

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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PERSATUAN GEOLOGI MALAYSIA

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About the Society

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

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

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CATATAN GEOLOGI

Geological Notes

Sifat fiziko-kimia tanah Aluvium Tua sepanjang Lebuhraya Johor Baharu-Pasir Gudang, Johor

ZAMILA ABDUL RAHMAN DAN TAN BOON KONG

Jabatan Geologi

Universiti Kebangsaan Malaysia

43600 Bangi, Selangor Darul Ehsan

Abstrak: Sebanyak 20 sampel tanah Aluvium Tua dikajian di kawasan sekitar Lebuhraya Johor Bahru-Pasir Gudang. Ujian dijalankan adalah untuk mencari sifat-sifat fizik seperti peratusan kandungan air, ketumpatan relatif, analisis saiz butiran had-had Atterberg dan pemadatan. Sifat-sifat kimia pula ditentukan dengan ujian kimia air liang iaitu menentukan pH, konduktiviti, kepekatan kation monovalen Na^+ dan K^+ , kepekatan kation dwivalen Mg^{2+} dan Ca^{2+} , kepekatan anion Cl^- dan SO_4^{2-} . Seterus dari sifat-sifat kimia ini maka sifat penyerakan tanah dapat ditentukan. Pengenalan mineralogi lempung di tentukan dengan kaedah pembelauan sinar-X. Mineral-mineral dikenal pasti dengan corak belauan sinar-X.

Pengelasan saiz butiran menunjukkan sampel OAK mempunyai fraksi G yang paling dominan iaitu sekitar 22–76% dan sampel OAH mempunyai fraksi S yang paling dominan iaitu sekitar 19–81%. Hasil dari kajian ini, pengelasan dapat dibuat dimana fraksi kasar tanah OAK adalah kelikir berpasir, GP-GW manakala fraksi kasar OAH adalah pasir berlodak, SM. Dari ujikaji had-had Atterberg, fraksi halus sampel OAH boleh dikelaskan CL-ML dengan nilai-nilai LL, 30–60%, menunjukkan penjerapan air yang rendah dan nilai-nilai terletak di antara garis U dan garis A.

Dari ekstrak air liang hanya sampel OAH sahaja yang dikaji kerana untuk menghasilkan ekstrak air liang sampel memerlukan bahagian fraksi lodak dan lempung yang tinggi. Berdasarkan dengan kepekatan kation-kation, parameter dapat diterbitkan untuk menerangkan sifat penyerakan tanah iaitu nisbah jerapan natrium (SAR) dan nisbah kation monovalen terhadap dwivalen. Kebanyakan nilai SAR > 2 yang secara umumnya ber julat dari 1.0–6.0. Hasil dari plot graf penyerakan (Rajah 2) Sherard *et al.* (1979), keseluruhan sampel berada di zon C iaitu zon perantaraan. Ada juga beberapa sampel yang jatuh di zon A, zon tanah terserak. Nisbah kation monovalen terhadap dwivalen memberikan julat sekitar 3–40. Nilai-nilai ini menunjukkan bahawa kation monovalen adalah lebih dominasi dari kation dwivalen, maka menurut Mitchell (1976) yang dipetik dari Tan (1995) nilai-nilai ini menunjukkan keupayaan penyerakan tanah yang tinggi. Secara umumnya mineralogi lempung bagi tanah Aluvium Tua adalah mineral kaolinit yang didapati secara dominan diikuti oleh ilit iaitu secara sederhana hingga jarang dan juga mineral geotit yang didapati jarang.

Kehadiran mineral kaolinit akan mengurangkan kecenderungan ini kerana mineral ini mempunyai struktur kekisi tetap dan keupayaan menjerap air atau ion adalah rendah. Pemisahan antara lapisan tidak berlaku seperti mineral smektit di mana penjerapan air atau ion berlaku di permukaan luar dan bucu-bucu zarah. Kepekatan natrium yang tinggi dengan kehadiran mineral kembang iaitu smektit biasanya akan membawa kepada masalah dalam kerja-kerja geologi kejuruteraan.

PENGENALAN

Kajian ini dilakukan untuk menentukan sifat fiziko-kimia dan mineralogi lempung tanah Aluvium Tua di sepanjang lebuh raya Johor Baharu-Pasir Gudang, Johor. Burton (1964) telah membuat kajian di kawasan Johor dan Singapura yang khusus menyentuh kewujudan Aluvium Tua. Beliau mendapati bahawa kebanyakan dari Aluvium Tua membentuk bukit-bukit rendah, membulat dan bercerun sangat landai. Ketinggian bukit-bukit biasanya jarang melebihi 70m dari paras laut. Ia telah menyentuh secara terperinci mengenai ciri-ciri Aluvium Tua. Burton (1973) juga telah menerbitkan hasil kajian geologinya meliputi kawasan Kulai hingga Johor Baharu, syit peta 130, Johor Baharu dimana beliau telah membahagikan enapan permukaan kepada Aluvium Tua dan Muda dan juga menyatakan usia sedimen ini adalah Pleistosen Awal berdasarkan perubahan aras laut semasa Pleistosen.

METODOLOGI

Sampel adalah sebanyak 20 sampel dengan 10 lokaliti penyampelan, 10 sampel untuk tanah 10 sampel Aluvium Tua bersaiz butiran halus (OAH) dan 10 sampel Aluvium Tua bersaiz butiran kasar (OAK). Ujian makmal fizikal adalah berdasarkan manual 'Engineer Manual (EM1011-2-1906) Laboratory Soil Testing' (1970) oleh Jabatan Tentera, Amerika Syarikat dan kaedah ekstrak air liang melalui kaedah "Ekstrak Tepuan" mengikut GRC Manual (tak bertarikh), Universiti McGill, Montreal.

SIFAT FIZIKAL

Sifat-sifat fizik tanah yang diuji adalah seperti peratusan kandungan air, ketumpatan relatif, analisis taburan saiz butiran, had-had Atterberg dan pepadatan. Hasil dari ujikaji yang dilakukan telah diringkaskan pada Jadual 1 untuk rujukan penggunaan simbol sifat-sifat yang dikaji serta unitnya.

Peratusan kandungan air OAK (3–15%) adalah lebih rendah berbanding OAH (8–24%). Ini menunjukkan tanah Aluvium Tua OAH mempunyai keupayaan menyimpan air berbanding OAK. Ini ada kemungkinan

kehadiran fraksi lempung yang tinggi di dalam OAH. Nilai Gs pula menunjukkan OAH (2.54–2.66) mempunyai julat nilai yang lebih tinggi dari OAK (2.52–2.63). Ini kemungkinan kehadiran fraksi lempung dalam OAH dimana Gs mineral lempung adalah tinggi dan juga kehadiran mineral berasosiasi dengan lempung iaitu oksida besi. Pengelasan saiz butiran menunjukkan sampel OAK mempunyai fraksi G yang paling dominan iaitu sekitar 22–76% dan sampel OAH mempunyai fraksi S yang paling dominan iaitu sekitar 19–81%. Hasil dari kajian ini, pengelasan dapat dibuat dimana fraksi kasar tanah OAK adalah kelikir berpasir, GP–GW manakala fraksi kasar OAH adalah pasir berlodak, SM. Dari ujikaji had-had Atterberg (Rajah 1), fraksi halus sampel OAH boleh dikelaskan CL-ML dengan nilai-nilai LL, 30–60%, menunjukkan penjerapan air yang rendah dan nilai-nilai terletak di antara garis U dan garis A. Perbandingan (Rajah 2) di antara parameter pepadatan tanah Aluvium Tua menunjukkan OAK mempunyai nilai Ddmax yang lebih tinggi, 1.62 g/cm³–1.69 g/cm³ dan nilai Wopt yang lebih rendah 13.54–15.70% dari OAH, Ddmax sekitar 1.45 g/cm³–1.55 g/cm³ dan Wopt 14.95–20.10%.

SIFAT-SIFAT KIMIA

Sifat-sifat kimia pula ditentukan dengan ujian kimia air liang iaitu menentukan pH, konduktiviti, kepekatan kation monovalen Na⁺ dan K⁺, kepekatan kation dwivalen Mg²⁺ dan Ca²⁺, kepekatan anion Cl⁻ dan SO₄²⁻. Seterus dari sifat-sifat kimia ini maka sifat penyerakan tanah dapat ditentukan. Pengenalan mineralogi lempung di tentukan dengan kaedah pembelauan sinar-X. Mineral-mineral dikenal pasti dengan corak belauan sinar-X.

Dari ekstrak air liang hanya sampel OAH sahaja yang dikaji kerana untuk menghasilkan ekstrak air liang sampel memerlukan bahagian fraksi lodak dan lempung yang tinggi. Nilai pH adalah berasid sehingga mencapai nilai 4.31. Hasil kajian Shamsudin (1986) yang mengatakan pH enapan aluvium memang berasid dengan pH < 5.5. Konduktiviti diukur menunjukkan sampel memberikan nilai sehingga 1.0 mS/cm. Secara keseluruhannya kepekatan kation monovalen K⁺ dan Na⁺ pada

Jadual 1. Ringkasan sifat-sifat fiziko-kimia tanah aluvium tua sepanjang Lebuhraya Johor Baharu-Pasir Gudang, Johor.

SIFAT FIZIKO KIMIA		JULAT NILAI		
		OAH	OAK	
Sifat-Sifat Fizik	Kandungan air, W_o (%)	7.73–24.36	2.7–15.45	
	Ketumpatan relatif, G_s	2.54–2.66	2.52–2.63	
	Had-had Atterberg			
	Had cecair, LL (%)	30–84		
	Had keplastikan, PL (%)	18–38		
	Indeks keplastikan, PI (%)	7–46		
	Analisis Taburan Saiz Butiran			
	Fraksi kelikir, G (%)	0–13	22–76	
	Fraksi pasir, S (%)	19–81	22–75	
	Fraksi lodak, M (%)	14–64	1–56	
	Fraksi lempung, C (%)	4–36	1–36	
	Pemadatan			
	Ketumpatan kering maksimum, D_{dmax} (g/cm^3)	1.45–1.55	1.62–1.69	
Kandungan air optimum, W_{opt} (%)	14.95–20.10	13.54–15.70		
Sifat-Sifat Kimia	OAH			
	PH	4.31–6.45		
	Konduktiviti (mS/cm)	0.035–1.04		
	Kation Na^+ (bpj)	6.3–39.3		
	Kation K^+ (bpj)	2–38.4		
	Kation Mg^{2+} (bpj)	0–4.12		
	Kation Ca^{2+} (bpj)	0.28–6.20		
	Anion Cl^- (bpj)	9–38.5		
	Anion SO_4^{2-} (bpj)	2.25–515.63		
	SAR	1.04–5.29		
	Kation Mono/Dwivalen	3.09–40		

