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CATATAN GEOLOGI
(GEOLOGICAL NOTES)

A NOTE ON THE AGE OF THE WEATHERING PROFILES OF
PENINSULAR MALAYSIA

J.K. RAJ, Jabatan Geologi, Universiti Malaya, Kuala Lumpur

Deep weathering profiles are found throughout the Malay Peninsula, where "thicknesses of weathered material in excess of 30 m are not uncommon" (Stauffer, 1973, p. 15). The main factors responsible for this deep weathering are undoubtedly the largely, or actively, emergent character of the Peninsula throughout the Cainozoic and its relative tectonic stability (Stauffer, 1973; Gobbett and Tjia, 1973), for most writers including Maignien (1966), Fitzpatrick (1971), Birkeland (1974) and Thomas (1974, p. 15), consider that the deep weathering, and through decomposition, of rocks requires "stable landscapes of considerable antiquity". The weathering profiles of the Peninsula have thus usually been considered to have developed during the Tertiary, with some writers (Law and Leamy, 1966; Eyles, 1970; Batchelor, 1979) considering the laterites, bauxites and laterosols (pedological horizons forming the upper layers of some weathering profiles) of the Peninsula to be fossil soils that developed during the Tertiary. Paramanathan (1982), however, considers these lateritic soils to have developed during the Pleistocene through the deposition of iron-coated materials that were derived (by erosion) from weathering profiles formed by intensive tropical weathering during the Tertiary. Some evidence for this Tertiary humid tropical climate is seen in Mueller (1972) whose palynological analysis led to the conclusion that there was a uniformity of humid climate through the Tertiary in East Malaysia (NW Borneo). A possible objection to the Tertiary development of the weathering profiles is, however, seen in the postulation of Verstappen (1975, 1980) that different weathering mantles were formed during the pluvial and inter-pluvial periods that prevailed in Southeast Asia during the Quaternary. Evidence for these Quaternary climatic changes is, however, conflicting with the work of some writers (Medway, 1972; Hasseldonckx, 1976) supporting these climatic changes, while the work of other writers (Van Steenis, 1965; Newell, 1971; Ahston, 1972) indicates that Quaternary climatic changes have not affected the Peninsula. A proposed compromise to this conflicting evidence (Ashton and Ashton, 1972) thus suggests that only the lowlands and extreme highlands of Southeast Asia were influenced by the Quaternary pluvial and inter-pluvial periods, while the low to moderate highland areas remained unaffected by these climatic periods. As Quaternary eustatic sea-levels of the Peninsula have furthermore, been quite considerable [(from + 6 m to more than - 100 m (Haile, 1971, 1975); from about + 50 m to more than -100 m (Tjia, 1970; Tjia, *et al.* 1977); heights relative to present day mean sea-level)], it is therefore likely that the present-day highland areas of the Peninsula (approximately above the 200 m contour) remained unaffected by the Quaternary climatic changes though the lowland areas were affected by these climatic changes. Some support for this postulation is seen in the present-day restriction of the laterites of the

Peninsula to areas below the 200 m contour, for the formation of these laterites requires Quaternary climatic changes (Paramanathan, 1982). Arising from this discussion, it is therefore concluded that the available evidence indicates that the weathering profiles of the Peninsula (apart from weathering profiles over the Kuantan Basalt, which is of a Quaternary age, Bignell, 1972) were developed during the Tertiary; the climatic changes of the Quaternary only influencing the development of pedological horizons in lowland areas.

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VIEWPOINT: THE EXPLOITATION AND CONSERVATION OF NATURAL RESOURCES - A DISCUSSION*

P.C. AW, 20, Jalan Lengkok Gopeng, Taman Golf, Ipoh, Perak.

Sir

Kiew (1982) is to be congratulated on his cogent view on a subject which is of interest to all people concerned. Kiew's discussion on the subject is of relevance to non-renewable resources in general and to metallic and fuel minerals in particular. However, his view on exploitation and conservation of industrial minerals requires qualification and clarification.

An industrial mineral, says the Glossary of Geology, is "any rock, mineral, or other naturally occurring substance of economic value, exclusive of metallic ores, mineral fuels and gemstones; one of the nonmetallics". There are exceptions, but the above definition can be taken as a general statement.

Industrial minerals are a highly diverse group of materials in terms of type and value. Most industrial minerals are large-bulk low-value commodities. However, in terms of total amount produced or required in any country, the most important industrial minerals are clay, sand and rock. These are the basic building and construction materials of our modern society. As the demand for such materials is ubiquitous, their exploitation has the greatest impact on the environment. Therefore, this discussion is based on the need to ensure long-term availability of industrial minerals and the desire to protect the environment from the uncontrolled exploitation of industrial minerals.

Owing to the large-bulk, transport cost is an important consideration in the economic exploitation of industrial minerals. Therefore, such materials are generally exploited close to places of demand. These places are usually in industrial, housing, urban and new growth centres. Owing to land-use conflicts and environmental impact, natural resources in such areas are becoming sterile. It is essential for both the public and private sectors to play their parts to ensure the availability of resources for exploitation and at the same time ensure that the quality of life is not adversely affected.

Kiew's assumption that "industrial minerals left unexploited can only increase in their value with time" is not strictly true. Generally, industrial minerals can only be economically exploited where there are infrastructures such as roads, ports or market nearby. Outside the sphere of development, the deposits are safe and remain as resources until they can be exploited. However, within the sphere of development, any industrial mineral deposits if not exploited in time are likely to become sterile and useless as resources, if the area over which the deposits are located is used for other purposes. For example, some of the silica sand deposits in Trengganu and kaolin deposits in Perak have become sterile because of building construction.

*This is the personal view of the author, and does not necessarily reflect in any way the policy of the Geological Survey Malaysia to which he is a staff member.

Kiew's argument for regulating the pace of exploitation is not relevant in the context of industrial minerals. Industrial minerals are produced whenever and wherever there is a demand for them. There is no fear of "exponential growth which will result in slumps in the market, wastages and ultimately the exhaustion of the mineral resource". If the demand for industrial minerals wanes, the production will naturally slow down. For example, until recently, when the Johore State Government banned the export of rock aggregates and bricks to Singapore, the production of these materials in Johore decreased considerably.

Land matters, including natural resources are under the jurisdiction of the State authorities. Although there is something to be said for more Federal power on natural resources, due to vested interests, the status quo is likely to remain. Therefore, for any conservation measure to be effective, it must be adopted and enforced by the State authorities.

Most industrial minerals, because of their seeming abundance and mundane quality, are usually taken for granted as natural resources. Their exploitation is ad hoc, depending on demand and availability, not on planning. A potential deposit over a piece of land can only be exploited if there are no other land-use conflicts. Unlike metallic mineral deposits, such as tin and iron, industrial mineral deposits have low priority in land utilization.

Owing to the lack of official recognition of such industrial mineral deposits as natural resources, some of the deposits have been blanketed by other development or have been exploited for lower-value uses. For example, there are cases where land with kaolin and silica sand have been used for building. There are also examples where good potential raw material for marble and limestone with suitable chemical composition for industrial and agricultural uses, have been exploited for use as aggregates and road metal.

There is a need for official recognition of such industrial mineral deposits. In urban areas where most of the development is taking place, the demand for aggregates and other raw materials is great. However, in urban areas, the land-use conflict is also very great. If no land is set aside for such resource exploitation, the materials required will have to be obtained from elsewhere at higher cost. It is to the benefit of all, both to the extractive industry and the public that there are deposits available nearby for exploitation.

Exploitation of industrial minerals often causes adverse environmental impact. Quarrying rock from hill scars the landscape. The blasting and crushing tend to cause vibration, noise and dust pollution. The spillage of crushed stones from overloaded lorries, sometimes causes inconvenience or accidents to other road users. Excavation of sand and clay is generally in lowlying areas. The visual impact is small, being confined to the area around the pit. In dry weather the movement of vehicles in and out of the pit may churn up dust. Overloaded lorries may also cause spillage on the road during transportation.

The environmental impact is greater, if the workings are close to residential and other built-up areas. It is therefore essential for the planners and state authorities concerned to set aside certain areas where there are industrial minerals deposits for resource exploitation. There should be a safe buffer zone around such areas where development, if any, should be controlled. Perhaps if this proposal was carried out.

in the early stages of development, not all the limestone quarries in Batu Caves need be closed or the residents around the APMC limestone quarries in Rawang would not have to contend with 'flying rocks' and cracked walls on their houses?

In conclusion, there is a need for planners and State authorities concerned to zone some of the industrial mineral deposits for resource exploitation. Forward planning is essential to ensure the continued availability of raw materials for development and also to ensure that the workings have minimal impact on the environment. Regular inspection of working sites is essential to ensure that basic rules of quarrying or excavation are maintained.

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PERKEMBANGAN DALAM PENERBITAN BUKU-BUKU GEOLOGI

MOHAMAD ALI b. HAJI HASAN, Jabatan Geologi, Universiti Malaya, Kuala Lumpur

Abstract

Efforts to write and translate geology books for the needs at tertiary level have been well received amongst the academicians as well as non-academicians. A few problems are encountered in the preparation and publication of books that have been proposed to be published. The aim of this brief paper is to present the progress and performance that have been achieved in the planning of the publication of books in geology and highlight the problems involved with the 'Rancangan Penulisan/Penterjemahan Buku Teks Asas Pengajian Tinggi dalam Bahasa Malaysia', a special program which is under the supervision of the Dewan Bahasa dan Pustaka. It is hoped that more academicians and others will come forward and get involved in the area of writing basic geology textbooks.

Abstrak

Usaha untuk menulis dan menterjemahkan buku-buku geologi pengajian tinggi telah disambut baik oleh kalangan akademik dan bukan akademik. Beberapa masalah timbul dalam penyediaan dan penerbitan buku-buku yang dirancangan. Kertas ringkas ini membentangkan kemajuan dan prestasi rancangan penerbitan buku-buku dalam bidang geologi serta mengkaji masalah-masalah yang bersangkutan dengan 'Rancangan Penulisan/Penterjemahan Buku Teks Asas Pengajian Tinggi dalam Bahasa Malaysia' yang dikelolakan oleh Dewan Bahasa dan Pustaka. Diharapkan lebih ramai lagi kalangan akademik dan bukan akademik akan tampil ke hadapan untuk menceburkan diri dalam arena penulisan buku teks asas geologi.

