost Jr.
Atlas Wireline Services (M) Sdn. Bhd., Letter Box 117, 7th Floor, UBN Tower, 10 Jalan P. Ramlee, 50250 Kuala Lumpur.
5. J.A. Grant-Mackie
Geology Dept., Univ. of Auckland, P.B. 92019, Auckland, New Zealand.
6. Richard A.S. Cayzer
A.S. Cayzer and Associates, 118 Bray Road, Lawnton Qld 4501.
7. E.F. Durkee
c/o Coplex Resources N.L., G.P.O. 302, Hobart, Tasmania 7000, Australia.

Perambahan Baru Perpustakaan (New Library Additions)

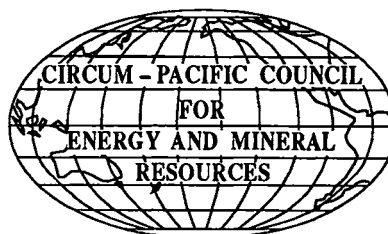
The Society has received the following publications:

1. SOPAC News, vol. 8, nos. 3, 1991.
2. Geological literature of USSR: Bibliographical Yearbook for 1986 year, vol. I & II, 1991.
3. AAPG Explorer, Feb 1992.
4. Oklahoma Geology Notes, vol. 51, nos. 4-6, 1991.
5. U.S. Geological Survey Yearbook Fiscal Year 1990.
6. Statistics on mining industry 1988, 1989.
7. Seatrad Bulletin, vol. XII, no. 2, 1991.
8. SOPAC: Proceedings of the Twentieth Session, 1991.
9. AGID, no. 67/68, 1991.
10. Report of investigation nos. 81 & 82, 1991.
11. Le "V3a" anhydritique du Sondage de Saint-Ghislain (150E387), Province du Hainaut, Belgique): Description macroscopique et Structures Sédimentaires by DR. Putter Th., Groessens E., & Herbosch, A., 1991.
12. Le Radon dans les habitations: aspects géologiques du risque.
13. U.S. Geological Survey Bulletin, 1991: 1904-G, H, 1952, 1934, 1737-E, 1748-B, 1962, 1704-A, 1904-I, 1965, 1978, 1990-F, 1904-K, 1963, 1972, 1987, 1961, 1724-E.
14. U.S. Geological Survey Professional Paper, 1991: 1392, 1367, 1386-G, 1401-A, 1516.
15. U.S. Geological Survey Circular, 1991: 1042, 1064, 1068.

GSM

SYMPOSIUM ON TECTONIC FRAMEWORK AND ENERGY RESOURCES OF THE WESTERN MARGIN OF THE PACIFIC BASIN

Shangri-La Hotel, Kuala Lumpur, Malaysia
29 November - 2 December 1992



BERITA-BERITA LAIN
Other News

INTERNATIONAL BASIN TECTONICS
AND HYDROCARBON ACCUMULATION CONFERENCE

Nanjing University, Nanjing, People's Republic of China
25 May-15 June 1993

Sponsored By:

Nanjing University
U.S. Geological Survey
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The Place. The conference will take place at Nanjing University, Nanjing, People's Republic of China. Nanjing is the ancient southern capital of six major dynasties. Ancient temples, government buildings, and statues of the Ming Dynasty still abound.

Now a modern metropolis with three million people, it lies along the right bank of the Yangtse River and is the home of Nanjing University. The university provides a newly constructed air conditioned conference facility. Foreign guests will be housed in nearby three-star hotels. In May and early June the weather is wonderfully spring-like in Nanjing.

Technical Session. Abstracts will be published in English, and English is the working language of the conference. Where required, simultaneous translations will be provided. Information on abstract format and instructions for submittal is on the reverse of this form.