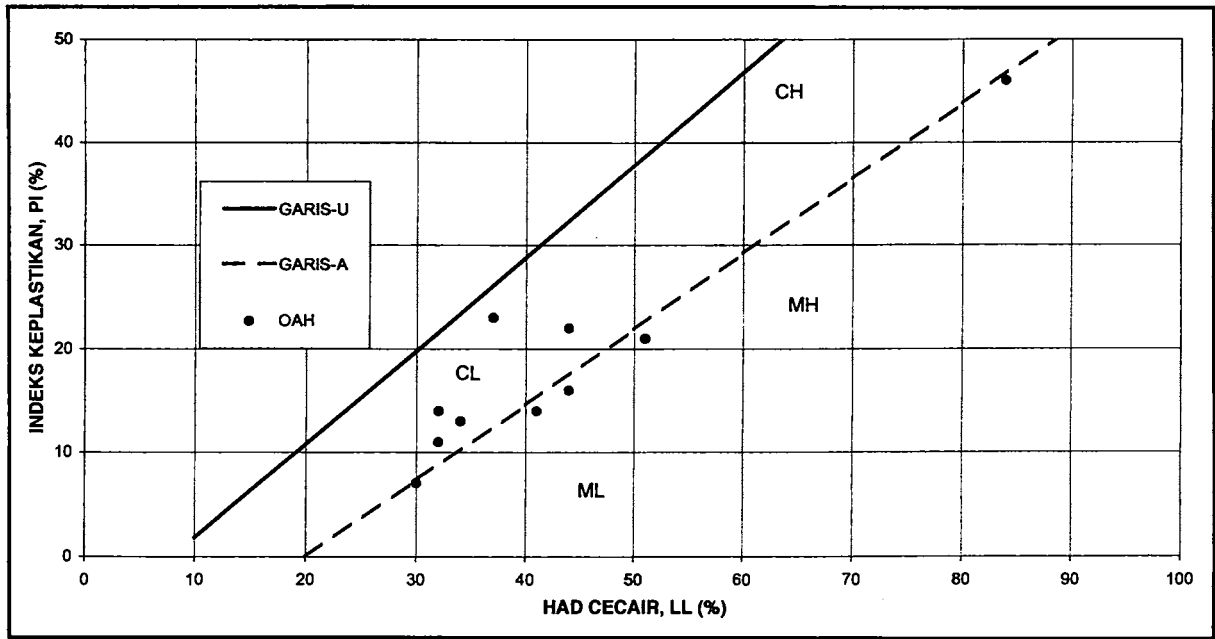
Simbol

OAH: Bahagian halus Tanah Aluvium Tua

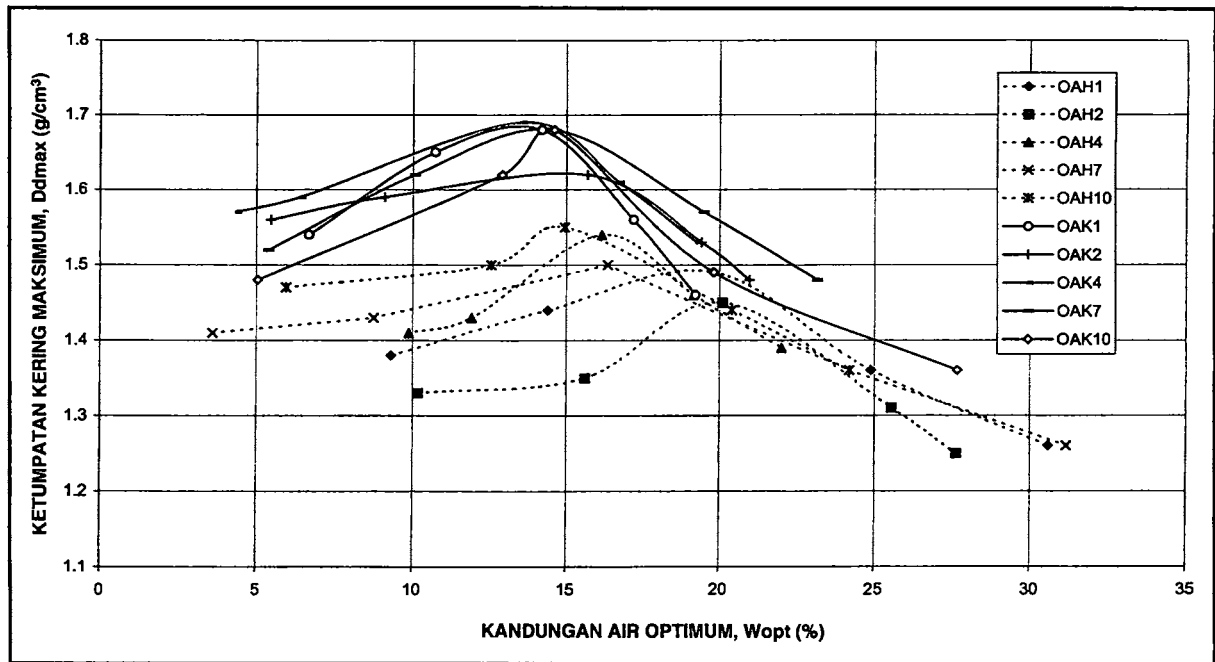
OAK: Bahagian kasar Tanah Aluvium Tua

sampel-sampel adalah rendah iaitu di bawah 40 bpj. Kepekatan kation dwivalen Mg^{2+} pula ditunjukkan oleh sampel memberikan nilai iaitu sekitar 0–4.2 bpj dan bagi kation dwivalen Ca^{2+} memberikan julat nilai sekitar 0.2–6.1 bpj. Kepekatan anion Cl^- di dapati berdasarkan keseluruhan sampel adalah rendah iaitu sekitar 10–40 bpj dan kepekatan SO_4^{2-} yang tinggi iaitu sehingga 100 bpj dan 2 sampel dari 10 sampel diuji menunjukkan kepekatan yang sangat tinggi iaitu sehingga 500 bpj memberikan kemungkinan pencemaran di lapangan telah berlaku dari sisa kilang kimia berdasarkan

lokalti penyampelan adalah di kawasan perindustrian. Berdasarkan dengan kepekatan kation-kation, parameter dapat diterbitkan untuk menerangkan sifat penyerakan tanah iaitu nisbah jerapan natrium (SAR) dan nisbah kation monovalen terhadap dwivalen. Kebanyakan nilai SAR > 2 yang secara umumnya ber julat dari 1.0–6.0. Hasil dari plot graf penyerakan (Rajah 3) Sherard *et al.* (1979), keseluruhan sampel berada di zon C iaitu zon perantaraan. Ada juga beberapa sampel yang jatuh di zon A, zon tanah terserak. Nisbah kation monovalen terhadap dwivalen



Rajah 1. Carta keplastikan bagi sampel tanah Aluvium Tua.



Rajah 2. Graf lengkung pemadatan menunjukkan perbandingan tanah OAH dan OAK.

memberikan julat sekitar 3–40. Nilai-nilai ini menunjukkan bahawa kation monovalen adalah lebih dominasi dari kation dwivalen, maka menurut Mitchell (1976) yang dipetik dari Tan (1995) nilai-nilai ini menunjukkan keupayaan penyerakan tanah yang tinggi.

KESIMPULAN

Secara umumnya mineralogi lempung bagi tanah Aluvium Tua adalah mineral kaolinit yang didapati secara dominan diikuti oleh ilit iaitu secara sederhana hingga jarang dan juga mineral geotit yang didapati jarang.

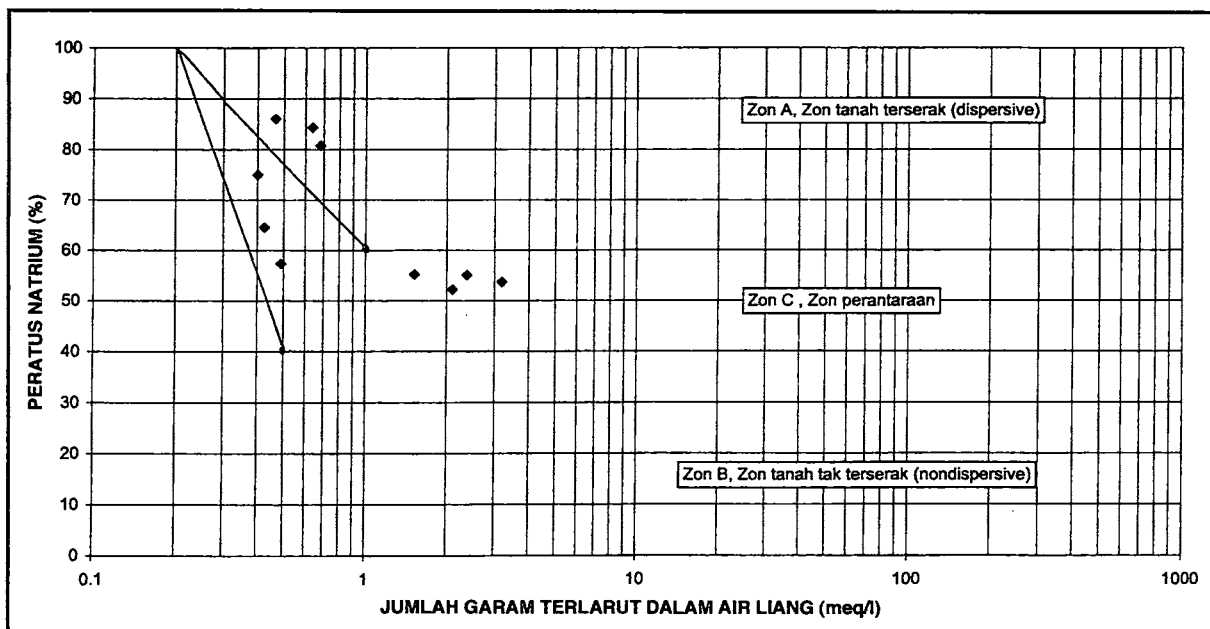
Sifat penyerakan tanah biasanya bergantung kepada kepekatan ion-ion di dalam tanah bertindakbalas dengan mineral lempung yang telah dinyatakan sebelum ini akan lebih cenderung jika kehadiran mineral smektit wujud di dalam sampel yang dikaji. Kehadiran mineral kaolinit akan mengurangkan kecenderungan ini kerana mineral ini mempunyai struktur kekisi tetap dan keupayaan menyerap air atau ion adalah rendah. Pemisahan antara lapisan

tidak berlaku seperti mineral smektit di mana penyerapan air atau ion berlaku di permukaan luar dan bucu-bucu zarah.

Akhir sekali penulis ingin mencadangkan agar kajian seterusnya dapat dilakukan di kawasan perindustrian Pasir Gudang mengenai punca dan kesan pencemaran akan mempengaruhi sifat kimia air liang dan kecenderungan tanah tersebut untuk terserak.

PENGHARGAAN

Hasil yang dilaporkan sini merupakan sebahagian daripada kajian disertasi penulis berjudul "*Sifat fiziko-kimia dan mineralogi lempung tanah di Lebuhraya Johor Baharu-Pasir Gudang, Johor*". Penulis ingin merakamkan penghargaan kepada Jabatan Geologi, UKM terutamanya Prof. Madya Tan Boon Kong selaku penyelia, Prof. Madya Dr. Ahmad Jantan, Prof Madya Dr. Anizan Isahak, En. Wan Ali Megal Omar, En. Yaacob Othman, En. Aziz Ngah, En. Azhaari Hussin, En. Abdul Ghani dan En. Hamid.



Rajah 3. Graf penyerakan menunjukkan perkaitan antara peratus natrium dan jumlah garam terlarut di dalam air liang (selepas Sherard, Dunnigan dan Decker, 1979).

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Manuscript received 27 August 1999

PERTEMUAN PERSATUAN Meetings of the Society

Ceramah Teknik (Technical Talk)

Engineering geology case histories: 1980 - Y2K

TAN BOON KONG

Laporan (Report)

Tan Boon Kong gave the above talk on Thursday 30 March 2000 at the Geology Department, University of Malaya.

In his interesting talk, the speaker showed slides of the many engineering geology projects he has been involved in since 1980, showing the many problems, causes for their failures and remedial work done where necessary.

The talk served as a good eye opener for the many young geologists in the audience who will one day have to be confronted with similar situations and probably have learnt something from the talk to tackle the problems.

G.H. Teh



AGM and Annual Dinner 2000 — Report

The 34th Annual General Meeting 2000 was held on 28th April 2000 at the Geological Department, University of Malaya. It was attended by 32 members.