1. Pendahuluan

Dalam usaha memperbanyakkan buku-buku Bahasa Malaysia untuk pengajian tinggi dalam bidang geologi, beberapa kakitangan akademik (terutamanya) tampil ke hadapan untuk menulis dan menterjemahkan buku-buku geologi untuk kegunaan pelajar. Buku-buku yang akan diterbitkan tentunya akan digunakan sebagai bahan-rujukan dan bacaan masyarakat umum seberapa yang boleh. Memandangkan penggunaan Bahasa Malaysia akan lebih pesat lagi di pusat-pusat pengajian tinggi terutamanya selepas 1983, tidak dapat tiada penerbitan buku-buku akan lebih diperhebatkan.

Kertas ringkas ini bertujuan untuk membentangkan kemajuan dan prestasi rancangan penerbitan buku-buku dalam bidang geologi serta mengkaji masalah-masalah yang bersangkutan dengan "Rancangan Penulisan/Penterjemahan Buku Teks Asas Pengajian Tinggi dalam Bahasa Malaysia" yang di-kelolakan oleh Dewan Bahasa dan Pustaka (DBP).

2. Rancangan Penerbitan 1981-1985 dan kemajuannya sehingga Mei 1982

Mengikut perancangan DBP, bagi tempoh 1981-1985 kira-kira 200 hingga 300 tajuk baru (buku) akan diterbitkan. Tajuk-tajuk yang sudah ada dan sedang diusahakan berjumlah 293 buah, yang mana daripada jumlah ini terdapat 163 tajuk dalam bidangan sains iaitu 70 tajuk karya asal dan 93 tajuk terjemahan. Jumlah tenaga penulis dan penterjemah yang terlibat

dalam Rancangan ini ialah lebih kurang 174 orang dalam bidang sains berbanding dengan lebih kurang 290 orang dalam bidang kemanusiaan (lihat Jadual 1).

Jadual 1 jelas menunjukkan kurangnya tenaga penulis dan penterjemah dalam bidang geologi jika dibandingkan dengan bidang-bidang sains yang lain. Perbincangan yang paling terkini penulis dengan seorang kakitangan (Pegawai Penyelidik), Cawangan Sains, Bahagian Buku Pelajaran, Dewan Bahasa dan Pustaka menunjukkan buku-buku dalam bidang geologi yang berikut sedang diusahakan.

<u>Bil.</u>	<u>Tajuk Buku</u>	<u>Karya Asal/Terjemahan</u>
1.	Principles of Geology (Gilluly, <i>et al</i>)	Terjemahan
2.	Simple Geological Structures (Platt & Challinor)	Terjemahan
3.	Reading Geological Maps (Bradshaw & Jarman)	Terjemahan
4.	Geological Maps (Brian Simpson)	Terjemahan
5.	Geomorfologi-Pengenalan kepada kajian Pandangan Barat	Karya Asal
6.	Latihan Pengenalan kepada Peta-Peta Geologi	Karya Asal
7.	Asas Mekanik Tanah	Karya Asal
8.	Groundwater Hydrology (Todd)	Terjemahan
9.	Geomorfologi (Lobeck, A.K.)*	Terjemahan

* sudah diterbitkan

Disamping senarai diatas, 3 buah buku dari Bahasa Indonesia sedang dalam peringkat penyesuaian dan penyuntingan kedalam Bahasa Malaysia. Buku-buku tersebut adalah:-

1. Geologi Minyak — dan Gasbumi, oleh R.P. Koesoemadinata, ITB, Jilid 1.
2. Geologi Minyak dan Gasbumi, oleh R.P. Koesoemadinata, ITB, Jilid 2.
3. Sekelumit Pengetahuan Mengenai Minyak di Lepas Pantai.

Dari Jadual 1 dan senarai tajuk buku diatas, dapatlah kita membuat rumusan bahawa sebelum tahun 1982, tidak ada satu buku pun dalam bidang geologi yang diterbitkan dalam Bahasa Malaysia. Senarai tajuk buku diatas juga dapat menggambarkan bahawa penglibatan pakar-pakar (ahli) geologi dalam penulisan dan penerbitan buku belum lagi memuaskan. Masih banyak lagi bidang-bidang geologi yang belum diusahakan.

3. Beberapa masalah yang dihadapi

Dalam kertas kerja Dasarnya yang dibentangkan oleh Datuk Haji Hassan Ahmad, Ketua Pengarah, DBP di Simposium Penerbitan Buku Pengajian Tinggi Dalam Bahasa Malaysia pada 28hb Oktober 1981, beliau menggariskan 5 masalah yang selalu dihadapi oleh pihak tenaga penulisan dan penerbitan buku. Ini termasuklah (1) Masalah umum, terutamanya kekurangan penulis dan penterjemah, (2) Masalah bahasa, (3) Masalah Peristilahan, (4) Masalah masa dan akhirnya masalah kelambatan memproses Penerbitan oleh DBP (Datuk Haji Hassan Ahmad, 1981). Tambahan kepada masalah-masalah yang disebutkan ialah masalah Cukai Pendapatan.

Yang dikatakan masalah umum ialah masalah yang berkaitan dengan kekurangan kumpulan tenaga penulis dan penterjemah yang berkualiti. Buat masa ini pihak DBP khususnya dan Malaysia amnya masih kekurangan tenaga yang berkebolehan dan berpengalaman untuk menulis atau/dan menterjemahkan buku pengajian tinggi dalam Bahasa Malaysia dengan sebaik-baiknya. Disamping itu, DBP masih lagi menghadapi kekurangan tenaga editor yang mahir dan berpengalaman luas bagi mengendalikan manuskrip yang diterima

Jadual 1. Jadual Projek Penerbitan Buku Pengajian Tinggi (Cawangan Sains) yang sedang diusahakan.
(Kedudukan pada 20 Oktober 1981)

Bidang	Bil. Penulis/ Penterjemah	Peringkat Kemajuan Kera		
		Penulisan/ Penterjemahan	Penulisan/ Penyuntingan	Pengeluaran/ Percetakan
Teknologi	26	22	9	-
Perubatan	21	21	8	1
Pertanian	17	8	6	1
Biologi	38	12	13	33
Kimia	28	14	5	2
Matematik	30	10	10	7
Fizik	7	3	2	1
Geologi	4	4	1	-
Pendidikan Sains	3	3	-	-
JUMLAH	174	97	54	12

(Jumlah Besar 163 judul)

(Sumber: Datuk Haji Hassan Ahmad, 1981)

yang dikarang atau diterjemahkan untuk pengajian tinggi. Dalam hal ini kita sedia maklum bahawa pihak DBP baru saja melangkah ke hadapan untuk melangkah ke hadapan untuk menerbitkan buku-buku pengajian tinggi dalam Bahasa Malaysia.

Kebanyakan manuskrip yang diterima oleh DBP mengandungi kelemahan bahasa dan ejaan. Bahasa yang digunakan oleh penulis atau penterjemah kurang memuaskan dan tidak mengikut sistem ejaan terbaru yang telah diselaraskan. Dalam satu soal selidik yang dibuat oleh pihak DBP terhadap 290 tenaga penulis dan penterjemah yang turut serta dalam Rancangan Penulisan dan Penerbitan buku-buku pengajian tinggi dalam Bahasa Malaysia terdapat 31% daripada mereka yang mengakui bahawa mereka menghadapi masalah menggunakan bahasa dengan baik dan sempurna. Manuskrip-manuskrip menghadapi masalah menggunakan bahasa dengan baik dan sempurna. Manuskrip-manuskrip yang diterima nanti sudah tentunya terpaksa diedit dengan banyaknya dan ini akan memakan masa yang lama.

Masalah Peristilahan yang selalu timbul dan yang paling sering membingungkan oleh sebab ianya seolah-olah tiada penyelesaian dan yang nampaknya berkepanjangan ialah ketidak selarasan istilah-istilah yang digunakan didalam satu-satu bidang yang sama oleh individu-individu dan institusi-institusi yang berlainan. Bagi bidang geologi misalnya telah dikemukakan di Bengkel Pendidikan Geosains (Mohamad Ali Hj. Hasan, 1982). Disamping itu terdapat juga istilah-istilah baru yang menggantikan istilah-istilah lama yang mana belum ramai yang mengetahuinya. Dan terdapat juga beberapa istilah yang masih belum ada. Dalam Projek Penyediaan dan Penerbitan istilah untuk Universiti yang dikelola oleh DBP misalnya, dari 19 bidang-bidang geosains hanya 4 yang manuskripnya telah siap sehingga April, 1982, walaupun projek tersebut dirancangan akan selesai penyediaan manuskripnya pada bulan Januari 1982 (S. Zauyah dan A.B. Rosenani, 1982). Menurut soal selidik yang dibuat oleh DBP lagi kira-kira 60% daripada peserta-peserta yang turut serta dalam Rancangan Penerbitan Buku-Buku pengajian tinggi dalam Bahasa Malaysia mengakui bahawa mereka sememangnya menghadapi masalah istilah.

Memandangkan kebanyakan tenaga penulis dan penterjemah terdiri daripada kakitangan akademik, masa yang terluang untuk menulis dan menterjemah tentunya terhad. Bagi kakitangan akademik geologi misalnya, walaupun terdapat masa yang terluang dalam cuti penggal, kebanyakan masa tersebut digunakan untuk kerjaluar/kajiluar dan penyelidikan. Pada umumnya, masa yang terluang bagi semua kakitangan akademik untuk menulis dan menterjemah buku-buku pengajian tinggi adalah terhad.

Proses penerbitan sesebuah buku selalunya melalui berbagai peringkat, iaitu peringkat perancangan; memohon hak cipta, kelulusan tajuk, penulisan atau penterjemahan, penilaian, penyuntingan, perekaan bentuk buku, proses tender dan percetakan. Inilah prosedur yang standard. Kelewatan pada mana-mana satu peringkat bermakna akan tergendala pula juga penerbitan sesebuah buku yang dirancangan itu.