Excursion. A 10 day post-meeting excursion is planned to Xinjiang, China's westernmost province and its frontier for over 2,000 years. This land of desert and high mountains, location of the famous Silk Route, provides superb exposures of complex

stratigraphic and structural relationships. Participants will proceed along the southern margin of the Jungar Basin, crossing an orogenic zone involving late Paleozoic volcanic arcs, ophiolites, and continental terranes. The trip then proceeds along the margin of the southern Tian Shan, a late Cenozoic south-verging fold-and-thrust system. Here the principal stratigraphic units range in age from Proterozoic to Holocene and include: Sinian basalts corresponding to a rifting event; Devonian "Old Red Sandstone" characterizing a Caledonian orogenic pulse; Permian basalts and clastic rocks representing rifting that preceded continental accretion; and up to 7 km of late Cenozoic foreland-basin fill that controlled the maturation and distribution of oil and gas. The route crosses the petroleum provinces of the Turpan Depression and the potentially prolific Tarim Basin. The excursion ends in Kashgar, where participants are free to arrange their return either through China or across the Khunjerab Pass into Pakistan. June weather in Xinjiang can be expected to be moderately hot and very dry. The field excursion will cost US\$1500, payable in Nanjing at the time of the conference.

Registration. A pre-registration of US\$200 (US\$75 for guests and students) must be sent before 1 February, 1993; registration after that date is US\$250. These fees cover all costs for technical sessions, opening reception party, closing banquet, transportation in the city of Nanjing, special recreation activities, and an evening entertainment extravaganza. Checks or money orders should be sent to: Bank of China; Nanjing Branch; Nanjing; People's Republic of China. Inform the bank to credit Nanjing University, acct. # 8105171098, and send copy of notification to Professor Shi Yangshen at the following address: Prof. Shi Yangshen; Department of Earth Sciences; Nanjing University; Nanjing; People's Republic of China. Telephone: 86-25-634651, extension 2890; Telefax 86-5-

302728; Telex: 34151 PRCNU CN. Per diem expenses are estimated at ~US\$75 per day.

Visas. Upon receipt of registration, a letter of invitation and visa information will be sent to all applicants. In order to process the necessary travel documents, all registration information must be delivered to Nanjing University not later than 1 February 1993.

Abstracts. An abstract volume will be published and distributed at the meeting. Abstracts should be submitted "camera-ready" in the following format:

- 1) All text, figures, and references should fit in a box 6.5 inches wide by 9 inches high (16.5 x 22.9 cm).
- 2) Title should be in all caps, centered at the top of the first page.
- 3) Names of the authors should be in upper and lower case, centered, below the title. Leave one blank line between the first author and the title.
- 4) Complete mailing address of each author should be on a line immediately below the author's name.
- 5) Text should be single-spaced, with paragraphs indented one-half inch (1.3 cm).
- 6) There is a two page maximum for each abstract.

Abstracts must be received by 15 March 1993. Send abstracts to Dr. David Howell.

For further information about the meeting, contact:

Dr. David Howell
 U.S. Geological Survey
 345 Middlefield road, MS 902
 Menlo Park, California 94025 (USA)
 Telephone: (415) 329-5430
 Telefax: (415) 354-3224
 or
 Prof. Shi Yangshen
 Department of Earth Sciences
 Nanjing University
 Nanjing
 Peoples Republic of China

THE MALVERN INTERNATIONAL CONFERENCE ON GEOLOGICAL AND LANDSCAPE CONSERVATION

Great Malvern, England
17-24 July 1993

Organised by the Joint Nature Conservation Committee on behalf of
English Nature, Scottish Natural Heritage and the Countryside Council for Wales

in association with

the Conservation Committee of the Geological Society of London
and the Geologists' Association

Purpose

The Malvern Conference will focus on the need to conserve the geological and geomorphological riches of the Earth. The aim is to bring together geologists and geomorphologists, conservationists, land managers, developers and representatives from the voluntary sector from all over the world to discuss and debate issues of geological and landscape conservation.

The Conference will offer lectures, discussion and poster sessions and exhibitions by sponsors. A varied choice of field trips in England and Wales is planned, carefully tailored to reflect the content of the discussion sessions.

An international convention

A crucial objective during the conference will be to agree the basis for an international convention to conserve the world's most outstanding geological sites and landscapes. The criteria which might be used in identifying such sites, and ways of developing the proposal, will be discussed and debated.