The President Abdul Ghani Rafek chaired the meeting and the Secretary, Ahmad Tajuddin took down the minutes.

Highlights of the Meeting include:

- the incoming Council should do a proper study of the pros and cons of the proposed Society's own building and come up with proper recommendations for the next AGM.
- Peter Lloyd, who is the President of AAPG Asia Pacific suggested the formation of a student local chapter involving students from UKM and UM to be sponsored by his wife.

The Annual Dinner that followed was held in the Museum of the Geology Department.

It was good to see a mixture of the old and young geologists mingling together. Among the past presidents who graced the occasion were Santokh Singh and C.S. Hutchison.

To add spice to the dinner, everyone present had to put up with the familiar surroundings and backdrop of dinosaurs, rocks, crystals, fossils, and human skulls!

G.H. Teh

Annual General Meeting and Annual Dinner 2000

Minutes of the 33rd Annual General Meeting
(see page 10)



The Annual General Meeting was held on the 15th of November 2000 at the 33rd Annual Dinner. The meeting was held in the evening and was attended by a large number of members and guests. The meeting was held in the evening and was attended by a large number of members and guests. The meeting was held in the evening and was attended by a large number of members and guests.

Minutes of the 33rd Annual General Meeting (1998/99)

Minutes of the 33rd Annual General Meeting held at the Boardroom 2 (Level 3), Hotel Eastin, Petaling Jaya, at 6.15 p.m. on the 30th April 1999 (Friday).

Present:

S. Paramanathan (Chairman)	Lee Chai Peng
Ahmad Tajuddin Ibrahim (Secretary)	Abd. Ghani Rafek
Teh Guan Hoe	Gan Lay Chin
Choo Mun Keong	Ng Tham Fatt
J.J. Pereira	Tan Boon Kong
Mogana Sundaram	M. Selvarajah
Tajul Anuar Jamaluddin	Malek Musa
Sia Hock Kiang	Liew Kit Kong
Peter Lloyd	Chong Foo Shin
Tan Bock Kang	Jasmi Ab. Talib
Yeap Cheng Hock	Chen Shick Pei

1. Confirmation of the minutes of the previous AGM (1998)

The minutes of the 32nd AGM were passed on the proposal of Ng Tham Fatt and seconded by Dr. Abdul Ghani Rafek.

2. Matters Arising

1. **Geologist's Act** — IGM President informed the meeting that the Institute has already drafted the 'Cabinet Paper' and has sent it to the Ministry. The Ministry has circulated the paper to the relevant agencies/organisations asking for comments.

3. President's Report

Dr. S. Paramanathan presented the report 1998/99 on behalf of Prof. Dr. Ibrahim Komoo, the president who was overseas on official duties.

He congratulated and thanked Prof. Dr. Hamzah Mohamad, the organising chairman of the GEOSEA 1998 and his committee members for the job well-done. The Congress saw participants from 18 countries that presented more than 160 papers. The GEOSEA Union meeting was also convened with the president of all the member societies present.

He also thanked the chairmen of the Working Groups for their contribution and reported the formation of two new Working Groups i.e. the Formation Evaluation Working Group and the Geophysics Working Group as well as the reactivation of the Geoscience Promotion Group to initiate activities to increase public awareness of the importance of geoscience towards nation building.

Finally he expressed gratitude to all the companies, agencies and individuals for their generous sponsorships, donations and support given.

The President's Report was passed on the proposal of Dr. J.J. Pereira and seconded by Ms. Gan Lay Chin.

4. Secretary's Report

Dr. Ahmad Tajuddin presented his report for the 1998/99 session.

He reported that the Council met almost every month (10 times) during the session. Total memberships of the Society shows a decrease from 615 to 551.

The Annual Geological Conference and the Annual Petroleum Geology Conference were not held this year to enable the Society to concentrate on the organisation of the GEOSEA '98. A total of 2 forums, 15 technical talks, 1 dialogue, 1 seminar, 2 public lectures and 3 fieldtrips/site visit were also organised during this session.

Members enquired about the drop in memberships. The increase in memberships in the previous session was due to the GEOSEA '98 and the drop is also partly due to the discontinuation of some student members.

The Secretary's Report was passed on the proposal of Dr. Abdul Ghani Rafek and seconded by Mr. Choo Mun Keong.

5. Editor's Report

Dr. G.H. Teh in his report stated that the Warta Geologi has been brought up-to-date. He reported that the Bulletins could not be published before this AGM due to technical problems with the computer but mentioned that they should be ready for the Annual Geological Conference 1999.

Mr. Choo Mun Keong commented on the current local news being included in the Warta Geologi. He requested that the Editor be more selective in future.

The Editor's Report was passed on the proposal of Mr. Tan Boon Kong and seconded by Mr. Choo Mun Keong.

6. Treasurer's and Honorary Auditor's Reports

Dr. C.P. Lee reported there is an increase in the net current assets from RM608,324.07 to RM630,425.97 for the past year.

The drop in the Society's income is partly due to payments already made for the many delayed Bulletins and also due to the drop in interest on fixed deposits due to the timing of their maturity dates. The deficit of RM79,580.17 is mainly due to the printing bill for GSM Bulletins and the Warta Geologi.

Mr. Choo Mun Keong requested that for future AGM there should be a separate accompanying note to explain big expenses incurred.

The Treasurer's Report and the Honorary Auditor's Report were passed on the proposal of Dr. J.J. Pereira and seconded by Mr. Liew Kit Kong.

7. Election of Honorary Auditor 1999/2000

The meeting re-elected Mr. Lee Siew Fatt of S.F. Lee & Co., on the proposal of Dr. Lee Chai Peng and seconded by Dr. Abdul Ghani Rafek as Honorary Auditor for the 1999/2000 session.

8. Other Business

Mr. Peter Lloyd thanked the Council for the setting up of the Formation Evaluation Working Group. He suggested that the Society find a suitable representative to the AAPG House of Delegates so as to benefit from AAPG activities. The meeting asked the incoming Council to look into this.

Members commented on the poor attendance of a few council members at its meetings. The meeting requested that members should be more careful when making nominations to the Council, to nominate only those who can really spare their time for this purpose.

The meeting also noted the Society have ambitious plans to promote geoscience especially to the public. More members should come forward and participate actively to help realize this vision.

9. Announcement of New Council (1999/2000)

The Council for 1999/2000 shall be as listed below:

President:	Prof. Ibrahim Komoo (UKM)
Vice-President:	Dr. Abdul Ghani Rafek (UKM)
Secretary:	Dr. Ahmad Tajuddin Ibrahim (UM)
Assistant Secretary:	Dr. Mazlan Madon (PRSS)
Treasurer:	Dr. Lee Chai Peng (UM)
Editor:	Dr. Teh Guan Hoe (UM)
Councillors (2-years):	Mr. Liew Kit Kong (PETRONAS Carigali) Mr. Tan Boon Kong (UKM) Mogana Sundaram (Consultant) Hamdan Hassan (Consultant)
Councillors (1-year):	Dr. Tajul Anuar Jamaluddin (UM) Mr. M. Selvarajah (JPK) Mr. Muhinder Singh (PLRT) 1 vacancy
Immediate Past President:	Dato' Dr. Khalid Ngah (Kedah Cement)

Laporan Presiden (President's Report)

Ucapan berbanyak terima kasih atas kepercayaan seluruh keluarga persatuan mengizinkan saya dan ahli Majlis lain menguruskan Persatuan Geologi Malaysia (PGM) untuk sidang 1999/2000. Kami berbangga memaklumkan bahawa PGM telah bergerak dengan cergas dengan menjalankan aktiviti tahunan selancarnya, sejajar dengan tradisi keilmuan yang diwarisi sejak PGM ditubuhkan. Saya akan mengundurkan diri sebagai Presiden untuk sidang akan datang, pengalaman dua tahun yang tuan dan puan berikan amat saya sanjung tinggi dan berharap tidak menghampakan harapan tuan dan puan. Kepada Presiden baru dan barisan ahli Majlis beliau, saya ucapkan selamat menjalankan tugas dan penghormatan ini.

Persidangan Tahunan Geologi 1999 yang telah diadakan pada 29–30 Mei di Desaru, Johor telah berlangsung dengan jayanya. Saya ingin mengucapkan syabas kepada pengerusinya iaitu ahli majlis muda kita, Dr. Tajul Anuar Jamaluddin atas usaha gigih beliau. Persidangan Petroleum Geologi Tahunan yang diadakan pada 23–24 November 1999 di Kuala Lumpur telah dianjurkan dengan jayanya dan mendapat sambutan luarbiasa dari kalangan ahli dan bukan ahli Persatuan. Persatuan ingin mengucapkan tahniah dan terima kasih kepada pengerusinya iaitu En. Barney Mahendran yang menjalankan tugas berat ini dengan cemerlang. Satu persidangan rantauan penting iaitu *2nd Asian Symposium on Engineering Geology and the Environment* yang dianjurkan oleh IAEG Malaysia national Group, IGM dan LESTARI-UKM telah berlangsung pada 23–25 September di Bangi, Persatuan dan ramai ahlinya telah terlibat untuk menjayakan simposium ini.

Persatuan secara berterusan telah menganjurkan aktiviti pengembangan ilmu menerusi Ceramah Teknik (13), Kerjalapanan (2), Forum (3), Bengkel (1) dan Dialog (1). Beberapa daripada aktiviti ini dianjurkan secara bersama dengan persatuan atau institusi lain. Saya ingin mengucapkan terima kasih, khususnya kepada Koordinator Ceramah Teknik, Prof. Madya Dr. Azhar Hussin dan ahli Majlis lain yang telah menjayakan aktiviti ini. Bagaimanapun, penglibatan ahli Persatuan dalam kebanyakan aktiviti ini amat terbatas sekali. Persatuan perlu terus berusaha meningkatkan lagi penglibatan ahli dalam semua aktiviti begini.

Beberapa cabaran semasa yang dihadapi oleh Persatuan ialah a) meningkatkan atau mempertahankan keahlian Persatuan; b) mengaktifkan aktiviti Kumpulan Kerja; dan c) memastikan Warta dan Buletin mengikut jadual. Ahli Majlis sentiasa membincangkan cabaran ini dan mencari jalan penyelesaian yang praktikal, tetapi mencapai kejayaan yang terhad. Tuan dan puan digalakkan memberikan pandangan dan idea untuk mengatasi cabaran ini.

Pada tahun-tahun sebelum ini, Persatuan dapat mengekalkan keahlian pada jumlah sekitar 550–600 ahli. Pada tahun ini, keahlian Persatuan, khususnya dari dalam negeri, telah menurun dengan mendadak. Kini ahli Persatuan ialah 468 orang. Ini merupakan

cabaran besar yang perlu ditangani oleh Persatuan. Jika kita ingain mengekalkan identiti sebagai persatuan 'ikhtisas', kita perlu melihat keperluan ahli geologi tempatan untuk berpersatuan, khususnya mereka yang berada dalam sektor swasta dan pentadbiran. Aktiviti persatuan pada masa akan datang perlu dijajar untuk memenuhi keperluan mereka. Sebaliknya, jika kita merasakan PGM perlu mengubahsuai identitinya sebagai persatuan 'sains'. Kita perlu bersedia meluaskan keahlian kepada mereka yang berminat dengan geologi (Sains Bumi) tetapi bukan ahli Geologi, malah kepada pelajar dan guru sekolah! Ini merupakan ketetapan yang perlu diambil untuk mengharungi cabaran abad ke-21.

Secara umumnya, sebagai sebuah Persatuan, khususnya untuk ahli Geologi di Malaysia, ahli Majlis pada sidang ini telah berjaya menjalankan aktiviti yang diamanahkan dengan memuaskan. Kewangan Persatuan juga terus kukuh hasil sumbangan luar yang berterusan dan pengurusan kewangan yang berhati-hati.