Akhir sekali perlu rasanya ditekankan soal kewangan dan cukai pendapatan. Cukai Pendapatan mungkin boleh digambarkan sebagai 'momok' yang melemahkan semangat sipenulis dan sipenterjemah. Betapa tidaknya, jika pendapatan tambahan yang sangat patut diterima oleh para penterjemah dan oleh kerana penat lelah mereka itu akhirnya hanya merupakan beban didalam bentuk cukai pendapatan. Tentunya tidak akan menghairankan jika kerja-kerja menulis dan menterjemah yang bukannya mudah itu menjadi tidak begitu menarik minat!

4. Beberapa langkah serta cadangan untuk mengatasi masalah

Kekurangan tenaga penulis dan penterjemah serta kumpulan editor yang mahir tidak akan dapat diatasi dalam masa yang singkat. Kejayaan untuk mendapatkan tenaga-tenaga yang dinyatakan memerlukan perancangan dan kerjasama mereka-mereka dan institusi-institusi yang berkenaan dalam penerbitan buku-buku pengajian tinggi dalam Bahasa Malaysia. Kesanggupan lebih kurang 174 orang dalam bidang sains untuk melibatkan diri dalam penulisan/penterjemah adalah satu petanda yang baik kearah kejayaan penerbitan buku-buku pengajian tinggi dalam Bahasa Malaysia. Diharapkan lebih ramai lagi kalangan akademik dan bukan akademik akan tampil ke hadapan untuk menceburkan diri dalam arena penulisan/penterjemahan buku teks asas geologi. Satu cara untuk membantu kerja-kerja penyuntingan ialah pembentukan kumpulan Editor Luar DBP dikalangan kakitangan dipusat-pusat pengajian tinggi.

Satu ciri yang patut diingat dalam menjayakan projek penerbitan buku-buku pengajian tinggi dalam Bahasa Malaysia ialah 'jurang pengalaman bahasa' yang dialami oleh sipenulis/penterjemah dengan keadaan Bahasa Malaysia yang sekarang ini. Kini Bahasa kita sedang mengalami berbagai perubahan terutamanya dari segi ejaan dan pengolahan istilah-istilah baru. Perubahan-perubahan ini ialah diantara ciri-ciri penting mana-mana bahasa sekali pun yang sedang berada disatu 'epoch' baru didalam sejarah perkembangannya. Bahasa Malaysia sedang berdiri dipersimpangan jalan menuju masa depan yang penuh cabaran. Tumbesaran dan karakternya dipengaruhi oleh pengguna-pengguna dan ilmu-ilmu yang berbagai rupa dan bentuk. Tidak dapat tiada perbezaan didalam penggunaan bahasa yang terdapat tentunya agak besar juga. Adanya dua buah buku Daftar Ejaan oleh DBP (1981) dan Awang Sariyan (1981) misalnya membayangkan bahawa kesilapan ejaan dan kelemahan bahasa agak berleluasa. Penerbitan buku-buku daftar kata seperti ini saya kira merupakan jalan pendek kearah penyelesaian kelemahan bahasa dan ejaan setiap penulis/penterjemah. Apa yang patut juga dilakukan ialah mengadakan beberapa ceramah/kursus pendek mengenai penulisan dan penterjemahan. Ceramah/kursus pendek ini patutlah lebih kerap diadakan (jika boleh). Ceramah-ceramah pendek seperti penyalahan bahasa, kelemahan penterjemahan, pencemaran bahasa, kesalahan umum penggunaan Bahasa Malaysia patut diadakan kepada bakal-bakal penulis dan penterjemah. Pihak Pusat Bahasa, Universiti Malaya misalnya, patut membuka peluang lebih ramai lagi mengambil kursus/Diploma Penterjemahan sepenuh masa atau cara sambilan. Kursus Intensif Penterjemahan patut diadakan lebih kerap lagi. Kursus 6 minggu misalnya boleh diadakan didalam 2 peringkat misalnya 3 minggu pada cuti penggal pertama dan tiga minggu lagi pada cuti penggal kedua kepada bakal-bakal penulis/penterjemah (khususnya mereka-mereka yang telah mendapat kelulusan tajuk dari Dewan Bahasa dan Pustaka). Untuk memperbaiki lagi mutu Bahasa Malaysia, bakal-bakal penulis/penterjemah eloklah memperbanyakkan bacaan dalam Bahasa Malaysia yang bermutu.

Masalah peristilahan geologi masih dan tetap ada. Beberapa cadangan telah dikemukakan kearah keseragaman istilah geologi. Antaranya ialah (i) mengadakan 'glossary': Bahasa Malaysia - Bahasa Inggeris, dan sebaliknya sebagai Lampiran pada buku yang akan diterbitkan, (ii) membentuk satu badan penyelarasan antara universiti, seperti yang telah ada sekarang bagi Fizik dan Matematik, (iii) membentuk JKI - JKIBM ISTILAH GEOLOGI serta menerbitkan ISTILAH GEOLOGI dll (Mohamad Ali Hj. Hasan, 1982b).

Satu pertimbangan yang sewajarnya patut diberikan kepada kakitangan

(akademik) yang benar-benar berminat dalam alam penulisan/penterjemahan buku-buku teks asas. Pengurangan beban pengajaran sebagai memberi masa untuk menulis dan menterjemah adalah salah satu cara yang boleh dilakukan. Dengan memberikan masa yang secukupnya, kepastian untuk menghasilkan karya yang baik dan bermutu baharulah boleh diharapkan. Satu cara lain ialah membenarkan Cuti-Cuti Sabatikal digunakan untuk menulis dan menterjemah buku.

Bagi mengatasi masalah Cukai Pendapatan, pihak DBP sepatutnya memaklumkan kepada Tuan Ketua Pengarah, Hasil Dalam Negeri Malaysia mengenai hak penulis/penterjemah mendapat pelepasan Cukai Pendapatan sebanyak tiga ribu (\$3,000) ringgit sahaja sebagai Perkhidmatan Pakar dan Khas seperti yang tercatat didalam 'Laws of Malaysia, Act 53, Income Tax 1967, m.s. 247, para 32'.

Selain daripada itu, penulis/penterjemah patutlah dibekalkan atau terlebih dahulu mempunyai bahan rujukan yang cukup seperti buku-buku edisi terkini yang berkaitan dengan penulisan/terjemahan, daftar/buku istilah; pedoman-pedoman pembentukan istilah dan ejaan rumi, kamus, dll.

Usaha secara berkelompok atau mengusahakan baba demi baba penulisan/penterjemahan buku patut juga digalakkan dan diberi bentuk pembalasan yang sewajarnya. Pelajar-pelajar yang sedang menunggu keputusan tahun akhirnya boleh juga digesa untuk sama-sama turut menyertai penulisan/penterjemahan buku dibawah penyeliaan kakitangan yang mahir dan berpengalaman.

5. Kesimpulan

Sesungguhnya perkembangan memperbanyakkan buku-buku geologi pengajaran tinggi dalam Bahasa Malaysia agak lambat. Kejayaan menerbitkan buku-buku yang dirancang bergantung kepada inisiatif seseorang penulis/penterjemah disamping persekitaran yang memberangsangkan.

Penghargaan

Terima kasih kepada Puan Azizan Baharuddin kerana sudi membaca dan memberi pandangan kepada draft kertas ini, dan juga Puan Zaimah A. Saleh diatas kerja-kerja menaip. Tidak ketinggalan, penghargaan juga ditujukan kepada Puan Rashidan Abdullah kerana sudi meluangkan masa dan berbincang mengenai tajuk kertas ini.

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RAHMAN HYDRAULIC TIN BERHAD

A YELLOW TIN-SPAR FROM IRELAND

K.F.G. HOSKING, IB Penlu, Tuckingmill, Cornwall TR14 8NL, England

As I am concerned with the search for and exploitation of mineral deposits, particularly tin deposits, the identification of mineral species in which tin is an essential component is of considerable interest and importance to me.

Now and in the past, tin species have been mistaken for non-tin species, and minerals which are not tin-bearing have been thought to be tin minerals. Doubtless before malayaite ($\text{CaO} \cdot \text{SnO}_2 \cdot \text{SiO}_2$) had been described and its properties had been established, it was, perhaps frequently, identified as powellite (CaMoO_4) which also occurs in skarns and displays a yellow fluorescence similar to that of malayaite, under short-wave ultraviolet light. Varlamoffite (essentially stannic oxide) is still identified, on occasion, in the field, as limonite, because of the similar appearance of the two substances. A panned concentrate of fine zircon crystals can quite closely resemble a concentrate of small cassiterite grains. Because the Chinese miner is aware of this he long ago hit upon a simple test of differentiating between the two. This simple consists of heating the concentrate in a shallow metal dish over the flame of a paraffin or similar lamp when the zircon, unlike the cassiterite becomes colourless and transparent. This leads me to the reason for writing this note and that is that recently I came upon a brief account of a mineral which, beyond any doubt, was erroneously believed to be a tin species. The account occurs on page 307 of 'Museum Regalis Societatis' or a Catalogue and Description of the natural and artificial Rarities belonging to the Royal Society and preserved at Gresham College. Made by Nehemiah Grew, London. Printed by W. Rawlins, for the author, 1681. The account (or entry) reads "A yellow tin-spar from Ireland. Given by Sir. Rob. Moray. The several crystals are angular, pointed and soft; semiperspicuous like brown Sugar-Candy. Dissoluble with acids."

The species in question is surely a carbonate, possibly siderite. No tin-bearing carbonate minerals are known. I wonder what persuaded the collector that his Irish specimen was tin-bearing? Perhaps it was the fact that its colour was not unlike that of some cassiterite.