The Themes of the Conference

The work of the Conference will centre on four themes:

Theme 1. Conservation and Sustainable Development

Will focus upon what lessons are to be learnt from the application of this model to issues such as geological conservation and the winning of geological raw materials. The necessary technology – both 'low-tech' – available to bridge the gap between conservation requirement will be explored.

Theme 2. Landscape conservation

The National Park is one of the longest-established and most widely-accepted models for conserving naturally beautiful areas rich in wildlife. The success of the National Park as a means of landscape conservation across the world, and other, alternative mechanisms, will be examined.

Theme 3. Local conservation and community initiatives

Across much of the world the most successful, and indeed sometimes the only, geological conservation efforts are locally-based and of a voluntary nature. Community goodwill, how it can be tapped and channelled into practical initiatives to conserve geological features, will be discussed.

Theme 4. Site conservation and public awareness

Protecting a site from destruction is one thing, but it is essential to explore how a site can be brought to life and become a feature valued by members of the public. Conference will discuss how a site can be so explained to visitors that when they leave they will be convinced of its heritage importance. More widely, the need to persuade the general public of the importance of conserving our geological heritage will be addressed.

Further information

Details of registration, accommodation and field trip costs will be available in due course.

For further information please contact Margaret Phillips, The Company, St. John's Innovation Centre, Cowley Road, Cambridge CB4 4WS, UK. Tel: +44 (0) 223 421124, Fax: +44 (0) 223 421158.

KALENDAR (CALENDAR)

1993

► April 1993

◆◆◆ April 1-3

FRACTALS AND DYNAMICS SYSTEMS IN GEOSCIENCES (International Meeting), Frankfurt/Main, Germany (Jörn H. Kruhl, Geology-Paleontology Institute, JW Goethe-University, Senckenberganlage 32, D-6000 Frankfurt/Main, Germany. Phone: 0049-69-7982695)

◆◆◆ April 1-30

COMPUTER SIMULATED MINERAL EXPLORATION (22nd Workshop), Fontainebleau, France. (L. Zanone, Ecole des Mines de Paris, CGGM-IGM, 35, rue Saint-Honoré, 77305 Fontainebleau Cedex, France. Phone: (33 1) 64 69 49 30; telefax: (33 1) 64 69 47 01; telex: 694 736F)

◆◆◆ April 4-8

REMOTE SENSING AND GLOBAL ENVIRONMENTAL CHANGE (25th International Symposium), Graz, Austria. (Dorothy M. Humphrey, ERIM, P.O. Box 134001, Ann Arbor, MI 43113-4001, USA. Phone: (313) 994-1200, ext. 2290; telefax: (313) 994-5123)

◆◆◆ April 5-8

GLOBAL WARMING, int'l. mtg., Chicago. (Sinyan Shen, Natural Resource Management Division, SUPCON International, One Heritage Plaza, Woodridge, III. 60517-0275. Phone: 708/910-1551; 419/372-8207. Fax: 708/910-1561)

◆◆◆ April 17-20

INTEGRATED METHODS IN EXPLORATION AND DISCOVERY (International Conference), Denver, Colorado, USA. (SEG Conference '93, P.O. Box 571, Golden, CO 80402, USA. Telefax: (303) 279-3118)

◆◆◆ April 21-25

GEOSCIENCE EDUCATION AND TRAINING (International Conference), Southampton, UK. (Mrs. Esther Johnson, GEOED Conference Secretariat, Department of Geology, University of Southampton, Southampton SO9 5NH, UK. Phone: (0703) 593049; telefax: (0703) 593052; telex: 47662 SOTONU G)

◆◆◆ April 19-23

REMOTE SENSING, int'l mtg., Enschede, The Netherlands, by international Institute for Aerospace Survey and Earth Sciences, and others. (Myriam Fahner, Box 6, 7500 AA Enschede, The Netherlands. Phone: 31-53-874 255. Fax: 31-53-874 436) Deadline for manuscripts: March 11.