Dalam sidang 1999/2000, Persatuan berjaya menganjurkan pelbagai aktiviti dengan sokongan padu tuan dan puan. Saya dan ahli Majlis yang lain mengucapkan ribuan terima kasih kepada semua ahli Persatuan yang telah terlibat secara langsung dan tidak langsung untuk menjayakan aktiviti Persatuan. Kepada rakan-rakan jaringan, khususnya individu, syarikat dan agensi, saya bagi pihak PGM ingin mengucapkan berbilang terima kasih atas sokongan dan sumbangan anda.

Prof. Ibrahim Komoo
Presiden,
Persatuan Geologi Malaysia
25 April 2000

Secretary's Report

1. The Council

Members of the Council of the Geological Society of Malaysia for the period of 30th April 1999 to the 28th April 2000 are as follows:

President	:	Ibrahim Komoo (<i>Universiti Kebangsaan Malaysia</i>)
Vice-President	:	Abdul Ghani Rafek (<i>Universiti Kebangsaan Malaysia</i>)
Secretary	:	Ahmad Tajuddin Ibrahim (<i>University of Malaya</i>)
Assistant Secretary	:	Mazlan Madon (<i>PRSS</i>) (<i>Resigned 19.1.2000</i>)
	:	Nik Ramli Nik Hassan (<i>Consultant</i>) (<i>Appointed 19.1.2000</i>)
Treasurer	:	Lee Chai Peng (<i>University of Malaya</i>)
Editor	:	Teh Guan Hoe (<i>University of Malaya</i>)
Councillors (2-years)	:	Liew Kit Kong (<i>PETRONAS Carigali</i>)
	:	Tan Boon Kong (<i>Universiti Kebangsaan Malaysia</i>)
	:	Mogana Sundaram (<i>Consultant</i>)
Councillors (1-year)	:	Hamdan Hassan (<i>Consultant</i>)
	:	M. Selvarajah (<i>Mineral & Geoscience Department Malaysia</i>)
	:	Tajul Anuar Jamaluddin (<i>University of Malaya</i>)
	:	Muhinder Singh (<i>PLRT</i>) (<i>Resigned 29.6.99</i>)
	:	Azhar Hj Hussin (<i>University of Malaya</i>) (<i>Appointed 27.7.99</i>)
	:	Nik Ramli Nik Hassan (<i>Consultant</i>) (<i>27.7.99 – 19.1.2000</i>)
Immediate Past President	:	Khalid Ngah (<i>Kedah Cement</i>)

2. Council Meetings

Council Meetings were held almost monthly throughout the 1999/2000 session. A total of 11 Council Meetings have been held. Attendance of all the Council Members at these meetings are shown in Appendix 1.

3. Membership

The total membership of the Society as at 31st December, 1999 is at 468 showing a big decrease from the previous year's total of 551. Local memberships have decreased by about 15%. Foreign memberships have also decreased from 98 to 84. Life memberships have however increased from 125 to 132. Details of the various classes of memberships and their geographical distributions are shown in Appendix 2.

4. Society Activities

The Annual Geological Conference was successfully organised under the chairmanship of Dr. Tajul Anuar Jamaluddin at the Desaru Gold Beach Hotel on the 29 & 30th May 1999. A total of 64 papers were presented. The Conference was officiated by the Y.B. Dr. Chua Soi Lek representing the Y.A.B. Menteri Besar of Johor. The Society would like to express our gratitude to the Y.A.B. Menteri Besar of Johor and Malaysia Mining Corporation for their generous support towards the Conference.

The Society also collaborated to successfully organise the 2nd Asian Symposium on Engineering Geology and the Environment which was co-organised by the IAEG Environment and Development (LESTARI) UKM on the 23–25 September at the Equatorial Hotel Bangi.

The Annual Petroleum Geology Conference, the last major conference organised by the Society for the millennium, was successfully organised on the 23–24th November 1999 at the Shangri-La Hotel, Kuala Lumpur. The very able organising committee was chaired by Mr. Barney Mahendran. 310 participants registered for the Conference with 33 papers presented and all 22 exhibition booths taken up. The Society would like to record our sincere appreciation for the generous support given by the various petroleum and service companies to make this event a success.

The Working Groups have not been very active during this session due to pressure of work. The Society was represented at a dialogue organised by the Ministry of Science, Technology and the Environment with the NGOs at the Pan Pacific Hotel, Kuala Lumpur on the 28 February 2000. Together with IGM, we also had a dialogue with representatives of the IEM held at the IEM building on the 10 March 2000.

The Society have also agreed to cooperate with KEJORA and the Johor State Government to initiate a geologic gallery at the Muzium Nelayan Tg. Balau, Johor. The project committee is being chaired by Dr. Tajul Anuar Jamaluddin.

A total of 2 forums, 13 technical talks, 1 dialogue, 1 Seminar, 1 Workshop and 3 fieldtrips/site visits were organised during the 1999/2000 session. Details of the Society's activities are shown in Appendix 3.

5. Publications

Sales of publications remain sluggish as in previous years. Bulletins 1, 9, 10, 12 and 14 are now no longer available. The remaining stock and sales made during 1999 is as shown in Appendix 4. Work is still in progress to get the Stratigraphic Lexicon completed. The publication of Robert Tate's Ph.D. thesis in the form of monograph is now delayed due to technical problem, which is being resolved. The Society continued to maintain a publication exchange with various professional bodies and libraries from various parts of the world.

6. Acknowledgements

The Society would like to acknowledge with thanks the generous cooperation and sponsorships received from companies, professional societies, government departments, universities and institutions; the Head of the Department of Geology, University of Malaya where the Society is housed and where most of the activities were held and the numerous individuals and Councillors who have contributed in one way or another to the Society's activities.

Ahmad Tajuddin Ibrahim
 Secretary,
 Geological Society of Malaysia
 12 April 2000

Appendix 2 Memberships for 1999

Category	Male	Female	Total
Academic	1	1	2
Business	1	1	2
Government	1	1	2
Industrial	1	1	2
Professional	1	1	2
Public	1	1	2
Student	1	1	2
Unaffiliated	1	1	2
Total	7	7	14

Appendix 1 Attendance of Council Members at Council Meetings

No.	Name	1*	2	3	4	5	6	7	8	9	10	11
1	Khalid Ngah	O	O	O	O	O	O	O	O	O	O	O
2	Ibrahim Komoo	X	X	O'	X	X	O'	X	X	X	O'	O'
3	Abdul Ghani Rafek	X	X	X	X	O'	X	X	X	X	X	X
4	Ahmad Tajuddin	X	X	X	X	X	X	X	O'	X	X	X
5	Lee Chai Peng	X	O'	X	X	X	X	X	X	X	X	X
6	Teh Guan Hoe	X	X	X	X	X	X	X	X	X	X	X
7	Mazlan Madon	O'	O'	O'	O'	O'	O'	O'	-	-	-	-
8	Azhar Hussin	-	-	O'	O'	O'	O'	O'	X	O'	O'	O'
9	Liew Kit Kong	O'	O'	O'	O'	X	X	X	X	X	X	O'
10	Mogana Sundaram	O	O	O	O	O	O	O	O	O	O	O
11	M. Selvarajah	O'	X	X	X	X	O'	X	X	X	X	X
12	Hamdan Hassan	O'	O'	X	X	O'	X	O'	O'	O'	X	O'
13	Nik Ramli Nik Hassan	-	-	X	O'	X	X	X	O'	O'	X	X
14	Tan Boon Kong	X	O'	X	X	X	X	X	X	X	X	X
15	Tajul Anuar Jamaluddin	X	X	X	X	O'	O'	O'	X	X	O'	O'

* Held at Desaru Gold Beach Resort during the Annual Conference 1999

X : present O' : absent with apologies O : absent - : resigned/not yet appointed

Appendix 2 Memberships for 1999

Country	Full	Life	Institutional	Student	Associate	Honorary	Total
Australia	9	10	2				19
Brunei	1	1	2	2			6
Canada	3			1			4
Europe	9	8	2		1	1	21
India	1						1
Indonesia	5	4					9
Japan	2	1					3
Middle East	1	3					4
New Zealand	1						1
Philippines		1					1
Singapore	4	4	1		1		10
South America	1						1
Thailand	1	1					2
USA	8	5		1			14
Vietnam			1				1
Malaysia	175	94	8	79	12	3	371
TOTAL	221	132	14	83	14	4	468

Appendix 3 Society Activities 1999/2000

No.	Date	Event/Speaker/Venue
1.	10 May 1999	Technical Talk 1: <i>Understanding slope movements and the failure process</i> by Prof. Andrew Malone (University of Hong Kong) at the University of Malaya, Kuala Lumpur.
2.	20 May 1999	Technical Talk 2: <i>The uses of surface area data obtained on reservoir core samples</i> by Robert East, Core Laboratories, Indonesia at the KLCC.
3.	28 May 1999	Fieldtrip 1: Pre-Conference Fieldtrip to Tg. Balau and Tg. Lompat, Mersing, Johor.
4.	29–30 May 1999	Annual Geological Conference 1999 at the Golden Beach Desaru Hotel, Desaru, Kota Tinggi, Johor.
5.	16 June 1999	Technical Talk 3: <i>Malam Geologis II: A review: Piezocone as a tool for stratigraphic logging in Malaysian Quaternary deposit</i> by Abd. Rasid Jaapar, Soil Centralab Sdn. Bhd. and <i>Drilling and Grouting for dam construction — case studies</i> by Nik Adlin Nik Yusoff, Carita Sdn. Bhd. at the University of Malaya.
5.	17 June 1999	Technical Talk 4: 4-D analysis of extensional fault systems in rift basins by Ken McClay (AAPG Distinguished Lecturer) at the University of Malaya.
7.	30 July 1999	Technical Talk 5: Geoscience for sustainable development by Prof. Bill Fyfe at the University of Malaya.
8.	10 August 1999	Technical Talk 6: <i>Malam Sains Tanah</i> — by Samsudin Jusop (Universiti Putra), Ghulam Mohd. Hashim (MARDI) & S. Paramanathan at the University of Malaya.
9.	14 August 1999	Seminar: <i>2nd Seminar — The Western Belt & Paleozoic of Peninsular Malaysia and neighbouring areas</i> at the Department of Geology Universiti Kebangsaan Malaysia Bangi.
10.	21–22 August 1999	Fieldtrip 2: Site visit to Penjom Gold Mine, Pahang.
11.	26 August 1999	Forum: <i>IEM/GSM Forum “Karst; Geology & Engineering”</i> jointly organised with IEM at the IEM Conference Hall, Petaling Jaya.
12.	7 September 1999	Technical Talk 7: <i>EIA of the oil industry — case histories and their geological input</i> by H.D. Tjia of the PRSS at the University of Malaya.
13.	16 September 1999	Technical Talk 8: <i>Malam Sumber Mineral: International Classification of Reserve and Resources</i> by Loh Chiok Hoong and <i>Overview of the Industrial Mineral Industry in Malaysia</i> by Ong Wee Seck from the Department of Mineral and Geoscience Malaysia at the University of Malaya.