Manuscript received 23 February 1982

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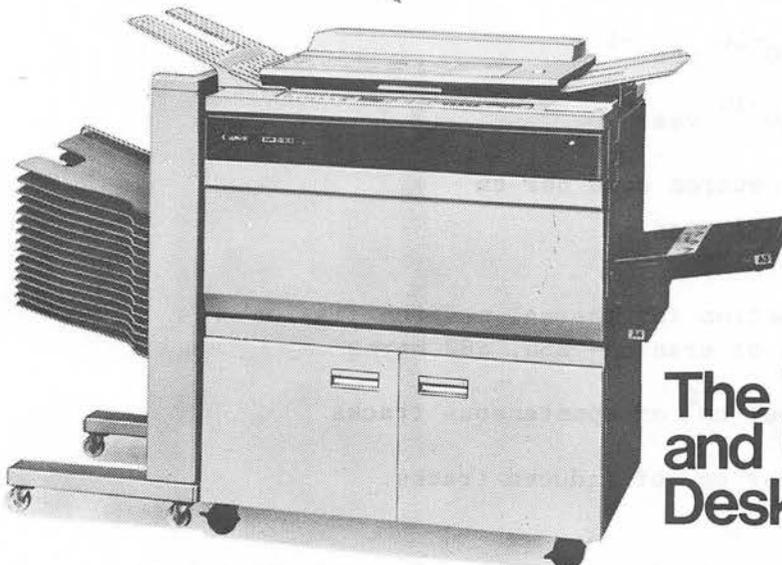
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PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

TECHNICAL TALKS

D.S. MILLER: Applications of the fission track age method: with examples from the Ries Meteorite Impact Crater (Germany), Bergell Mountains (Switzerland), Adirondack Mountains and Catskill Mountains (New York)

On 13th July 1982, Dr. Donald S. Miller, of the Department of Geology, Rensselaer Polytechnic Institute, Troy, New York, gave the above Technical Talk to an audience of about 25 members at the Dept. of Geology, University of Malaya. The Society is grateful to the Ketua Pengarah Penyiasatan Kajibumi and Mr. Yap Fook Loi for making it possible for Dr. Miller to present the talk.

What follows is a summary of the talk specially prepared by the author for the benefit of GSM members.

The fission track age method depends upon the spontaneous decay of uranium-238 into two fission products of approximately equal mass (~90 and ~140 amu) at a rate of 8.46×10^{-17} years⁻¹ (Fleischer, *et al.* 1975). Similar to all age methods based upon radioactive decay two measurements are required: the number of "parent" atoms, i.e. uranium-238 and the number of "daughter" atoms, i.e. the number of fission decays. The number of fission decays is determined by measuring in the mineral under investigation, the damaged regions which are caused by the fission process. These damaged regions are called "fission tracks". The age equation is as follows:

$$t = \frac{1}{\lambda_T} \ln \left\{ 1 + \frac{\rho_S \phi}{\rho_I} \frac{\lambda_T}{\lambda_F} \left(\frac{1}{I} \right) (\sigma) \right\} \quad \text{years}$$

where

$$\lambda_T = 1.55 \times 10^{-10} \text{ year}^{-1}$$

$$\lambda_F = 8.46 \times 10^{-10} \text{ year}^{-1}$$

$$\phi = \text{thermal neutron dose per cm}^2$$

$$I = 137.88, \quad {}^{238}\text{U}/{}^{235}\text{U}$$

$$\sigma = \text{cross-section for thermal neutron fission reaction of uranium-235, 582 barns}$$

$$\rho_S = \text{tracks per cm}^2 \text{ of spontaneous tracks}$$

$$\rho_I = \text{tracks per cm}^2 \text{ of induced tracks.}$$

The uranium concentration is determined on the same mineral or identical mineral aliquot as used for determining the spontaneous track density by use of the induced fission of uranium-235.

Applications

Although there are many applications of the method in the literature, only three will be discussed here: impact age and thermal history of the Ries Meteorite Crater, Germany, the uplift rate of the Adirondack Mountains, N.Y. and the depth of burial of Devonian Sediments, Catskill Mountains, N.Y. The study of the Bergell Mountains is reported by Wagner, *et al.*, (1979).

Ries Meteorite Impact Crater

A fission track study on the Ries Meteorite Impact Crater has allowed the determination of the age of impact and an estimate of the temperature profile shortly after the impact event.

A thermal event reduces the number of previously registered fission tracks in a mineral dependent upon the track retention properties of the individual mineral. Apatite, sphene and zircon have retention properties over a wide range of temperatures (from 100°C to 550°C); apatite data reveal information at lowest temperatures while sphene and zircon data are useful for higher temperatures. Thermal events within this temperature range are suitable for study with this technique. The age of the event is determined from samples in which the fission tracks are completely erased, while minerals containing partially removed (erased) tracks provide information on the temperatures occurring during the thermal event.

Minerals which suffer complete loss of fission tracks at the time of the thermal event reveal the age of the event which, in the case of the Ries impact event, is 14.7 m.y. At the same time this complete loss of tracks provides the capability of estimating minimum temperatures for the event, thus a temperature of greater than 520°C is estimated for the fallout suevite of the Ries Crater.

If the thermal event causes no reduction of fossil track density, an analysis of the data reveals the original age of the pre-existing crystalline basement and provides an estimate of the maximum equilibrium temperatures produced by the event. A 300 m.y. age is obtained for the crystalline basement underlying the Ries crater while an upper limit of 255°C is found for the crater floor (Miller & Wagner, 1979).

Partial reduction of fossil track densities due to the thermal event allows an analysis which reveals temperature estimates for each rock unit. Temperature estimates for some Ries crater rocks include 445°C to 620°C for the fallback suevite; 195°C to approximately 300°C for the crystalline breccia injected with suevite; and 200°C to 255°C for the crater floor rocks (Fig. 1).

Adirondack Mountains, N.Y.

A suite of apatites from the Adirondack Anorthosite massif have been analyzed by the fission track method to determine an uplift rate (Miller & Lakatos, in preparation). The samples were collected from an elevation of -184 to 1380 meters with respect to mean sea level. The samples were made available through the New York State Museum and Science Service by Dr. Y.W. Isachsen.

Ages from 86 to 147 million years were obtained on apatites concentrated from 500 grams of each rock. A plot of elevation versus age gives the uplift rate as the slope. A value of 0.025 mm/yr is excellent documentation of estimates based upon mineral equilibria at high pressures.

This value is in sharp contrast to the rapid uplift rate measured in the Swiss Alps of approximately 1 mm/yr (Wagner, *et al.*, 1979).

Burial Depth of Upper Devonian Sediment, Catskill Mountains, N.Y.

A widely accepted assumption among geologists has been that the Devonian sediments in the Catskill Mountains underwent only shallow burial, i.e. on the order of 1 kilometer (Zen, 1981). Recently, in order to explain the occurrence of anthracite in some of these sediments, it was proposed that they were buried to depths of about 6.5 kilometers (Friedman & Sanders, 1982).

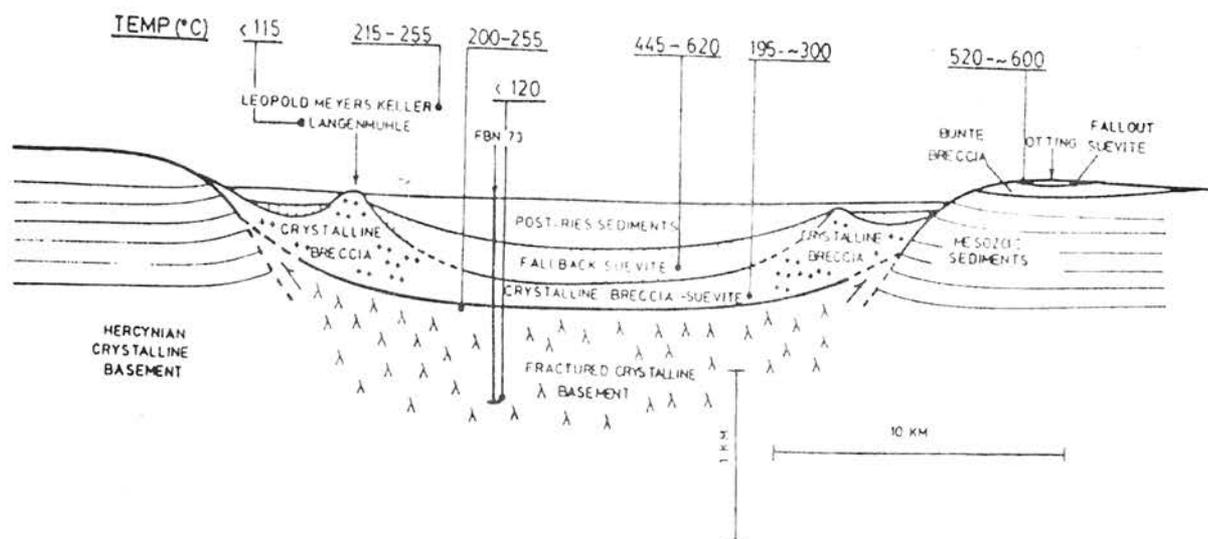


Fig. 1. Schematic cross section of Ries Crater including initial equilibrium temperatures caused by impact.

Fission track analysis is especially suited to test the above assumptions because the stability of fission tracks in a mineral is dependent upon the temperature conditions throughout the mineral's existence. Two minerals, apatite and zircon, have been used extensively by researchers to delineate the thermal history of rocks (Gleadow and Lovering, 1978; Gleadow & Duddy, 1981; Miller and Wagner, 1979; Naeser, 1979). In the present study (Lakatos & Miller, in press), an attempt was made to determine temperature histories from fission track ages obtained on apatite and zircon from the Upper Devonian layer in the Catskill Mountains and, in turn, to infer depth of burial for these minerals.

Five apatite grains analyzed gave an average age of 125 ± 4 m.y. while an age of 320 ± 13 m.y. was obtained from three zircon grains which were suitable for analysis.

A fission track age of 125 m.y. for an Upper Devonian sediment requires a geothermal history which is suitable to erase the fossil tracks in apatite during 225 m.y. or less. A temperature of $120 \pm 20^\circ\text{C}$ for 225 m.y. would suffice to completely erase the fossil tracks. Using the temperature of 120°C , assuming an average surface temperature

of 20°C and using a geothermal gradient of 25°C/km, a depth of 4 km is obtained.