◆◆◆ April 25-28

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), New Orleans, Louisiana, USA. (Convention Department, AAPG, Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555; telefax: (918) 584-0469)

► May 1993

◆◆◆ May 5-8

PROTECTING THE EARTH - CHALLENGES TO SCIENCE AND TECHNOLOGY (1st International Fair and Congress), Koln, Germany. (Alfred-Wegener-Stiftung zur Forderung der Geowissenschaften, Wissenschaftszentrum Ahrstraße 45, Postfach 20 14 48, D-5300 Bonn 2, Germany. Phone: 02 28/302-260; telefax: 02 28/302-270; telex: 885 420 wzd).

◆◆◆ May 5-8

GEOTECHNICA '93 (International Symposium), Cologne, Germany. (Hans Teetz, Cologne International Trade Fairs Inc., 21st Floor, 666 Fifth Ave., New York, NY 10103-0165, USA. Phone: (212) 974-8836; telefax: (212) 974-8838)

◆◆◆ May 15-21

ENVIRONMENTAL HYDROLOGY AND HYDROGEOLOGY (2nd USA/CIS Joint Conference), Arlington, Virginia, USA. (Americal Institute of Hydrology, 3416 University Avenue, SE. Minneapolis, MN 55414-3328, USA. Phone: (612) 379-1030; telefax: (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 (International Conference), Nanjing, China. Professor Shi Yangshen, Department of Earth Sciences, Nanjing University, Nanjing, China. Phone: 86-25-634651, ext. 2890; telefax: 86-25-302728; telex: 34151 PRCNU CH. Or David Howell, U.S. Geological Survey, 345 Middlefield Road, MS 902, Menlo Park, CA 94025, USA. Phone: (415) 354-5430; telefax: (415) 354-3224

◆◆◆ May 31–June 2

APPLIED MINERALOGY, int'l. mtg., Perth, Western Australia. (Jim Graham, ICAM '93, Private Bag, P.O. Wembley 6014, Australia. Phone: 619/387-0371)

▶ June 1993

◆◆◆ June 1–5

GEOTECHNICAL ENGINEERING (International Meeting), St. Louis, Missouri, USA. (Norma R. Fleming, 119 ME Annex, University of Missouri, Rolla, MO 65401-0249. Phone: (314) 341-6061; (800) 752-5057. telefax: (314) 341-4992)

◆◆◆ June 7–16

SUBCOMMISSION ON CARBONIFEROUS STRATIGRAPHY 1993 FIELD AND GENERAL MEETING (International Symposium), Liège, Belgium, and field excursions to Belgium, Germany, and the Pyrenees in France. (Dr. M. StreeL, Paléontologie, Université de Liège, 7 Place du Vingt-Août, B-4000 Liège, Belgium)

◆◆◆ June 20–27

ZEOLITES (International Meeting), Boise, Idaho, USA. Sponsored 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 (Meeting and Workshop), Lisbon, Portugal. Sponsored by the International Society for Rock Mechanics. (Luis Ribeiro e Sousa, Portuguese Society for Geotechnique, Laboratório Nacional de Engenharia Civil, Av. do Brasil, 101, 1799 Lisboa Codex Portugal. Phone: 848 21 31; telefax: 89 76 60)

◆◆◆ June 28–July 2

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS: HYDROGEOLOGY

OF HARD ROCKS (24th IAH Congress), Oslo, Norway. (Geological Survey of Norway, P.O. Box 3813, Ullevål Hageby, N-0805 Oslo, Norway. Phone: 47-2-950895)

▶ July 1993

◆◆◆ 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 5–8

ROCK FRAGMENTATION BY BLASTING (4th International Symposium), Vienna, Austria. (Dr. H.P. Rossmann, Institute of Mechanics, Technical University Vienna, Wiedner Hauptstraße 8–10/325, A-1040 Vienna, Austria. Phone: (222) 588 01 5514 or 5519; telefax: (222) 587 5863)

◆◆◆ July 5–9

FLUVIAL SEDIMENTOLOGY (5th International Conference), Brisbane, Australia. (Continuing Professional Education, The University of Queensland, Queensland 4072, Australia. Phone: 61 7 365 7100; telefax: 61 7 365 7099; telex: UNIVQLD AA40315)