Appendix 3 (cont'd) Society Activities 1999/2000

No.	Date	Event/Speaker/Venue
14.	17 September 1999	Technical Talk 9: <i>EIA Procedures in Malaysia and Current Issues</i> by Ir. Lee Heng Keng, Pengarah Penilaian, Jabatan Alam Sekitar at the University of Malaya.
15.	23–25 September 1999	Symposium: <i>2nd Symposium on Engineering Geology and the Environment</i> in collaboration with IAEG/IGM held at Equatorial Hotel Bangi.
16.	8 October 1999	1-Day Technical Workshop: <i>Our Evolving Planet, Earth History in New Perspective: A Review</i> by Prof. Karsten M. Storetvedt of the Institute of Geophysics, University of Bergen, Norway at the University of Malaya.
17.	28 October 1999	Technical Talk 10: <i>Malam Jurutera — Geotechnical Assessment of Slopes</i> by Ir. S.S. Gue (Gue & Partners), <i>Rockfall Protection</i> by Ir. L.H. Ooi (Soils & Foundations) and <i>Influence of Geology & Geological Structures on Cut Slope Stability</i> by Ir. C.T. Toh & Ir. S.K. Chee (Dr. C.T. Toh Consultants) at the University of Malaya.
18.	12–13 November 1999	Mini Forum & Fieldtrip: <i>Chasing Channel Sands</i> by Mark Sams (Jasons Geosystems Asia), Jeremy Prosser (Baker Atlas GEOScience), Peter Lloyd (Schlumberger) and Wan Manan (Carigali-Triton Operating Company) at the Shell House, Miri, Sarawak. Fieldtrip led by Azhar Hussin and Boniface Bait.
19.	23–24 November 1999	Petroleum Geology Conference '99 at the Shangri-La Hotel, Kuala Lumpur.
20.	30 November 1999	Technical Talk 11: <i>Malam Geologi — The Origin of Sapphire</i> by Mat Ruzlin Maulud (University of Malaya) and <i>Gemstones of Malaysia</i> by K.N. Moorthy at the University of Malaya.
21.	7 December 1999	Technical Talk 12: <i>Beyond the Sequence Stratigraphy Paradigm: Learning to Exploit High-Resolution Data</i> by Henry W. Posamentier of the Atlantic Richfield Indonesia Inc. Indonesia at the University of Malaya.
22.	10 March 2000	Dialogue: <i>Dialogue between IEM, GSM and IGM</i> at the Institution of Engineers Malaysia, Bangunan Ingenieur, Petaling Jaya.
23.	30 March 2000	Technical Talk 13: <i>Engineering Geology Case Histories: 1980–2000</i> by Tan Boon Kong at the University of Malaya.

Appendix 4 Stock of Publications

BULLETIN NO./PUBLICATION	SALES 1999	STOCK REMAINING
2	3	249
3	4	250
4	4	115
5	4	22
6	9	467
7	4	289
8	3	10
11	5	47
13	3	89
16	4	29
17	5	88
18	5	69
19	8	622
20	11	467
21	5	239
22	6	298
23	8	298
24	4	473
25	7	250
26	9	292
27	10	169
28	8	170
29	9	165
30	6	237
31	0	188
32	7	213
33	12	329
34	7	137
35	6	144
36	9	177
37	296*	504
41	8	95
Abstracts (Bulletin 6)	0	4
Stratigraphic Correlation	17	228
Rocks and Minerals Poster	50	439
Geological Evolution of SEA (CSH)	30	413
Malaysian Stratigraphic Guide	10	779

* inclusive of free copies to members.

Editor's Report 1999/2000

The Society's newsletter, the *Warta Geologi*, after a late start, has been brought up-to-date. The latest *Warta*, Vol. 26, No. 2 (Mar-Apr 2000), is with the printers.

The problems with the computer have been sorted out to some extent. Bulletins 38, 39, 40, 42 & 43 have subsequently been formatted. We hope to get the GEOSEA Bulletin (Bulletin 43) out around the time of the Annual General Meeting.

The Society is grateful to the many authors for their valuable paper contributions, and the donors and advertisers for their valuable financial contributions to the Society's Funds.

Special thanks are due to Ng Tham Fatt and A.K. Fan for assistance in the various editorial processes. The contributions of members of the Editorial Subcommittee and reviewers and advice of members of the Editorial Advisory Board are greatly appreciated.

G.H. Teh
Editor

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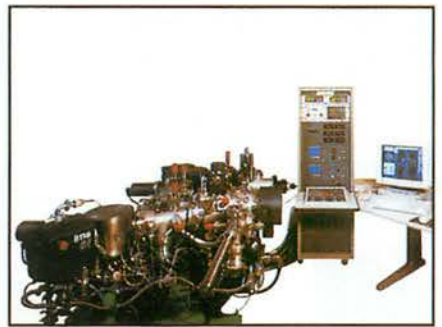
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- Imaging Processing and Analysis (IA)

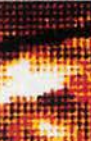


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People, Knowledge & Technology

Treasurer's Report 1999

There is an apparent drop in nett current assets from RM630,425.97 in 1998 to RM573,959.11 in 1999. We still have RM100,000 with Art Printing as the prepaid printing cost in 1998 is not used up yet in 1999. This means in effect the Society's nett current asset has increased to RM673,959.11.

The substantial increase in income from RM98,918.95 for 1998 to RM163,795.32 for 1999 is mainly due to the RM100,718.97 GEOSEA '98 donations which has come in.

The large drop in expenditure from RM178,499.12 in 1998 to RM118,580.11 in 1999 is due to the prepayment of printing bulletin in 1998.

There is an excess of income over expenditure of RM45,215.21 in 1999.

The Society would like to express our thanks to our generous donors for their continuous support and to our Honorary Auditor, Mr. Lee Sia Fatt for auditing the accounts.

Lee Chai Peng
Hon. Treasurer

14th March 2000

Notes on accounts 1999

1. Fixed Deposits

Our fixed deposits totalled Rm488,716.66 are in Standard Chartered Bank (RM158,792.90); Public Bank (RM172,062.38) and Mayban Finance (RM165,861.38).

2. Deposit and prepayment is for deposits on Telephone (RM300); Telefax (RM300); Student Loan (RM1,984.64); Geological Evolution of SEA (RM4,037.31); Advance audit fee (RM500); Petroleum Geology Conference (RM549.10); Sunto Compass (RM9,240.00)

**Auditors' Report to the Members of
Persatuan Geologi Malaysia
(Geological Society of Malaysia)**

We have audited the accounts in accordance with approved auditing standards.

In our opinion, the accounts give a true and fair view of the state of affairs of the Society as at 31st December 1999 and of its income and expenditure and receipts and payments for the year ended on that date.

Signed

S.F. LEE & CO.

(AF: 0670)

Public Accountants

5-3, Udarama Complex

Jalan 1/64A, Off Jalan Ipoh

50350 Kuala Lumpur

Signed

LEE SIEW FATT

(1179/9/00J)

Public Accountant

Kuala Lumpur

Date: 18 April 2000

PERSATUAN GEOLOGI MALAYSIA (Geological Society of Malaysia)

Statement of Income and Expenditure for the Year Ended 31st December 1999

Dear Members,

I have great pleasure in presenting my report on the Income and Expenditure Statement for our Society for the year ended 31st December 1999.

INCOME:	1999 RM	1998 RM
Entrance fees	560.00	540.00
Interest on fixed deposit	40,462.65	38,999.34
Subscriptions	15,013.01	17,809.18
Sales of publications	6,134.29	4,533.91
PGC '97/GEOSEA '98: Donation	100,718.97	33,500.31
Xerox	866.40	3,467.21
Souvenirs	40.00	69.00
Total Income	163,795.32	98,918.95
LESS: EXPENDITURE		
Audit fee	500.00	500.00
Annual dinner	1,351.00	1,237.44
Annual Conference	13,707.45	-
E-mail	-	500.00
Bank charges	230.23	258.34
Honorarium	11,765.00	10,656.00
Postages	6,117.10	188.59
Geoscience Promotion	-	480.30
Printing and Stationery		
— Miscellaneous	10,391.50	11,680.92
— Bulletin	42,000.00	117,083.00
— Warta Geologi	18,702.20	19,631.59
Refreshment	889.57	1,364.60
Study groups	2,535.58	734.88
Sundry expenses	760.36	4,022.96
Speakers' account	4,553.80	3,211.65
Subscription: Professional bodies	191.50	209.70
Telephone	727.67	175.27
Telefax	681.26	1,636.75
Depreciation on fixed assets	3,475.89	3,862.11
Stratigraphic committee	-	215.02
Photo competition	-	850.00
Total Expenditure	118,580.11	178,499.12
SURPLUS/DEFICIT FOR THE YEAR	45,215.21	(79,580.17)

PERSATUAN GEOLOGI MALAYSIA
(Geological Society of Malaysia)

Balance Sheet as at 31 December 1999

	1999 RM	1998 RM
FIXED ASSET	31,283.06	34,758.95
CURRENT ASSETS		
Sundry deposit and prepayment	16,911.05	9,283.95
Fixed deposits with licensed banks	495,734.99	488,167.49
Cash and bank balances	30,030.01	98,215.58
	<u>542,676.05</u>	<u>595,667.02</u>
NET CURRENT ASSETS	<u>573,959.11</u>	<u>630,425.97</u>
 FINANCED BY:		
ACCUMULATED FUND		
Balance brought forward	525,601.07	605,181.24
Surplus/Deficit for the year	45,215.21	(79,580.17)
	<u>570,816.28</u>	<u>525,601.07</u>
Young Geoscientist Award	3,142.83	3,142.83
GEOSEA '98	-	101,682.07
	<u>573,959.11</u>	<u>630,425.97</u>

Council For 2000/2001

President	:	Abdul Ghani Rafek <i>(Universiti Kebangsaan Malaysia)</i>
Vice-President	:	Mohd. Shafeea Leman <i>(Universiti Kebangsaan Malaysia)</i>
Secretary	:	Ahmad Tajuddin Ibrahim <i>(University of Malaya)</i>
Assistant Secretary	:	Nik Ramli Nik Hassan <i>(Consultant)</i>
Treasurer	:	Lee Chai Peng <i>(University of Malaya)</i>
Editor	:	Teh Guan Hoe <i>(University of Malaya)</i>
Councillors (2-years)	:	Abdul Rahim Samsudin <i>(Universiti Kebangsaan Malaysia)</i> Tajul Anuar Jamaluddin <i>(University of Malaya)</i> Azmi Yakzan <i>(PETRONAS Research & Scientific Services)</i> M. Selvarajah <i>(Mineral & Geoscience Department)</i>
Councillors (1-year)	:	Liew Kit Kong <i>(PETRONAS Carigali)</i> Mogana Sundaram <i>(Consultant)</i> Hamdan Hassan <i>(Consultant)</i> Tan Boon Kong <i>(Universiti Kebangsaan Malaysia)</i>
Immediate Past President	:	Ibrahim Komoo <i>(Universiti Kebangsaan Malaysia)</i>

Laporan Ringkas

Majlis Pelancaran Peraduan Menulis Esei Geosains Peringkat Kebangsaan PGM-DBP

Sekolah Alam Shah, Jalan Cheras, Kuala Lumpur

29 April 2000

1. ACARA-ACARA UTAMA

1.1. Ceramah Umum Kerjaya

Dr. Kadderi Md. Desa telah menyampaikan, melalui persembahan LCD yang menarik, ceramah bertajuk "myGEO & SAINS — geosains, saya dan kerjaya".

1.2. Kata Aluan-aluan Presiden PGM

Kata alu-aluan ini telah disampaikan oleh Presiden PGM, Prof. Madya Dr. Abdul Ghani Rafek.

1.3. Majlis Pelancaran

Majlis pelancaran telah disempurnakan oleh Tuan Haji Hamdan b. Yahya, Pengarah Jabatan Sastera Dewan bahasa dan Pustaka. Majlis ini didahului dengan ucapan perasmian, diikuti dengan upacara menekan papan kunci memulakan persembahan LCD mengenai Peraduan.