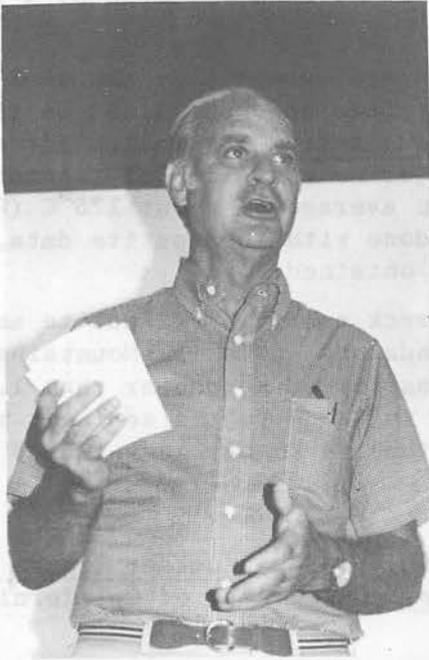
The zircon age of 320 + 13 m.y., an age essentially the same as the sedimentation age, makes it possible to place an upper limit on the temperature to which these grains were subjected. Estimates for maximum permissible temperatures causing little or no annealing of fission tracks in zircon during 200 m.y. give an average of about 175°C (Parrish, 1982). Using a similar calculation as done with the apatite data, a burial depth of no greater than 6 km is obtained.

Consequently, based upon fission track analysis of apatite and zircon grains from an Upper Devonian Sandstone, Catskill Mountains, N.Y., it is concluded that (1) the sediment was buried no deeper than 1.5 km during the last 125 m.y. and (2) prior to 125 m.y. the sediment was buried to a depth equal to, or greater than, 4 km but less than 6 km.

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GSM TECHNICAL TALKS Jul-Aug 1982



B.W. NELSON



D. S. MILLER



GSMpix-G.H. TEH



G. H. MOH

G.H. MOH: Complex tungsten deposits (geology, mineralogy, geochemistry and genesis)

On the 14th July 1982, Prof. Dr. G.H. Moh, of the Mineralogical-Petrographic Institute, University of Heidelberg, West Germany, gave the talk entitled "Complex tungsten deposits (geology, mineralogy, geochemistry and genesis)" to a crowd of about 65 members gathered at the Conference Hall, Geological Survey Laboratories, Tiger Lane, Ipoh. Despite the vehicle breaking down at Bidor, repairs were completed in record time for Prof. Moh to arrive just 5 minutes past the time scheduled for his talk.

As a classic example of a complex tungsten deposit, Prof. Moh chose the Shizhuyuan Mine of the Dangpo ore field, Shizhu, Hunan Province, China. The deposit is classified as the tin-tungsten-molybdenum-bismuth type. Mineralization is found to be associated with Middle and Upper Devonian rocks, consisting essentially of limestones and minor sandstone and shale, which have been affected by two Mesozoic granites - an early and middle stage granite of similar texture and geochemistry and a late stage granite porphyry with feldspar phenocrysts in a fine-grained matrix. Normally W-Mo-Bi mineralization is found to occur between the first and second generation granites, Sn-Bi associated with the second generation granite whereas most of the sulphides and tin are related to the granite porphyry. W-Sn-Mo-Bi skarns occur near the granite contacts in association with greisens, while further away in the limestones, metasomatic Pb-Zn ore veins develop. To add to the complexity of the deposit, all ore types show transitions to each other coupled with several stages of metamorphism and mineralisation which have resulted in the total number of identified minerals already exceeding one hundred. They include various sulphides, sulphosalts, oxides, phosphates, sulphates, carbonates and a large number of silicates. The common silicates include diopside, vesuvianite, tremolite, garnet, wollastonite, sillimanite, andalusite and cordierite.

Tungsten in the complex skarn deposit is found as scheelite associated with calcite and molybdenite in greisens and as wolframite associated with molybdenite and bismuthinite in metamorphic areas. Nb and Ta contents in wolframite are variable depending on whether they originated from the granites, skarns or the marbles.

Tin generally occurs as cassiterite and stannite in marble in small veins with lepidolite, tourmaline, pyrrhotite and pyrite, in fine veins throughout the greisens, in skarns with replacement textures associated with sulphides with fairly high pyrite and pyrrhotite contents and with copper-bearing lead-zinc ores. Tin has yet to be extracted from the ores. So far liberation and separation has failed because the cassiterite, mostly associated with stannite, appears to be too extensively intergrown throughout the deposit and extremely fine-grained.

A lively discussion ensued after the talk and Prof. Moh ably answered various questions put forward by the enthusiastic audience. Mr. F. Chand of the Geological Survey Malaysia proposed a vote of thanks on behalf of the Society for Prof. Moh's interesting talk. The excellent organisation by GSM's Ipoh representative, Mr. P.C. Aw, and the good turnout augers well for holding more talks in Ipoh in future, so that GSM members in that region can also benefit from GSM's Technical Talks.

G.H. Teh

B.W. NELSON: Environmental Significance of Clay Minerals

On August 13th the GSM sponsored a talk entitled "Environmental Significance of Clay Minerals" by Professor Bruce W. Nelson, at the Geology Department, University of Malaya. It was well attended by about 65 members. Prof. Nelson is attached to the Department of Geology, University of Malaya for 1982-83 as a visiting Fulbright lecturer sponsored by the Malaysian-American Commission on Educational Exchange (MACEE). His home base is the Department of Environmental Sciences, University of Virginia, USA.

In his talk Professor Nelson discussed the implications of clay mineralogy in weathering and sedimentation and described the role clay minerals play in determining the geotechnical properties of foundation materials. He also discussed clay minerals as indicators of environmental pollution and environments of deposition.

Clay minerals are silicate minerals belonging to one of three major types: the kaolins, the illites, and the smectites (or montmorillonites). Each has its own structure consisting of charged silicate layers, and each has a characteristic range of properties, such as surface area, hydration, ion exchange capacity, etc., which is determined by the layer structure and the magnitude of its charge.

Montmorillonites, for example, have the ability to adsorb large amounts of water under conditions of high humidity, compared to illite and to kaolinite. This affects the geotechnical properties. The plastic limits, the liquid limits, and the activity of foundation materials that contain montmorillonite are much greater than those of illitic or kaolinitic materials. Foundation problems in montmorillonitic soils are much more severe, because they have lower stability and are subject to greater expansion and contraction than other types of soil. Thus it is important to study the clay mineral composition in conjunction with the geotechnical properties of soils whenever they may be a factor in construction activity.

The ion exchange capacity of clay materials is also affected by their clay mineral composition, being greatest for montmorillonitic, less for illitic, and least for kaolinitic materials. The property of ion exchange makes clays sensitive to their external environment. For example, the cations dissolved in the water surrounding a clay particle are, in part, adsorbed by the charged clay mineral surface layer. Whenever the composition of the water changes, the number and kind of adsorbed ion is adjusted. A clay in fresh water may carry adsorbed calcium ions, whereas if it is exposed to sea water where the most abundant ions are sodium and magnesium these latter ions will replace the calcium adsorbed on the clay surface. It has also been shown that whenever a clayey sediment passes through a zone of pollution, trace elements that reflect the type and degree of pollution become attached to the clay and remain with it until the clay is deposited. In this manner, the chemical constituents associated with the clay complex in sediments may be used to indicate the types of environmental conditions to which the clay has been exposed.

Clay minerals are formed by the alteration of primary minerals, such as feldspars and pyroxenes. Typically such alteration takes place in weathering horizons and soil profiles on the land, although it may occur elsewhere. The progress of alteration and the final clay mineral products are influenced by the details of the chemical environment in the weathering zone. Recent advances in aqueous geochemistry have helped us to understand the chemical nature of the weathering environment and the processes that result.

In tropical soils the most common end product of weathering is kaolinite. This is a result of the low dissolved silica and low potassium compared to hydrogen in the water percolating through the soil. The primary minerals become unstable in the presence of such dilute solutions and change to secondary clay minerals. In some rocks, particularly mafic, the initial weathering products may be montmorillonite or illite, but eventually they too transform to kaolinite.

The lateritic weathering profiles developed over schist, granite, and volcanic rocks of dacite and andesite composition in Southeastern Johore illustrate the sensitivity of clay minerals to chemical conditions of weathering. The weathering profiles in this area have been studied by recent B.Sc. students in Geology at the University of Malaya (see particularly Yeow, 1971). They have shown that kaolinite is the weathering product whenever as little as ten percent quartz occurs in the weathering profile. On the other hand, when quartz virtually disappears from the profile, gibbsite develops. The occurrence of kaolinite and gibbsite correspond to equilibrium relations in the relevant chemical system. Kaolinite persists in the presence of dissolved silica associated with quartz, while gibbsite develops only when the silica level is much less. An understanding of this relationship is important to economic geologists, because ore grade laterites, i.e., bauxites, depend on the presence of abundant gibbsite.

A final illustration of the environmental significance of clay minerals may be found in the recent sedimentary environments of the coastal plain of Malaysia. The soils and sediments of this region have been studied by the Soil Survey (Division of Agriculture) and a Ph.D. candidate at the University of Malaya (R.R. Allbrook, 1974). The coastal plain of northwest Kedah and Perlis, as much of the western coastal plain of Malaysia, consists of recent marine alluvium, mature marine alluvium, freshwater swamp deposits, river alluvium, and colluvial deposits. These all lie west of the hilly, granitic hinterland which is blanketed by deeply weathered soils. Each type of deposit has a characteristic suite of clay minerals that allows it to be distinguished and assists in its environmental interpretation.

The colluvial soils, the river alluvium, and the freshwater swamp deposits are all very rich in kaolinite. This is most pronounced for the river alluvium which is derived directly from the kaolinitic soils of the hinterland. By contrast, the recent marine deposits are rich in montmorillonite. The more mature marine alluvium contain montmorillonite and kaolinite. It is reasonable to think that kaolinite has developed from montmorillonite in the mature marine alluvium as a consequence of its exposure to weathering conditions. Montmorillonite is typical of marine sediments in many parts of the world, so its occurrence is consistent with the interpretation of these deposits. But if these sediments are marine, where have they come from? What is their provenance? Kaolinite, rather than montmorillonite, develops in the granitic hinterland from which the river alluvium has been derived. The source of the abundant montmorillonite in marine alluvium of the Malaysian coastal plain is, therefore, an intriguing geological puzzle. Additional detailed study of the mineralogy and stratigraphy of the Quaternary section needs to be made to solve this puzzle.