◆◆◆ July 5–16

VERY LOW GRADE METAMORPHISM: MECHANISMS AND GEOLOGICAL APPLICATIONS (IGCP Project 294 Thematic Meeting and Field Excursions), Xi'an, People's Republic of China. (Dr. Wu Hanquan, Xi'an Institute of Geology and Mineral Resources, 116 Easy Youyi Road, Xi'an 710054, People's Republic of China)

◆◆◆ July 17–24

GEOLOGICAL AND LANDSCAPE CONSERVATION, int'l. mtg., Great Malvern, U.K. (Margaret Phillips, The Company, St. John's Innovation Centre, Cowley Road, Cambridge CB4 4WS. Phone: (0223) 421124. Fax: (0223) 421158)

◆◆◆ 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)

◆◆◆ July 25-30

ORIGIN OF PARENTAL ANORTHOSITE MAGMAS, TECTONIC AND METAMORPHIC PROCESSES IN THE EVOLUTION OF ANORTHOSSITES (Conference), Kadalaksha, Kola Peninsula, Russia. Sponsored by International Geological Correlation Programme Project 290. (Michael Higgins, Sciences de la Terre, Université du Québec à Chicoutimi, Chicoutimi, Québec G7H 2B1, Canada. Phone: (418) 545-5012)

▶ August 1993

◆◆◆ August

INTRAPLATE VOLCANISM: THE POLYNESIAN PLUME PROVINCE (International Workshop), Tahiti, French Polynesia. (Workshop Tahiti 1993, C. Dupuy, Centre Géologique et Géophysique, Case 060, Université de Montpellier II, place E. Bataillon, 34095 Montpellier Cedex 5, France. Phone: (33) 67-634-983; telefax: (33) 67-523-908)

◆◆◆ August 1-6

GEOCHEMISTRY OF THE EARTH SURFACE (3rd International Symposium), University Park, Pennsylvania, USA. (Lee Kump, Department of Geosciences, Pennsylvania State University, 210 Deike Bldg., University Park, PA 16802, USA. Phone: (814) 863-1274; telefax: (814) 865-3191)

◆◆◆ August 4-7

PALEOZOIC MICROVERTEBRATES (IGCP Project-328) (2nd International Symposium), Berlin, Germany. In conjunction with the birthday anniversary of Professor Walter Gross. (Dr. S. Turner, Queensland Museum, P.O. Box 3300, South Brisbane, Qld 4101, Australia. Telefax: 617 846 1918. Or Prof. H. Jaeger, Museum für Naturkunde, Invalidenstr. 43, 00-104 Berlin, Germany)

◆◆◆ August 8-12

STRATIGRAPHIC RECORD OF GLOBAL CHANGES: CLIMATE, SEA LEVEL, AND LIFE (SEPM Meeting), University Park, Pennsylvania, USA. (Mike Arthur, Department of Geosciences, Pennsylvania State University, University Park, PA, 16802, USA. Phone: (814) 865-6711)

◆◆◆ August 11-15

GEOSCIENCE IN URBAN DEVELOPMENT (International Conference), Beijing, China. (Professor Wang Sijing, Chairman LANDPLAN IV, Institute of Geology, Academia Sinica, P.O.

Box 634, Beijing 100029, China. Phone: 86-1-2027766; telefax: 86-1-4919140; telefax: 22474 ASCHI CN c/o Institute of Geology)

◆◆◆ August 15-19

CARBONIFEROUS TO JURASSIC PANGEA: A GLOBAL VIEW OF ENVIRONMENTS AND RESOURCES (International Symposium), Calgary, Alberta, Canada. (Dr. Benoit Beauchamp or Dr. Ashton Embry, Geological Survey of Canada, 3303 33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7190; telefax: (403) 292-4961)

◆◆◆ August 23-29

GEOMORPHOLOGY (3rd International Conference), Hamilton, Ontario, Canada. (3rd International Geomorphology Conference, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1, Canada. Phone: (416) 525-9140, ext. 4535; telefax: (416) 546-0463; E-mail: GEOMORPH)