1.4. Penyampaian Poster dan Borang Penyertaan

Upacara ini telah disempurnakan oleh En. Chu Ling Heng, Timbalan Pengarah Jabatan Mineral dan Geosains. Poster, syarat peraduan dan borang penyertaan telah disampaikan kepada guru-guru pengiring dari lapan buah sekolah, termasuk sekolah tuan rumah.

1.5. Pameran Geosains

Pameran ini telah diadakan dari jam 10.30 pagi hingga 12.30 tengahari. Sebanyak 100 eksebit telah dipamerkan, dengan bantuan 10 poster. Pameran yang bertemakan "Peranan Geosains dalam Pembangunan Negara" ini dibahagikan kepada lima komponen, iaitu:

- Geosains? Geologi?
- Kerjaya geosaintis
- Bahan bumi asas peradaban
 - Bahan bumi sebagai sumber logam/semi logam
 - Bahan bumi sebagai sumber industri
 - Bahan bumi sebagai bahan binaan
 - Bahan bumi sebagai punca tenaga
 - Bahan bumi sebagai sumber keperluan harian
- Unsur estetik dalam geosains
- Geosains dan anda (pameran interaktif dengan pengunjung)

Majlis Pelancaran Peraduan Menulis Esei Geosains Peringkat Kebangsaan PGM-DBP



Sebuah gerai jualan Majalah BUMI (UKM), poster *Common Rocks of Malaysia* (PGM), dan topi (PGM) turut diadakan.

1.6. Jamuan Ringan

Selamat diadakan untuk tetamu kehormat, tetamu, guru dan pelajar.

2. KEHADIRAN

Seramai lebih kurang 300 orang telah menghadiri Majlis Pelancaran Peraduan, dengan pecahan seperti berikut:

Tetamu kehormat (DBP, JMG, Sekolah Alam Shah)		3
Jemputan lain (PETRONAS, dll.)		6
Ahli Majlis PGM/JK Penganjur (termasuk pameran)		15
Guru-guru pengiring (termasuk tuan rumah)		8
Pelajar (selain Sekolah Alam Shah)		68
1. SMK Cheras	5	
2. SMK Bandar Baru Bangi	4	
3. SMK Convent, Kajang	4	
4. SM Teknik Setapak	5	
5. SMK Convent, Jln. Peel	5	
6. SMK Maxwell	5	
7. SM Sains Selangor, Cheras	40	
Pelajar Sekolah Alam Shah		200
	<i>Jumlah</i>	300

Terdapat 6 buah sekolah yang menjawab "tidak dapat hadir" atas pelbagai sebab.

3. PERBELANJAAN

Majlis Pelancaran Peraduan menelan belanja sebanyak RM2,571.00 dengan pecahan seperti berikut:

Majlis Pelancaran		RM1,615.00
Fotokopi 350 helaian aturcara, @RM0.18	RM63.00	
Fotokopi 200 syarat/borang, @RM0.12	RM24.00	
Rozeq AJK (15) dan reben hadiah (2)	RM23.00	
Caj membuat <i>backdrop</i> oleh Sek. Alam Shah	RM100.00	
Kaset "Varsiti Kita", latar pelancaran	RM10.00	
Sagu hati pengendali LCD (En. Lim, UKM)	RM25.00	
Sagu hati perekabentuk poster (En. Hafidz, UKM)	RM25.00	
Jamuan ringan bagi 350 orang, @RM2.50	RM875.00	
Mencetak 550 poster A-3, @RM0.85 (UKM)	RM470.00	
<i>Jumlah kecil 1</i>	RM1,615.00	
Pameran		RM923.90
Fotokopi 240 risalah pameran 1, @RM0.20	RM48.00	
Fotokopi 200 risalah pameran 2, @RM0.10	RM20.00	
Kain lapik meja pameran, 15 m @RM4.00	RM60.00	
Laminasi 55 keterangan eksebit, @RM1.70	RM93.50	
Pelbagai peralatan kecil lain	RM102.20	
Saguhati pelajar 5 x 2 hari x RM25.00	250.00	
Kaki pemegang keterangan eksebit (perspek), 50 buah, @RM2.20	RM110.00	

Dakwat pencetak berwarna	RM105.00	
Seva van untuk mengangkut bahan pameran UKM-Alam Shah-UKM	RM110.00	
Petrol	RM20.00	
Tol	RM5.20	
	<i>Jumlah Kecil 2</i>	RM923.90
Perbelanjaan-perbelanjaan Lain		RM32.10
Jamuan ringan mesyuarat JK Pertama, 29/4/2000	RM21.60	
Fotokopi 17 salinan minit Mesyuarat JK Pertama	RM10.50	
	<i>Jumlah Kecil 3</i>	RM32.10
	<i>Jumlah Besar</i>	RM2,571.00

4. PENUTUP

Secara umumnya, jika dilihat dari segi bilangan tetamu dan pelajar yang hadir serta acara-acara utama yang dapat dijalankan mengikut aturcara yang telah dirancang, bolehlah dikatakan Majlis Pelancaran Peraduan ini telah berjaya mencapai sebahagian besar daripada matlamatnya.

Maklumat daripada sekolah-sekolah yang "tidak dapat hadir" menunjukkan sebab utama banyak yang tidak hadir ialah kerana sekolah mempunyai kegiatan-kegiatan lain, tambahan pula banyak kegiatan ko-kurikulum mereka terpaksa diadakan pada dua Sabtu sahaja setiap bula berikutan cuti Sabtu dua kali sebulan.

Hamzah Mohamad
15.5.2000

Common Rocks of Malaysia

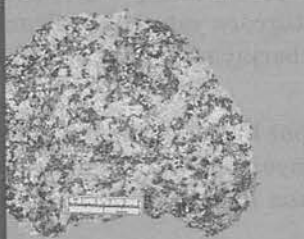
A full colour poster illustrating 28 common rocks of Malaysia. With concise description of the features and characteristics of each rock type including common textures of igneous, sedimentary and metamorphic rocks.

Laminated

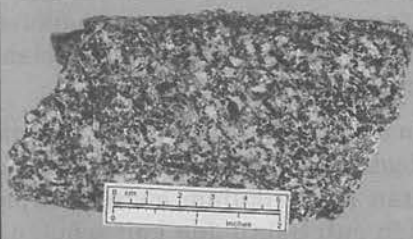
Size: 94 cm x 66 cm (42" x 26")

Price: Student members RM7.00 (one copy per member, subsequent copies RM10.00 each)
 Members RM8.00 (one copy per member, subsequent copies RM10.00 each)
 Non-members RM10.00 per copy

COMMON ROCKS



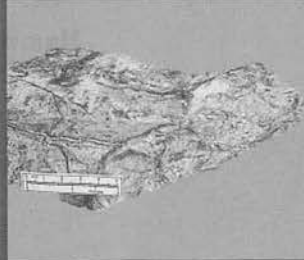
1. Granite (Tampin, Negri Sembilan)



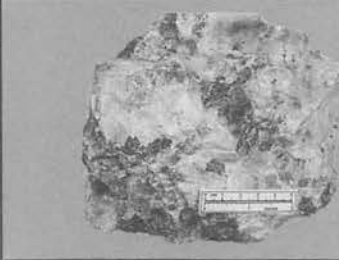
5. Diorite (Kg. Kemahang, Kelantan)



6. Basalt (Segamat, Johor)



8. Serpentinite (Raub, Pahang)



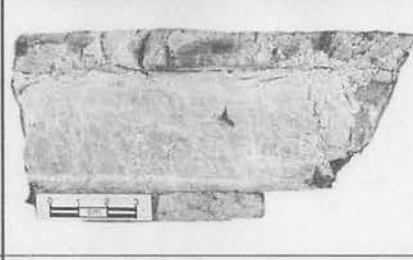
12. Pegmatite (Bukit Mar, Johor)



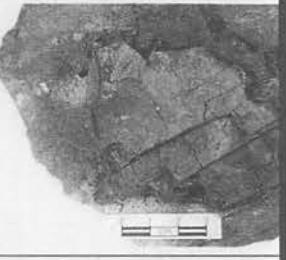
13. Conglomerate (Pulau Redang, Terengganu)



14. Mudstone (Kg. Laloh, Kelantan)



19. Chert (Nenering, Kedah)



20. Coal (Batu Arang, Selangor)



21. Sandstone (Kg. Laloh, Kelantan)



22. Diorite (Kg. Kemahang, Kelantan)



23. Basalt (Segamat, Johor)

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ORDERS

The Hon. Assistant Secretary
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 c/o Dept. of Geology, University of Malaya
 50603 Kuala Lumpur, MALAYSIA

BERITA-BERITA PERSATUAN

News of the Society

KEAHLIAN (Membership)

The following applications for membership were approved:

Full Members

- | | |
|--|--|
| <p>1. Tan Yaw Tzong
C7-4, Happy Mansion Flat, Jalan 17/13,
46400 Petaling Jaya.</p> <p>2. Abd. Holed Ishak
845 Lot 6/6350, Taman Sejahtera, Jalan
Tampin Lama, 70100 Seremban.</p> | <p>3. Ahmad Nazhri Mohd Zain
PRSS, Lot 3288 & 3289, Kawasan Institusi,
43000 Kajang.</p> |
|--|--|

Student Members

- | | |
|---|--|
| <p>1. Sawsan Kamel Shariah
Universiti Putra Malaysia, Serdang.</p> <p>2. Abdul Aziz Abdul Karim
Department of Petroleum Geoscience,
University Brunei Darussalam, Brunei.</p> | <p>3. Makoundi Charles
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur.</p> |
|---|--|

PETUKARAN ALAMAT (Change of Address)

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

- | | |
|--|--|
| <p>1. Michael C. Friederich
BHP Minerals, BRI Building, 6th Floor, Jl
Jend. Sudirman No. 37, Balikpapan 76112,
East Kalimantan, Indonesia.</p> | <p>2. Dato'k K.K. Lim
A-3-6, No. 1 Persiaran Greentown 2,
Greentown Business Centre, 30450 Ipoh.</p> |
|--|--|

CURRENT ADDRESSES WANTED

The GSM is seeking the address of the following member. Anyone knowing the new address please inform the Society.