This review of environmental aspects of clay minerals suggests that more studies of the clay materials of Malaysia are needed. They should provide valuable insights to the processes of weathering and soil formation, to the geological interpretation of the Quaternary section, to an understanding of the appropriate use of construction materials, and to an understanding of man's impact on the environment in this region.

BERITA PERSATUAN
(NEWS OF THE SOCIETY)

TRAINING COURSE AND SYMPOSIUM ON ROCK AS CONSTRUCTION MATERIALS

Training Course:

Venue: Dept. of Geology, University of Malaya, Kuala Lumpur

Date: 26 November - 6 December 1982

Symposium:

Venue: Federal Hotel, Jalan Bukit Bintang, Kuala Lumpur

Date: 30 November - 1 December 1982.

Sponsors:

- 1) Geological Society of Malaysia
- 2) Association of Geoscientists for International Development (AGID)
- 3) Australian Development Assistance Bureau (ADAB)
- 4) University of Malaya.

The training course and symposium are open to all geologists, engineers and others who are interested in rocks as construction materials. The number of course participants is limited to a maximum of 40 to ensure close contact and exchange among the participants and the lecturers. Limited fundings are available to support a few deserving course participants from Malaysia and other Southeast Asian countries.

The ROCKCON TRAINING COURSE is now scheduled for 26th November - 6th December 1982, and will be held at the Department of Geology, University of Malaya, Kuala Lumpur.

The topics to be covered in the training course include the following:

- i) Classification, engineering use and requirements of construction materials
- ii) Material testing
- iii) Material processing
- iv) Location and selection of material sources
- v) Material excavation, including blasting
- vi) Pavements, asphalt, cement and concrete.

Laboratory sessions and site visits are also planned for the course participants.

The course lectures consist of invited speakers from overseas and others from the local universities, government departments and industrial sectors. The invited speakers are: Dr. Prinya Nutalaya (Asian Institute of Technology), Mr. P.J. Clutterbuck (Main Roads Department), Mr. Stig Olofsson (Tenaga Kimia/Nitro Nobel).

The fee for the Course is \$600 (Malaysian) or US\$275. The fee includes course materials, snacks and refreshments, lunch, registration fee for the specialist symposium, and local transport for field visits.

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Anyone interested in participating in the training course should write to the address below before 10th November 1982:

The Organising Secretary
ROCKCON
Geological Society of Malaysia
c/o Department of Geology
University of Malaya
Kuala Lumpur 22-11, Malaysia.

ROCKCON SYMPOSIUM: In conjunction with the training course, a two-day symposium and exhibition will be held on the 30th November and 1st December 1982 at the Federal Hotel, Kuala Lumpur on matters related to the same theme. Papers to be presented at the Symposium include the following:

- i) Engineering properties of Malaysian rocks
- ii) Weathering and rock strength
- iii) Dimension stone industries of Peninsular Malaysia
- iv) Emulsion explosives in rock excavation
- v) Batu Caves Quarries closure and alternative rock sources for the Federal Territory, Malaysia
- vi) Weathering profiles over granite bedrock-morphological zones, seismic velocities and excavability
- vii) Material survey for the Kemasin-Semerak Project, Kelantan
- viii) A role of geological survey and estimation of construction materials
- ix) Construction materials exploitation and their relation with geological environments
- x) Conservation and management of construction materials
- xi) and others.

The registration fees for the two-day Symposium are as follows:

	<u>Early Registration</u> (before 15 Nov 1982)	<u>Late Registration</u> (after 15 Nov 1982)
Members	\$20 (US\$10.00)	\$30 (US\$15)
Student Members	Free	\$ 5
Non-Members	\$40 (US\$20.00)	\$60 (US\$30)

Lunch coupons are available at registration desk for those interested in having lunch together with other participants in Federal Hotel.

All those interested in participating in the Symposium are requested to send the registration to the Organizing Secretary, ROCKCON as soon as possible.

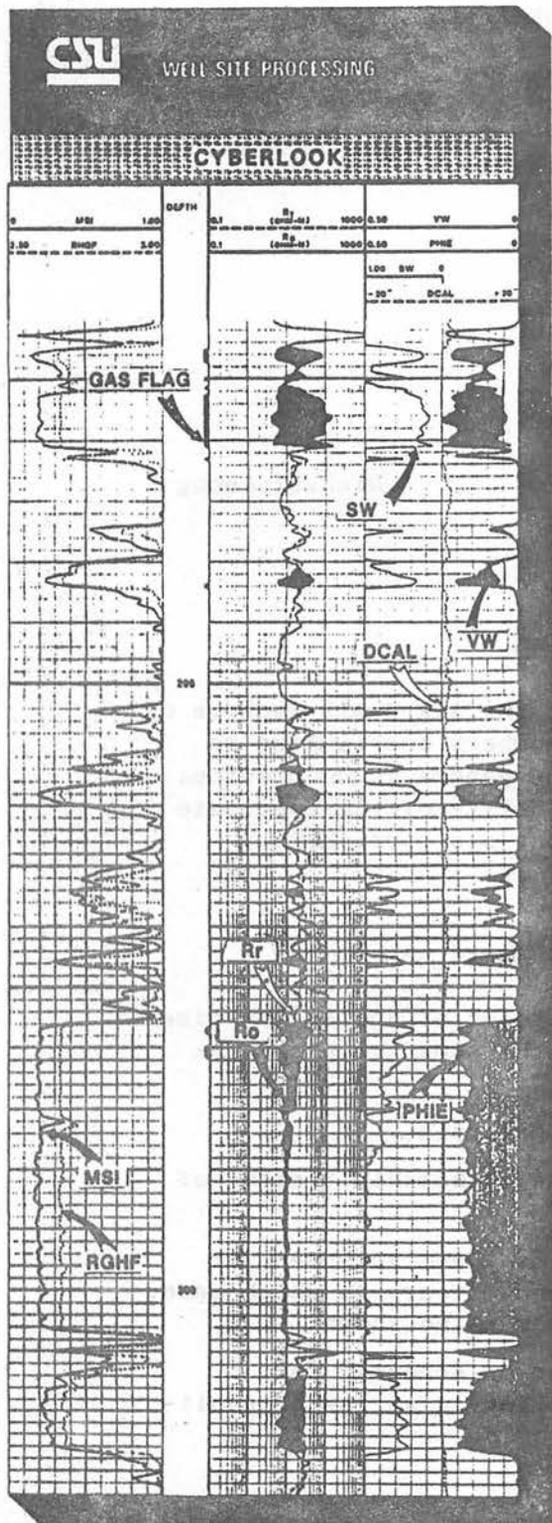
GSM PETROLEUM GEOLOGY SEMINAR '82 - PAPERS SO FAR

The organization of the above Seminar is well in its advanced stages. The donations received so far is gratifying and we are happy to announce the papers approved so far for the Seminar (Dec. 6 & 7, 1982).

ROBERTSON RESEARCH (S) PTE. LTD.

1. Micritization by Stephen James
2. Proposed calcareous nannofossil zonation scheme for the Neogene of Southeast Asia by Ofman Barol.

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PETRONAS CARIGALI SDN. BHD.

3. Limestone occurrence in the Sotong Field by Koh Tuck Wai

UNIVERSITY OF MALAYA - DEPT. OF GEOLOGY

4. Collision event in the evolution of Sabah by C.S. Hutchison

CARIGALI-BP SDN. BHD.

5. The geology of the Neogene Carbonate Buildups, Offshore N.W. Sabah, Malaysia by Mohd. Hatta

ESSO PRODUCTION MALAYSIA INC.

6. Case history of the Tembungo Field, Offshore Sabah
7. Exploration of the Semangkok Structure, Offshore Peninsular
8. Delineation and evaluation of the Semangkok Field, Offshore Peninsular Malaysia

UNIVERSITI SAINS MALAYSIA

9. Seismic survey in Bangladesh for Hydrocarbon.

For further information contact:

Michael Leong
 Organizing Chairman
 Petroleum Geology Seminar '82
 Geological Society of Malaysia
 c/o Dept. of Geology
 University of Malaya
 Kuala Lumpur 22-11, Malaysia.

Michael Leong

GSM YOUNG GEOSCIENTIST PUBLICATION AWARD

According to the Rules and Regulations of the Award all members of the Society who are not student or Associate members are invited to nominate young geoscientists who have published papers in the previous calendar year (1981) for the Award. The eligibility of the candidate and the procedure from the Rules and Regulations are given below.

Eligibility

5. (1) No person shall be considered for the Award unless he satisfied the Board:
 - (a) that he is not more than thirty years of age at the time of publication of the paper or the time the paper was accepted for publication;
 - (b) that he is normally resident in Malaysia;
 - (c) that he belongs to any one of the membership classes of the Society;
 - (d) that the paper was published or had been accepted for publication in the previous calendar year, in which case written proof from the publisher must be shown;
 - (e) that the paper has been published or accepted for publication in any one of the Society's series of publications or in international journals.

Procedure

8. (1) Nominations for an award must be made by a member who is not a Student or Associate Member
- (2) An author cannot nominate himself for the award
- (3) The written consent of the author is required
9. (1) The award, in the opinion of the Board, shall be made to the author of the best paper in geology about Malaysia or the region and/or should be of general interest to the local community of geoscientists.
- (2) Papers with joint authorship may be considered, if a statement as to the relative responsibility of the authors, signed by all the authors, is attached.
- (3) In the case of joint authorships, the Board may make the award to one author, or to two or more authors, provided these qualify under subsection 5.(1).

Further information on the Rules and Regulations can be obtained from the Chairman, Award Nominations Board.

Members wishing to nominate are requested to fill up the prescribed forms and return to the Chairman, Award Nominations Board, Persatuan Geologi Malaysia, d/a Jabatan Geologi, Universiti Malaya, Kuala Lumpur before 1st November 1982.