◆◆◆ August 23-29

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

◆◆◆ August 28-September 15

LANDSLIDES (International Meeting and Workshop), Czech and Slovak Federal Republic. (ICFL-C.S. Landslides '93, c/o NOVOSAD IG/EG, I. Sekaniny 1801, CS-70800 Ostrava 4, Czechoslovakia. Phone: (42-69) 473028; telefax: (42-2) 381848)

▶ September 1993

◆◆◆ September 5-11

NUCLEAR-WASTE MANAGEMENT, int'l mtg., Prague, Czech and Slovak Federal Republic, by American Society of Mechanical Engineers. Czech and Slovak Mechanical Engineering Society, and the Czech and Slovak Nuclear Society. (Radovan Kohout, Ontario Hydro (H11 A2), 700 University Ave., Toronto, Ontario M5G 1X6. Phone: 416/592-5384. Fax: 416/592-4485)

◆◆◆ September 6-8

STRUCTURES AND TECTONICS AT DIFFERENT LITHOSPHERIC LEVELS (International Conference), Graz, Austria. (Wolfgang Unzog, Department of Geology, University of Graz, Heinrichstrasse 26, A-8010 Graz, Austria. Phone: 43 316 380 5584; telefax: 43 316 38 28 85)

◆◆◆ September 8-13

JURASSIC GEOLOGY (Arkel International Symposium), London, UK. (Dr. Stewart Brown, Conference Secretary, Petroleum Science and Technology Institute, 25 Ravelston Terrace, Edinburgh EH4 3EX, UK. Phone: 031 451 5231; telefax: 031 451 5232)

◆◆◆ September 8-17

LAYERING IN IGNEOUS COMPLEXES - WAGER AND BROWN 25th ANNIVERSARY COMMEMORATIVE MEETING (Symposium), Johannesburg, South Africa. (Professor R. Grant Cawthorn, Department of Geology, University of the Witwatersrand, P.O. Wits 2050, Republic of South Africa. Phone: 11 716 2711 or 2608; telefax: 11 339 1697 or 430 1926)

◆◆◆ September 14-16

AFRICAN GEOLOGY (16th International Colloquium), Ezulwini, Swaziland. (The Chairman or Secretary, Organizing Committee, 16th Colloquium of African Geology, P.O. Box 9, Mbabane, Swaziland. Phone: 42411; telefax: 45215; telex: 2301 WD; telegram: GSM)

◆◆◆ September 21-23

ANDEAN GEODYNAMICS (2nd International Symposium), Oxford, UK. Sponsored by University of Oxford and Institut Francais de Recherche Scientifique pour le Développement en Coopération (Orstom). (Pierre Soler, ISAG 93, Orstom, CS1, 213 rue Lafayette, 75480 Paris Cedex 10, France. Telefax: 33 1 48 03 08 28)

◆◆◆ September 25-October 1

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

◆◆◆ September 27-30

ENVIRONMENTAL BIOGEOCHEMISTRY (11th International Symposium), Salamanca, Spain. (Dr. J.F. Gallardo Lancho, I.E.T./CSIC, Aptdo. 257, Salamanca 37071, Espana, Spain. Phone: (923) 219606; telefax: (923) 219609)

◆◆◆ September 27-29

GLOBAL BOUNDARY EVENTS (Interdisciplinary Conference of IGCP Project 293, Geochemical Marker Events in the Phanerozoic), Kielce, Poland. (Barbara Studencka, Muzeum Ziemi PAN, Al. Na Skarpie

20/26, 00-488 Warszawa, Poland. Phone: (4822) 217-391; telefax: (4822) 297-497. Or Helmut H.J. Geldsetzer, Geological Survey of Canada, 3303-33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7155; telefax: (403) 292-5377)