1. Dr. Wong Wei Kiang
Tameron Sdn. Bhd., 37A, Jalan SS21/1A,
47400 Petaling Jaya, Selangor.

GSM

PERTAMBAHAN BAHARU PERPUSTAKAAN (New Library Additions)

The Society has received the following publications:

- | | |
|--|--|
| 1. AAPG Explorer, March, April 2000. | 12. Humans & Nature, no. 10. 1999. |
| 2. Annual Report: Chinese Academy of Geological Sciences, 1998. | 13. Nature & Human Activities, no. 4, 1999. |
| 3. Acta Geoscientia Sinica, vol. 20, no. 4, 1999. | 14. 2nd Asian Symposium on Engineering Geology & the Environment, 23–25 Sept. 1999: proceedings. |
| 4. Journal of Shijiazhuang, University of Economics, vol. 22, no. 5, 1999. | 13. Palaeontological abstracts, vol. 15, no. 1, 2000 and vol. 14, no. 4, 1999. |
| 5. Geoscience, vol. 13, nos. 2, 3 & 4, 1999. | 14. Acta Palaeontologica Sinica, vol. 38, no. 4, 1999 & vol. 39, no. 1, 2000. |
| 6. Earth Science Frontiers, vol. 6, nos. 3 & 4, 1999. | 15. Acta Micropalaeontologica Sinica, vol. 16, no. 4, 1999 & vol. 17, no. 1, 2000. |
| 7. National Science Museum Monographs no. 17, 2000. | 16. Monthly Statistics on Mining Industry in Malaysia, Nov. 1999. |
| 8. Geological Survey of New South Wales, Quaterly Notes, no. 110, 1999. | 17. AAPG Bulletin, vol. 84/3, 2000. |
| 9. Tin International, vol. 73, no. 3, 2000. | 18. Episodes, vol. 23, no. 1, 2000. |
| 10. Scripta Geologica, nos. 117 & 119 (1999). | 19. USGS Professional Paper 1997: no. 1614. |
| 11. American Museum of Natural History, no. 247, 2000. | |

GSM

NEW

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BULLETIN

PERSATUAN

GEOLOGI

MALAYSIA



GEOLOGICAL
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MALAYSIA

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Editor: G.H. Teh

Bulletin of the

GEOLOGICAL SOCIETY OF MALAYSIA

JULY 1994

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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.
- Bulletin 4** (Jun 1971). 100 p. Papers in Petrology, Structure and Economic Geology. Edited by P.H. Stauffer. Price: RM10.00.
- 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.
- Bulletin 14** (Dec 1981). 151 p. A collection of papers on geology of Southeast Asia. Edited by G.H. Teh. Price: RM30.00.
- Bulletin 15** (Dec 1982). 151 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM30.00.
- Bulletin 16** (Dec 1983). 239 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM30.00.
- Bulletin 17** (Dec 1984). 371 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM35.00.
- Bulletin 18** (Nov 1985). 209 p. Special Issue on Petroleum Geology. Edited by G.H. Teh & S. Paramanathan. Price: RM30.00.
- Bulletin 19** (Apr 1986) & **20** (Aug 1986). GEOSEA V Proceedings Vols. I & II, Fifth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia, Kuala Lumpur, 9-13 April 1984. Edited by G.H. Teh & S. Paramanathan. Price for both Bulletins 19 & 20: Members - RM50.00, Non-Members - RM125.00.
- Bulletin 21** (Dec 1987). 271 p. Special Issue on Petroleum Geology Vol. II. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 22** (Dec 1988). 272 p. Special Issue on Petroleum Geology Vol. III. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 23** (Aug 1989). 215 p. A collection of papers on the geology of Malaysia, Thailand and Burma. Edited by G.H. Teh. Price: RM35.00.
- Bulletin 24** (Oct 1989). 199 p. A collection of papers presented at GSM Annual Geological Conference 1987 and 1988. Edited by G.H. Teh. Price: RM35.00.
- Bulletin 25** (Dec 1989). 161 p. Special Issue on Petroleum Geology Vol. IV. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 26** (Apr 1990). 223 p. A collection of papers presented at GSM Annual Geological Conference 1989 and others. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 27** (Nov 1990). 292 p. Special Issue on Petroleum Geology Vol. V. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 28** (Nov 1991). 292 p. Special Issue on Petroleum Geology Vol. VI. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 29** (Jul 1991). 255 p. A collection of papers presented at GSM Annual Geological Conference 1990 and others. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 30** (Apr 1992). 90 p. Annotated bibliography of the geology of the South China Sea and adjacent parts of Borneo by N.S. Haile. Edited by G.H. Teh. Price RM20.00
- Bulletin 31** (Jul 1992). 176 p. A collection of papers presented at GSM Annual Geological Conference 1991 and others. Edited by G.H. Teh. Price: RM35.00.
- Bulletin 32** (Nov 1992). 283 p. Special Issue on Petroleum Geology Vol. VII. Edited by G.H. Teh. Price RM50.00
- Bulletin 33** (Nov 1993). 419 p. Proceedings Symposium on Tectonic Framework and Energy Resources of the Western Margin of the Pacific Basin. Edited by G.H. Teh. Price: RM60.00.
- Bulletin 34** (Dec 1993). 181 p. Bibliography and Index - Publications of the Geological Society of Malaysia 1967-1993. Compiled by T.F. Ng. Edited by G.H. Teh. Price: RM30.00.
- Bulletin 35** (Jul 1994). 174 p. A collection of papers presented at GSM Annual Geological Conference 1992 & 1993 and others. Edited by G.H. Teh. Price: RM35.00.
- Field Guide 1** (1973). A 7-day one thousand mile, geological excursion in Central and South Malaya (West Malaysia and Singapore). 40 p. by C.S. Hutchison. Price: RM5.00. **Out of stock.**
- Abstracts of papers** (1972). Regional Conference on the Geology of Southeast Asia, Kuala Lumpur, 1972. 64 p. 8 figs, 3 tables, many extended abstracts. Edited by N.S. Haile. Price: RM6.00.
- Proceedings of the Workshop on Stratigraphic Correlation of Thailand and Malaysia Vol. 1.** (1983). Technical Papers. 383 p. Price: RM25.00 (Members: RM12.00).
- WARTA GEOLOGI** (Newsletter of the Geological Society of Malaysia). Price: RM5.00 per bimonthly issue from July 1966.
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KALENDAR (CALENDAR)

2000

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 15-16

PERMO-CARBONIFEROUS CARBONATE PLATFORMS AND REEFS (A Research and Field Conference jointly sponsored by SEPM and IAS), El Paso, Texas, USA. (Contact: Judy Tarpley, SEPM 1731 E, 71 Street, Tulsa, OK 74136, USA. Tel: +1 918 493 33 61; Fax: +1 918 493 20 93; E-mail: jtarpley@sepm.org; Website: <http://www.sepm.org/research/conferences/permcarb2000.html>)

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: gsnsymp@nbgm.unr.edu; Website: <http://www.seismo.unr.edu/GSN>)

May 15-19

EARLY VERTEBRATES-LOWER VERTEBRATES (International Meeting), Flagstaff, USA. (Contact: Dr. D.K. Elliot, Department of Geology, Box 4099, Northern Arizona University, Flagstaff, Arizona 86011-4099, USA. Tel: +1 520 523 7188; Fax: +1 520 523 9220; E-mail: David.Elliot@nau.edu)

May 23-25

TRACERS AND MODELLING IN CONTAMINANT HYDROLOGY (International Conference), Liege, Belgium. (Contact: TraM2000, 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)

May 29 - June 2

62ND EAGE CONFERENCE & TECHNICAL EXHIBITION, GLASGOW, Scotland, UK. (Contact: EAGE Conference Dept., P.O. Box 59, 3990 DB Houten, The Netherland. Tel: +31 30 6354055; Fax: +31 30 6343524)

May 30 - June 3

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Washington, DC, 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 4-8

GSA PENROSE CONFERENCE "GREAT CASCADIA EARTHQUAKE TRICENTENNIAL", Seaside, Oregon, USA. (Contact: John Clague, Department of Earth Sciences, Simon Fraser University, Burnaby, British Columbia V5A 1S6 Canada. E-mail: jclague@sfu.ca)

June 4-9

INTERNATIONAL SYMPOSIUM ON THE BIOGEOGRAPHY OF SE ASIA 2000, Leiden, The Netherlands. (Contact: Rienk de Jong, Nationaal Natuurhistorisch Museum, Department of Entomology, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands. Tel: +31 71 516 26 52; Fax: +31 71 513 33 44; E-mail: jong@nmm.nl.)

June 14-16

MANAGEMENT INFORMATION SYSTEMS, INCORPORATING REMOTE SENSING, Lisbon, Portugal. Organised by Wessex Institute of Technology, UK. (Contact: Gabriella Cossutta. Tel: +44 (0)238-029-3223; Fax: +44

(0) 238-029-2853; E-mail: gcosutta@wessex.ac.uk; Website: www.wessex.ac.uk/conferences/2000)

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, Academia Sinica, 39 East Beijing Road, Nanjing 210008, China. Website: <http://members.spree.com/sip/spore/index.htm>)

June 27-30

PETROGRAPHY ON THE VERGE OF THE XXI CENTURY: RESULTS AND PERSPECTIVES (The Second Russian Petrographic Meeting), Syktyvkar, Komi Republic, Russia. (Contact: Dr. Irina Golubeva, Institute of Geology of Komi Sc. Centre UD RAS, Pervomaiskaya st., 54, Syktyvkar, 167610, Russia. Tel: +7(8212)447262; Fax: +7(8212)425346; E-mail: petr@geo.komo.ru)

July 3-7

GEOLOGICAL SOCIETY OF AUSTRALIA (Biennial Meeting), 15TH AUSTRALIAN GEOLOGICAL CONVENTION (Theme: Understanding Planet Earth — Searching for a sustainable future), University of Technology, Sydney, Australia. (Contact: Misha Frankel, Geological Society of Australia, Suite 706, 301 George Street, Sydney, NSW, Australia. Tel: +61 2 92902194; Fax: +61 2 9290 2198; E-mail: 15thagc@gsa.org.au; Website: www.science.uts.edu.au/agc/agchome.html)

July 3-7

18TH COLLOQUIUM OF AFRICAN GEOLOGY (Hosted and organized by the Austrian Geological Society and the Austrian Mineralogical Society), Graz, Austria. (Contact: Institut für Geologie und Paläontologie, Karl-Franzens-Universität Graz, Heinrichstraße 26, A-8010 Graz, Austria. Tel: +43-316-380-5587; Fax: +43-316-380-9870; E-mail: cag18@bimn22.kfunigraz.ac.at)

July 9-12

INTERNATIONAL CONFERENCE ON CATASTROPHIC EVENTS AND MASS EXTINCTIONS: IMPACTS AND BEYOND, Vienna, Austria. Sponsored by: University of Vienna, Lunar and Planetary Institute,

European Science Foundation IMPACT Program, Federal Ministry of Science and Transport, Austria, and the Geological Survey of Austria. (Contact: Elizabeth Wagganer, Impact 2000 Conference, Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston TX 77058-1113. Tel: (281)486-2177; E-mail: wagganer@lpi.jsc.nasa.gov; Website: <http://cass.jsc.nasa.gov/meetings/impact2000/>)

July 11-15

APC-2000, COMBINED AUSTRALIAN PALAEOONTOLOGICAL CONVENTION; 3RD INTERNATIONAL SYMPOSIUM ON THE SILURIAN SYSTEM; AND 2ND AUSTRALIAN CONODONT SYMPOSIUM, New South Wales, Australia. (Contact: George Wilson, Department of Earth and Planetary Sciences, Macquarie University, Sydney, NSW 2109, Australia. Website: <http://www.es.mq.edu.au/MUCEP/auscos/auscos.htm>)

July 12-14

GEOFLUID-III 2000 (The third international conference on fluid evolution, migration and interaction in sedimentary basins and orogenic belts), Barcelona, Spain. (Organized by the University of Barcelona and Instituto Jaume Almera. Website: www.ub.es/geoquimi/geofluids)

July 16-22

APPLIED MINERALOGY — ICAM 2000 (6th International Congress), Göttingen & Hannover, Germany. (Contact: ICAM 2000 Office, P.O. Box 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 16-22

"GEO-INFORMATION FOR ALL" (19th International Congress of the International Society for Photogrammetry and Remote Sensing), Amsterdam, The Netherlands. (Contact: Prof. K.J. Beek, P.O. Box 6, 7500 AA Enschede, The Netherlands. Tel: +31 (0) 53 4874214; Fax: +31 (0) 53 4874200; E-mail: beek@itc.nl)

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@crystal.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/>)

September 11-15

8TH INTERNATIONAL NANNOPLANKTON ASSOCIATION CONFERENCE, Bremen, Germany. (Contact: Prof. Helmut Willems, FB-5-Geowissenschaften, Universität Bremen, Postfach 330 440, 28334 Bremen, Germany. Tel: +49 421 21 82 198; Fax: +49 421 21 84 451; E-mail: willems@micropal.uni-bremen.de; Website: <http://uni.bremen.de/~micropal/ina8.html>)