Tan Boon Kong

GSM GEOLOGICAL FIELD GUIDES

The constant inquiries and demand for the Society's other field guides available since Field Guide No. 1 by C.S. Hutchison, have prompted the Council to try and come out with more such guides to inform members and those interested in places of geological interest in the country. This project is also aimed at getting suitable field guides ready in time for the GSM-sponsored GEOSEA V in early 1984.

To initiate this project, the Council has decided on a number of areas and nominated various authors who are familiar with the areas concerned to help in producing the field guides. The list includes:-

<u>Area</u>	<u>Author (or Authors)</u>
1. Kinta Valley	Aw Peck Chin
2. Kuala Lumpur Area	Yeap Ee Beng
3. Langkawi & adjacent areas	B.K. Tan & T.T. Khoo
4. Sarawak	Denis Tan
5. Sabah	Lim Peng Siong

If there are other authors or guides to be added to the above list we would be happy if you could write to the Editor GSM.

G.H. Teh

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- WARTA GEOLOGI, Vol. 9, No. 4 (Jul-Aug 1983)
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University of Malaya
Kuala Lumpur 22-11, Malaysia

KEAHLIAN (MEMBERSHIP)

The following have joined the Society:

Full Membership

1. Anizan Isahak, Geology Dept., Universiti Kebangsaan Malaysia, Bangi, Selangor
2. B. Gopinathan, Soil Science Branch, MARDI, Serdang, Selangor
3. Victor Hon, Geological Survey Malaysia, Kuching, Sarawak.

Student Membership

1. Abdul Halim Abdul Samad, Dept. of Geology, Universiti Malaya, K.L.
2. Abdul Halim Mohammad, - ditto -
3. Jamala Bojei, - ditto -
4. Kamarudin Salim, - ditto -
5. Mohammad Azmi Zain, - ditto -
6. Robert Toba Siahaan, - ditto -
7. Zulkefli Abdullah, - ditto -
8. Mohamad Anuar Mohamad Yusof, Universiti Kebangsaan Malaysia, Bangi
9. Lau Ban Keng, Universiti Sains Malaysia, Penang
10. Ida Suzaini, Dept. of Geology, Universiti Malaya, K.L.
11. Sazali Sulaiman, - ditto -
12. Harmizi Mohd. Hashim, - ditto -
13. Lili Sulastri Zainal Abidin, - ditto -
14. Ahmad Zainuddin Yusoff, - ditto -

KEAHLIAN PROFESIONAL (PROFESSIONAL MEMBERSHIP)

Dr. Ibrahim bin Komoo and Mr. Liew Yoke Choy have been elected as Professional Members.

PERTUKARAN ALAMAT (CHANGE OF ADDRESS)

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

1. Richard W. Murphy, 8 Ashley Drive, Walton-On-Thames, Surrey KT12 1JL, England
2. Yukifusa Nakashima, Kiso-Jiban Consultants (M) Sdn. Bhd., 115, Jalan Mega Mendung, Kompleks Bandar, Batu 5, Jalan Kelang, Kuala Lumpur
3. D.A.C. Manning, 33, Cedar Road, Hale, Altrincham, Cheshire WA15 9JB, England
4. J.H. Leow, Geomat, Unit 06-45, 6th Floor, Tanglin Shopping Centre, 19 Tanglin Road, Singapore 1024
5. Husein Aman, PEG/14, Sarawak Shell Bhd., Lutong, Sarawak
6. G.J.J. Aleva, Billiton International Metals B.V., Dr. van Zeelandstraat 1, P.O. Box 436, 2260 AK Leidschendam, The Netherlands
7. R.A. Harrison, Exploration Manager, Jackson Exploration Inc., 9-B, Podium Block, Goldhill Plaza, Thomson Road, Singapore 1130.
8. Mustapha Kamal Shahrom, Berjantai Tin Dredging Bhd., P.O. Box 208, Batang Berjantai, Selangor.

PERTAMBAHAN BARU PERPUSTAKAAN (NEW LIBRARY ADDITIONS)

The following publications were added to the Library:

1. Cretaceous-Quaternary Ostracode fauna from Jiangsu by Hou You-tang and others
2. Cretaceous and Cenozoic charophytes from Jiangsu by Wang Shui, and others
3. Grondboor & Hamer, no. 6 (1981), & nos. 1-4 (1982)
4. AAPG Explorer, Aug. 1982
5. National Library Singapore, adult reference collections, accessions list, July 1982
6. The University of Kansas, Paleontological contributions, Monograph 1, 1982
7. Bulletin, Institute of Mineral Engineers, no. 8, 1982
8. Permian foraminifera of the Sydney Basin by Viera Scheibrurova, 1982
9. IMM Bulletin no. 910, 1982
10. Geosciences, vol. 5, no. 1, 1982.

BERITA - BERITA LAIN (OTHER NEWS)

ULASAN BUKU (BOOK REVIEW) - THE GEOLOGY AND TECTONICS OF EASTERN INDONESIA

The Geology and Tectonics of Eastern Indonesia, edited by A.J. Barber and S. Wirjosujono, 1981. (Proceedings of the CCOP - IOC SEATAR Working Group Meeting, Bandung, Indonesia, 9-14 July 1979). Geological Research and Development Centre, Special Publication No. 2, 415 pages (softcovers).

One of the great achievements of the International Decade of Ocean Exploration (IDOE) studies in East Asian Tectonics and Resources (SEATAR) is to have raised the region of Eastern Indonesia from one of obscurity to one of the best studied regions of S.E. Asia. The fascination of the region lies in the fact that in Eastern Indonesia we can see orogenesis in progress, as the northern margins of continental Australia collide with island arc systems. There are also sufficient marginal seas interspersed with islands, so that an effective interplay between traditional onland geologists and oceanographers can be achieved. The region is also active seismically and volcanically, so it provides an excellent field laboratory for the interplay between the complete spectrum of earth scientists. The geological, oceanographic and geophysical studies represent an outstanding example of international scientific endeavour, which I am proud to have participated in. Scientists from the following countries successfully collaborated: USA., Australia, United Kingdom, Malaysia, France, Japan, Papua New Guinea, and of course Indonesia. The CCOP office in Bangkok played an important role in planning, and Mr. H. M.S. Hartono of the Geological Research and Development Centre, Bandung, co-ordinated the studies.

The book is recommended to all geologists interested in the geology and tectonics of eastern Indonesia, and several papers will make useful reference material for students of plate tectonics. It makes an

excellent supplement to Warren Hamilton's 1979 U.S. Geological Survey Professional paper 1078 "Tectonics of the Indonesian Region".

The main geological papers are:

1. R.W. Cardwell and B.L. Isacks "A review of the configuration of the lithosphere subducted beneath the Eastern Indonesian and Philippine Islands"
2. R.F. Burolet and C. Salle "Tectonic Framework of Eastern Indonesia"
3. M. Untung and B.C. Barlow "The gravity field in Eastern Indonesia"
4. C.S. Hutchison "Review of the Indonesian Volcanic Arc"
5. N.S. Haile "Palaeomagnetic evidence and the geotectonic history and palaeogeography of Eastern Indonesia"
6. H.D. Tjia "Examples of young tectonism in Eastern Indonesia"
7. S. Nishimura, Y. Otofujii, T. Ikeda, E. Abe, T. Yokoyama, Y. Kobayashi, S. Hadiwisastra, J. Sophaluwakan and F. Hehuwat "Physical geology of the Sumba, Sumbawa and Flores islands"
8. J.D. Foden and R. Varne "The geochemistry and petrology of the basalt-andesite-dacite suite from Rinjani volcano Lombok; implications for the petrogenesis of island arc, calcalkaline magmas"
9. J.D. Foden and R. Varne "Petrogenetic and tectonic implications of near coeval calcalkaline to highly alkaline volcanism on Lombok and Sumbawa islands in the eastern Sunda Arc"
10. R.S. Jacobson, G.G. Shor, R.M. Kieckhefer, and G.M. Purdy "Seismic refraction and reflection studies in the Timor-Aru trough system and Australian Continental Shelf"
11. R.F. Berry and A.E. Grady "The age of the major orogenesis in Timor"
12. A.J. Barber "Structural interpretations of the Island of Timor, eastern Indonesia"
13. C.R. Johnston "A review of Timor tectonics, with implications for the development of the Banda Arc"
14. M.G. Audley-Charles, D.J. Carter, A.J. Barber, M.S. Norvick, and S. Tjokrosapoetra "Reinterpretation of the geology of Seram: implications for the Banda Arcs and northern Australia"
15. M. Earle "The metamorphic rocks of Boi, Timor, Eastern Indonesia"
16. M.J. Abbott and F.H. Chamalaun "Geochronology of some Banda Arc Volcanics"
17. P.F. Burolet and C. Salle "Seismic reflection profiles in the Makassar Strait"
18. T.M. Van Leeuwen "The geology of Southwest Sulawesi with special reference to the Biru Area"
19. S. Sasajima, S. Nishimura, Y. Otofujii, K. Hirooka, J. Van Leeuwen, and F. Hehuwat "Paleomagnetic studies combined with fission-track dating on the Western Arc of Sulawesi, East Indonesia"
20. E.A. Silver, R. McCaffrey and Y. Joyodiwiryo "Gravity results and emplacement geometry of the Sulawesi ultramafic Belt, Indonesia"
21. R. McCaffrey, E.A. Silver and R.W. Raitt "Seismic refraction studies in the east arm, Sulawesi-Banggai Island region of Eastern Indonesia"

22. E.A. Silver and J. Casey Moore "The Molucca Sea Collision Zone, Indonesia"
23. E.A. Silver "A new tectonic map of the Molucca Sea and east Sulawesi, Indonesia, with implications for hydrocarbon potential and metallogenesis"
24. R. Sukanto, J. Apandi, S. Supriatna and A. Yasin "The geology and tectonics of Halmahera Island and surrounding areas"
25. R. Soeria Atmadja "Ophiolites in the Halmahera paired belts, east Indonesia"
26. P.H. Sillitonga, H. Pudjowaluyo, and H. Mollat "Geological reconnaissance and mineral prospecting on Bacan Island (Moluccas, Indonesia)"
27. P.A. Jezek, D.J. Whitford and J.B. Gill "Geochemistry of recent lavas from the Sangihe-Sulawesi Arc, Indonesia"
28. H.L. Davies "The major ophiolite complex in Southeastern Papua New Guinea: a review"

The book is well produced, but unfortunately suffers from inferior binding. It has to be handled carefully otherwise the pages fall out. International sales are being handled by Pergamon Press, England but readers may be interested to know that the cost direct from the Geological Research and Development, Jalan Diponegoro 57, Bandung (US\$30) is only half the Pergamon price.