◆◆◆ September 28-October 1

ENVIRONMENTAL POLLUTION (International Conference), Barcelona, Spain. (ICEP Conference Office, ICTR Secretariat, 11-12 Pall Mall, London SW1Y 5LU, UK. Phone: 44 71 930-6825; telefax: 44 71 976-1587; telex: 925312 REICO)

▶ October 1993

◆◆◆ October 4-9

BASIN INVERSION (International Conference), Oxford, UK. (James G. Buchanan, British Gas Exploration and Production Limited, 100 Thames Valley Park Drive, Reading, Berkshire RG6 IPT, UK. Phone: 0734-353222; telefax: 0734-353484; telex: 846231)

◆◆◆ October 10-15

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY (Silver Anniversary Meeting), Prague, Czechoslovakia. (John C. Davis, Kansas Geological Survey, University of Kansas, Lawrence, KS 66047, USA. Phone: (913) 864-3955; telefax: (913) 864-5317; E-mail: john_davis.moore_@msmail.kgs.ukans.edu. Europe, Africa, and Asia: Jan Harff, Institute for Baltic Sea Research, Seestr. 15, 0-2530 Warnemuende, Germany. Phone: 49 381 58 261; telefax: 49 381 58.336; E-mail: harff@geologie.io-warnemuende.dbp.de)

◆◆◆ October 11-24

INTERGEMS '93 (2nd International Symposium on Precious and Decorative Stones), Prague, Czechoslovakia. Sponsored by Czech and Slovak Geological Services and Museums. (Secretariat INTERGEMS, Malostranske nam. 19, CS-11821 Praha 1, Czechoslovakia. Phone: 535 357; telefax: 533 564)

◆◆◆ October 17-20

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Meeting), The Hague, The Netherlands. (AAPG, Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555; telefax: (918) 584-0469)

◆◆◆ October 18-23

NEW DEVELOPMENTS IN GEOTHERMAL MEASUREMENTS IN BOREHOLES (Meeting), Klein Koris, Germany. (Prof. E. Hurtig, GFZ Potsdam, Telegrafenberg A45, 0-1561 Potsdam, Germany. Phone: 49 331 310 347; telefax: 49 331 310 610; E-mail: gth@gfz-postsdam.dbp.de)

◆◆◆ October 25-28

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Boston, Massachusetts, USA. (Vanessa George, GSA, P.O. Box 9140, Boulder, CO 80301, USA. Phone: (303) 447-2020)

▶ November 1993

◆◆◆ November 15-30

LOW TEMPERATURE METAMORPHISM: PROCESSES, PRODUCTS AND ECONOMIC SIGNIFICANCE (IGCP Project 294 Thematic Meeting), Santiago, Chile. (Professor M. Vergara, Universidad de Chile, Departamento de geología y Geofísica, Casilla 13518-Correo 21 Santiago, Chile. Telefax: 56 2-6963050)