September 17-21

7TH INTERNATIONAL CONFERENCE ON PALEOCEANOGRAPHY, Sapporo, Japan. (Contact: Prof. Helmut Weissert, Geological Institute, ETH-Zurich, CH-8092 Zurich Switzerland. Tel: +41 (0)1 632 37 15; Fax: +41

(0)1 632 10 30; E-mail: helmi@erdw.ethz.ch; Website: <http://www.ijnet.or.jp/jtb-cs/icp7/>)

September 17-26

KARST'2000: 6TH INTERNATIONAL SYMPOSIUM AND FIELD SEMINAR ON PRESENT STATE AND FUTURE TRENDS OF KARST STUDIES, Marmaris, Turkiye. (Contact: Hacettepe University, International Research and Application Centre for Karst Water Resources (UKAM), Beytepe Campus, 06532 Ankara, Turkiye. Fax: 90 312 299 213; E-mail: ukam@naim.jeo.edu.tr)

September 25-29

12TH INTERNATIONAL SYMPOSIUM ON PLACER AND WEATHERED ROCK DEPOSITS, Moscow, Russia. Pre-congress and post-congress workshops and field excursions. Abstract deadline: May 1, 2000. (Contact: Prof. Patyk-Kara N.G., Secretary General, Igem RAS, 35. Staromonetny Per., 109017 Moscow. Tel: 7 (095) 230-8427; Fax: 7 (095) 230-2179; E-mail: rkv2000@igem.ru; Website: <http://www.igem.ru/symp/rkv2000/>)

October

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

October 11-13

RISK ANALYSIS 2000, Second International Conference on Computer Simulation in Risk Analysis and Hazard Mitigation, Bologna, Italy. Organised by Wessex Institute of Technology (WTT), Ashurst Lodge, Ashurst, Southampton SO40 7AA, UK. (Contact: Karen Savage, RISK 2000/1479. Tel: +44(0)238 029 3223; Fax: +44(0)238 029 2853; E-mail: ksavage@wessex.ac.uk; Website: www.wessex.ac.uk/conferences/2000)

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

9TH INTERNATIONAL CORAL REEF SYMPOSIUM, Bali, Indonesia. (Contact: Secretariat of the International Coral Reef Symposium, c/o COREMAP, Jl. Raden Saleh 43, Jakarta 10330, Indonesia. Tel: +62 21 314

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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: geoeng2000@icms.com.au; Website: <http://civil-www.eng.monash.edu.au/discipl/mgg/geo2000.htm>)

December 3–6

DEEP WATER RESERVOIRS OF THE WORLD (Gulf Coast Section of Society of Economic Paleontologists and Mineralogists Foundation Research Conference), Houston, Texas. (Contact: GCSSEPM Foundation, 165 Pineburst Rd., West Hartland, Conn. 06091-0065. Tel: 800/436-1424; Fax: 860/738-3542; E-mail: gcssepm@mail.snet.net; Website: <http://www.gcssepm.org>)

December 11–16

INTERNATIONAL SYMPOSIUM AND FIELD WORKSHOP ON GEODYNAMIC EVOLUTION OF HIMALAYA-KARAKORAM-EASTERN SYNTAXIS (INDO-BURMA RANGE)-ANDAMANNICOBAR ISLAND ARC AND ADJOINING REGION, Lucknow, India. (Contact: Prof. A.K. Sinha, Director/Dr. Anil Chandra, Organizing Secretary, Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226 001, India. Tel: 0091-0522-333620/32491/323206/325822/325945; Fax: 0091-0522-381948/374528; E-mail: bsip@bsip.sirneta.ernet.in)

December 15–19

AMERICAN GEOPHYSICAL UNION (FALL MEETING), San Francisco, California, USA. (Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA. Tel: +1 202 462 6990; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>)

2001

May 11–21

MID-PALAEOZOIC BIO- AND GEODYNAMICS: THE NORTH GONDWANA-LAURUSSIA INTERACTION, Joint meeting of the 'International Geological Correlation Program (IGCP) 421' and the 'Subcommission on Devonian Stratigraphy (SDS)' hosted by the 'Senckenbergische Naturforschende Gesellschaft', Frankfurt am Main at the 'Forschungsinstitut und Naturmuseum Senckenberg' Frankfurt am Main, Germany. (Contact: G. Plodowski, Forschungsinstitut Senckenberg, Senckenberganlage 25. D-60325 Frankfurt am Main. Tel: ++49-69-97075127; Fax: ++49-69-97075137; E-mail: gplodows@sngkw.uni-frankfurt.de)

June 3–6

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)

June 11–16

63RD EAGE CONFERENCE & TECHNICAL EXHIBITION, Amsterdam, The Netherlands. (Contact: EAGE Conference Dept., P.O. Box 59, 3990 DB Houten, The Netherlands. Tel: +31 30 6354055; Fax: +31 30 6343524)

July 30 – August

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY AND THE ENVIRONMENT (IAEG), "Engineering Geological Problems of Urban Areas" (International Symposium), Ekaterinburg, Russia. (Contact: Secretariat, "EngGeolCity-2001, UralTISIZ 79, Bazhov str., Ekaterinburg,

Russia 620075. Tel: +7 3432 559772; Fax: +7 3432 550043; E-mail: UralTIS@etel.ru)

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)

September 6–12

IAMG2001 (THE ANNUAL CONFERENCE OF THE INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY), Cancún, Mexico. (Contact: IAMG2001 Conference Secretariat, c/o Jorgina A. Ross, Kansas Geological Survey, 1930 Constant Avenue, Lawrence, KS 66047-3724, USA. Tel: +785-864-3965; Fax: +785-864-5317; E-mail: aspiazu@kgs.ukansedu; Website: <http://www.kgs.ukans.edu/Conferences/IAMG/index.html>)

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

INTERNATIONAL ASSOCIATION ON THE GENESIS OF ORE DEPOSITS (11th International Symposium), South Africa. (Contact: Dr. Erik Hammerbeck, Geological Survey, Department of Mineral and Energy

Affairs, 280 Pretoria Street, Private Bag X112, Silverton, Pretoria 0001, South Africa. Tel: +012 841 1130; Fax: +012 841 1203; E-mail: ehammerb@geoscience.org.za)

April 7–10

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)

July 7–12

16TH INTERNATIONAL SEDIMENTOLOGICAL CONGRESS, Auckland Park, Gauteng, South Africa. (Contact: Bruce Cairncross, Department of Geology, Rand Africans University, P.O. Box 524, Auckland Park, 2006, South Africa. Tel: +27 11 489 23 13; Fax: +27 11 489 23 09; E-mail: bc@na.rau.ac.za; Website: <http://general.rau.ac.za/geology/announcement.htm>)

September 16–20

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY AND THE ENVIRONMENT (IAEG), "Engineering Geology for Developing Countries" (9th International Congress), Durban, South Africa. (Contact: The Technical Committee, 9th IAEG Congress, P.O. Box 1283, Westville 3630, South Africa)

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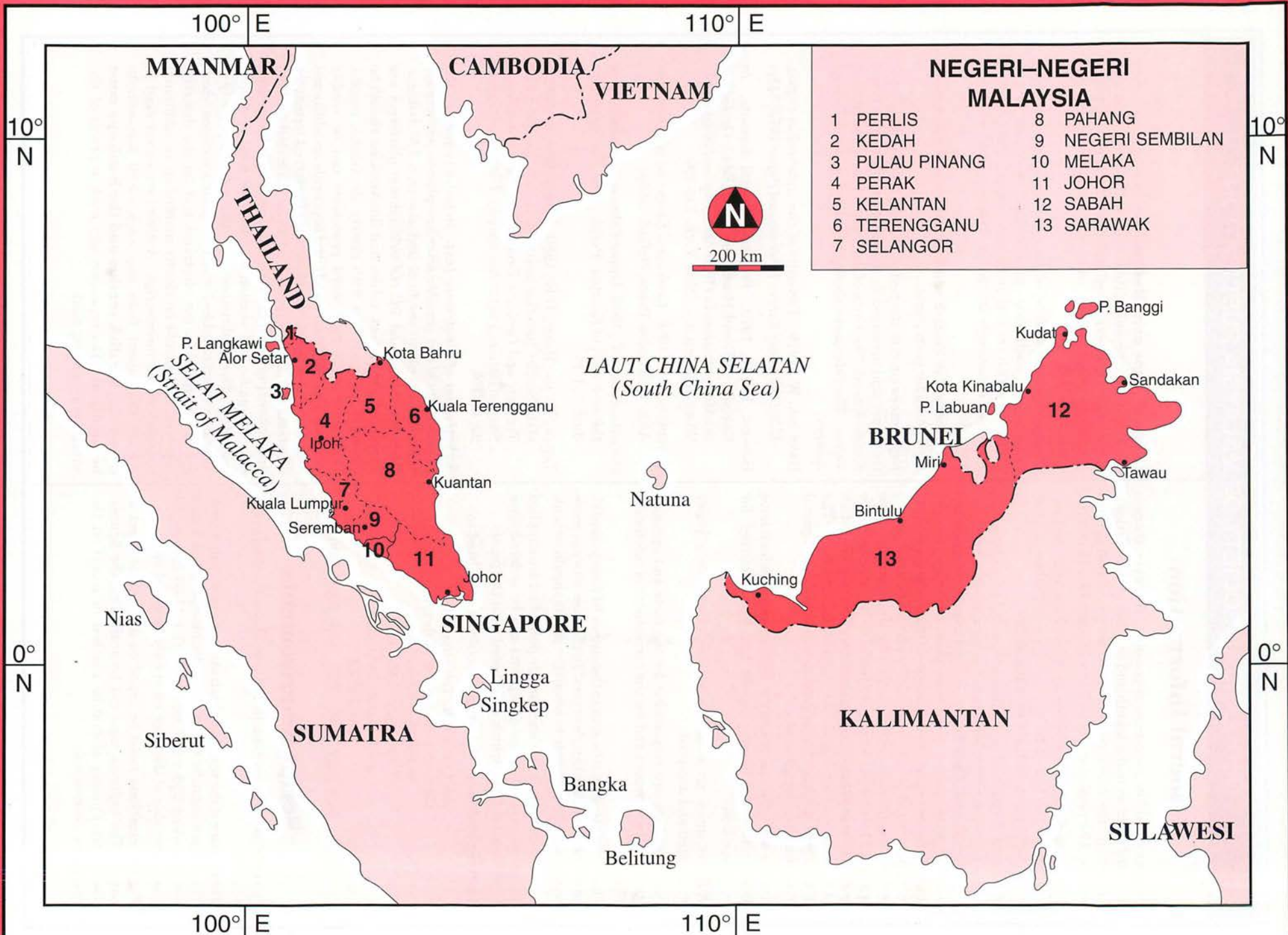
HOSKING, K.F.G., 1973. Primary mineral deposits. In Gobbett, D.J. and Hutchison, C.S. (Eds.), *Geology of the Malay Peninsula (West Malaysia and Singapore)*. Wiley-Interscience. New York, 335-390.

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. Geophys. Union Monograph 23*, 89-104.

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CAMBODIA VIETNAM

NEGERI-NEGERI MALAYSIA

- 1 PERLIS
- 2 KEDAH
- 3 PULAU PINANG
- 4 PERAK
- 5 KELANTAN
- 6 TERENGGANU
- 7 SELANGOR
- 8 PAHANG
- 9 NEGERI SEMBILAN
- 10 MELAKA
- 11 JOHOR
- 12 SABAH
- 13 SARAWAK



SELAT MELAKA
(Strait of Malacca)

LAUT CHINA SELATAN
(South China Sea)

BRUNEI

KALIMANTAN

SULAWESI

Nias

SINGAPORE

SUMATRA

Lingga
Singkep

Bangka

Belitung

10° N

10° N

0° N

0° N

100° E

110° E

100° E

110° E