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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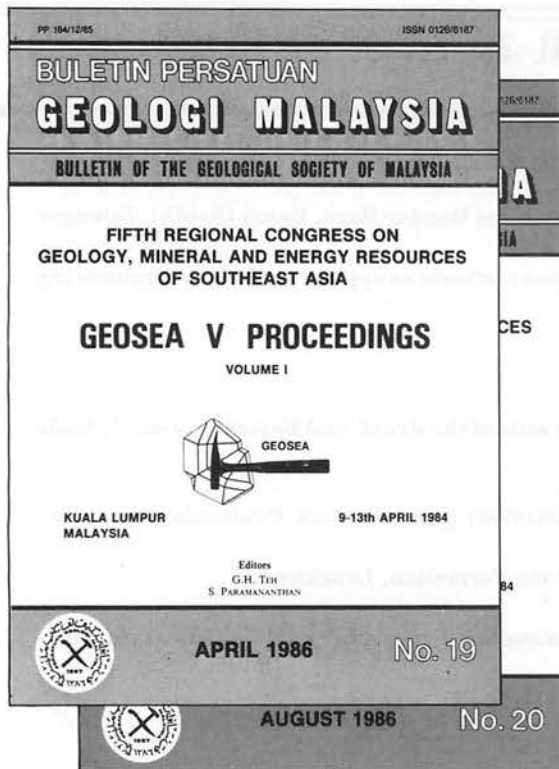
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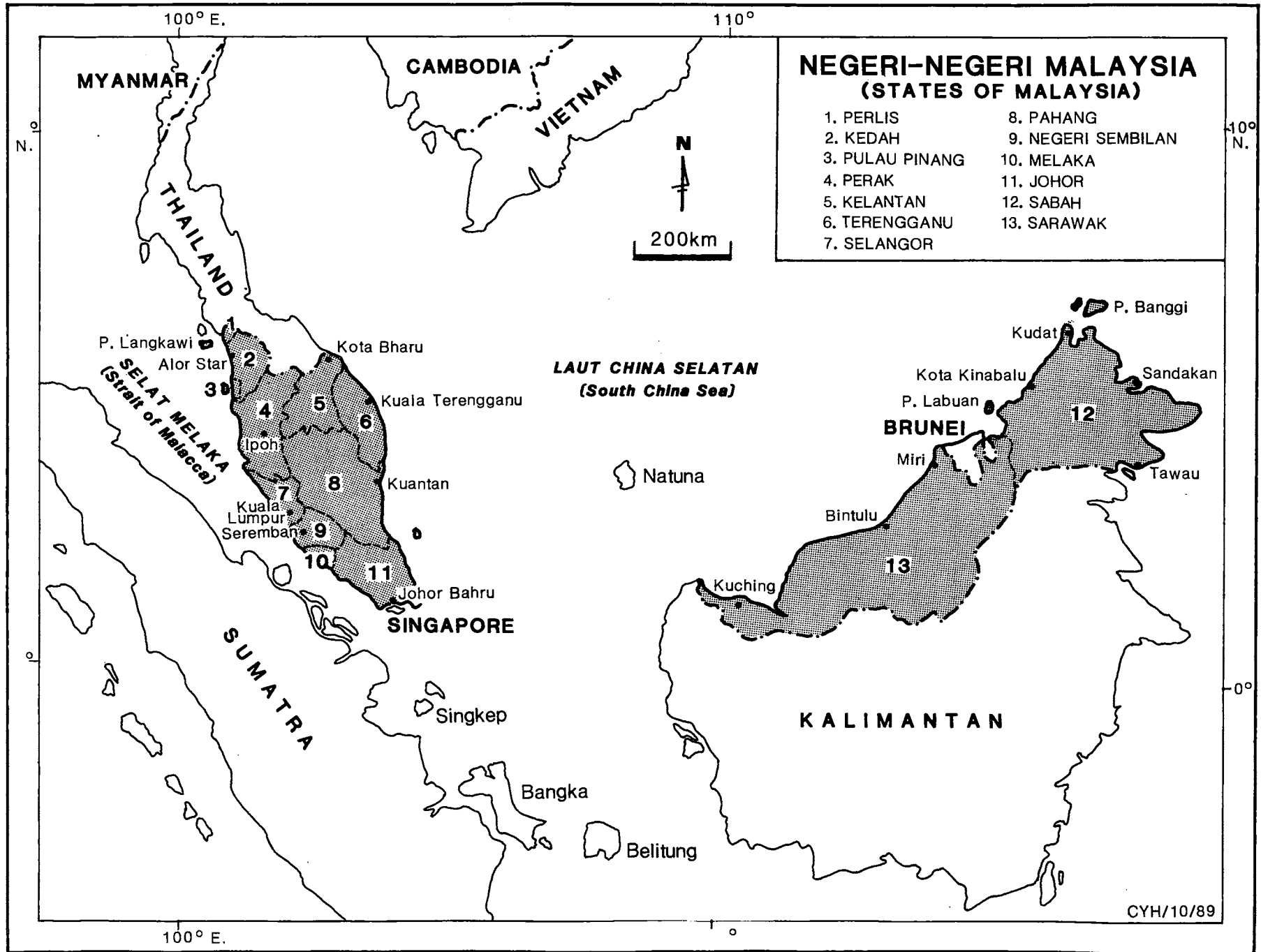
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