C.S. Hutchison

PENGULAS BUKU (BOOK REVIEWER)

Prof. C.S. Hutchison is Professor of Applied Geology, Department of Geology, University of Malaya, Kuala Lumpur, Malaysia.

GEOSCIENCES IN SOUTHEAST ASIA

January 24 - 25, 1983: IUGS Seminar on Development and Coordination of Regional Geological Activities in Developing Countries organized by International Union of Geological Sciences.

January 26 - 27 1983: IGCP Workshop on Developing New Project Proposals for Geosciences Research in Southeast Asia - China organized by International Geological Correlation Programme.

Venue: The IUGS Seminar and the IGCP Workshop will be held at

ESCAP - Economic and Social Commission for Asia and the Pacific

The United Nations Building

Rajadamern Avenue

Bangkok 10200, Thailand.

Purpose

1. To promote and stimulate the development and coordination of geological activities on the regional level.

2. To advise on and evaluate the results of regional geological and resources programs; the mechanisms utilized in formulating, developing, and managing these programs; and the effectiveness of these programs in achieving both scientific and economic goals.
3. To compare the mechanisms and effectiveness of different programs as carried on in different regions and their relationship to inter-regional and world-wide programs.
4. To develop guidelines for regional program planning by IUGS, and IGCP and for possible use by other international bodies.
5. To identify and define high priority regional projects.
6. To review the objectives of cooperating organizations such as CCOP, ESCAP, AIT, AGID and UNESCO already heavily involved in organizing and sponsoring geological and natural resource programs in developing countries.

Highlights of the Programme for the IUGS Seminar on Development and Coordination of Regional Geological Activities in Developing Countries include:

- January 24th: * Keynote Address : A review of the geologic, tectonic and resources framework and problems of the region
- * Review of significant regional programmes and new results in Southeast Asia including:
 - AGID - Association of Geoscientists for International Development
 - ASCOPE - Asean Council on Petroleum
 - ASEAN/COIME - Association of Southeast Asian Nations/ Committee on Industry, Minerals and Energy
 - CCOP - Committee for Co-ordination of joint Prospecting in Offshore Areas
 - CPEMR - Circum Pacific Energy and Mineral Resources
 - ESCAP - Economic and Social Commission for Asia and the Pacific
 - GEOSEA - Geology Mineral and Energy Resources in South-East Asia
 - IGCP - International Geological Correlation Programme
 - RMRDC - Regional Mineral Resources Development Centre
 - SEAGS - Southeast Asian Geotechnical Society
 - SEAPEX - Southeast Asia Petroleum Exploration Society
 - SEARNG - Southeast Asia Regional Network of Geoscience
 - SEATAR - Studies on East Asia Tectonics and Resources
 - SEATRAD - Southeast Asia Tin Research and Development Centre
 - * Round-table review and discussion of the experience gained in Southeast Asia programmes to date.
- January 25th: * Review of programmes in Africa and Latin America and other regions
- * Discussion on possibilities for new work programmes in Southeast Asia
 - * Panel discussion on improved mechanism for identifying and conducting programmes in developing countries including initiatives for bodies such as IUGS and IGCP.

Highlights of the Programme for the IGCP Workshop on Developing New Project Proposals for Geosciences Research in Southeast Asia - China include:

- January 26th: * General discussion or proposals of new projects for the region including the following:
- 1) Correlation and evaluation of tin-tungsten granite in Southeast Asia
 - 2) Sedimentary basin analysis and energy and fertilizer mineral resources assessment in Southeast Asia (follow up on IGCP 32)
 - 3) Correlation and applications of Quaternary studies in Southeast Asia
 - 4) Other proposals
- * Working groups for development of specific projects
- January 27th: * Reports of working groups
- * Summary and concluding statements by coordinator.

For further information contact:

CCOP Project Office
 (IUGS/IGCOP Meetings)
 41 Sukhumvit Soi 4
 Bangkok 10110, Thailand.
 Telex: 82315 (ESCAP TH)
 Tel: 252-4024, 251-1662.

or the Malaysian representatives:

Mr. S.K. Chung, Chairman
 IGCP National Committee
 Director-General
 Geological Survey of Malaysia
 Jalan Gurney
 Kuala Lumpur 15-01

or

Mr. Santokh Singh, Secretary
 IGCP National Committee
 Deputy Director-General
 Geological Survey of Malaysia
 Jalan Gurney
 Kuala Lumpur 15-01.

Related Activities

Date (1983)	Activities	Contact
1. 26-29 January	IUGS Executive Committee Meeting, AIT, Bangkok, Thailand	Dr. C.C. Weber Maison de la Geologie 77 rue Claude-Bernard 75005 Paris, France
2. January	Meeting of the Advisory Council of Southeast Asia Regional Network of Geosciences, Chiangmai, Thailand	Mr. Sa-ngob Kaewbaidhoon Dept. of Mineral Resources Rama VI Road Bangkok 10400 Thailand
3. 30-31 January	Workshop on Geoscience Curriculum in Southeast Asia, Chiangmai, Thailand	Dr. Tavisakdi Ramingwong Dept. of Geological Sciences, Chiangmai University, Chiangmai 50002, Thailand
4. 24-25 January	USAID/ASEAN Workshop on Phosphate Rock Assessment and Exploration, DMR, Bangkok, Thailand	Dr. M.J. Terman Office of International Geology, U.S. Geological Survey, Reston, Virginia 22091, USA

Date (1983)	Activities	Contact
5. 19-21 January	Seminar on Phosphate Rock Potential in Southeast Asia. USGS/AGID/CCOP/DMR/EWC, AIT, Bangkok, Thailand	Dr. Prinya Nutalaya Asian Institute of Technology, GPO Box 2754, Bangkok 10501, Thailand
6. 19-29 January	Short Course on Geology of Surficial Deposits. CCOP/DMR/CMU, Chiang mai, Thailand	Mr. Charn Tantisukrit Dept. of Geological Sciences, Chiangmai University, Chiangmai 50002, Thailand
7. 1-2 February	Annual Technical Meeting of the Department of Geological Sciences, Chiangmai University, Chiangmai, Thailand	The Secretary Annual Technical Meeting 1982, Dept. of Geological Sciences Chiangmai University Chiangmai 50002 Thailand

WORKSHOP ON GEOSCIENCE CURRICULUM DEVELOPMENT IN SOUTHEAST ASIA

Place and Date: Chiangmai, Thailand: January 30-31, 1983

Organized by: Southeast Asia Regional Network of Geosciences Association of Geoscientists for International Development

Supported by: UNESCO Regional Office for Science and Technology for Southeast Asia

Objectives

At the Regional Workshop on Role of Geoscience Educational Institutes in Natural Resources Development in Southeast Asia, organized by AGID, Southeast Asia Regional Network of Geosciences and the Philippines National Committee on Geological Sciences, held in Manila, Philippines, November 17, 1981, the subject on Geoscience Curriculum Development was discussed at length. The question are how relevant the present curriculum is to the needs of industry and of governmental geoscience departments and enterprises; ways and means of tailoring and modifications of current curriculum were foci of the meeting. Several problem areas were defined and this Workshop is the follow up.

1. To provide a forum for the exchange of views and experiences in geoscience curriculum development between Southeast Asia universities and academic institutes, aimed at improving geoscience education in the region.
2. To promote link between universities and academic institutes in order to build a strong geoscience education that would serve as a foundation for natural resources development.
3. To identify clearly the problem areas and design realistic ways of remedial.

Format of the Workshop

Format of the Workshop will be exchange of views and idea-oriented

rather than lecture-oriented. The Workshop will include invited papers, group discussions and plenary sessions.

Participants

Representatives from universities and academic institutes from Southeast Asia and adjacent countries, and all interested geoscientists.

Papers

Invited keynote and country report papers will be printed and distributed before the Workshop.

Report of the Meeting

Participants will receive the Report of the Workshop and the Summary of Recommendations following the Workshop.

Other Activities

International Union of Geological Societies (IUGS): Executive Committee Meeting, in Bangkok.

Meeting on IGCP and/or UNESCO sponsored geological projects within the SE Asian and Asian Regions.

Southeast Asia Regional Network of Geosciences: Regional Coordination Board Meeting, Chiangmai.

1982 Annual Technical Meeting of Department of Geological Sciences, Chiangmai University.

Excursion

Following the Workshop, a one-day excursion to tourist sites in Chiangmai will be arranged.

Further information

Please contact: Dr. T. Ramingwong
Dept. of Geological Sciences
Chiangmai University
Chiangmai 50000, Thailand.

15TH PACIFIC SCIENCE CONGRESS: FEBRUARY 1-11 1983

All those interested in the objectives of the Pacific Science Association are cordially invited to attend its Fifteenth Congress. This will be held on the Campus of the University of Otago, Dunedin, New Zealand. The Congress is sponsored by the Royal Society of New Zealand.

The theme of the Fifteenth Congress is
CONSERVATION, DEVELOPMENT AND UTILIZATION OF THE RESOURCES OF THE
PACIFIC.

This broad topic will be developed through four general symposia:

- i) Energy in Agriculture
- ii) High latitude resources: their assessment and development
- iii) Resources, science, and the law of the sea
- iv) Pacific island potentials.

In addition, there will be 14 sections organized by the scientific committees of the Association.

The Pacific Science Association is an international, non-governmental, regional scientific organization.

The membership is composed of countries or appropriate areas within or bordering the Pacific Ocean, or with territorial responsibilities within the region. There are currently over 40 member countries or areas.

The objectives of the Association are to initiate and promote co-operation in the study of scientific problems relating to the Pacific Region - more particularly those affecting the prosperity and well-being of Pacific peoples; and to strengthen the bonds of peace among Pacific peoples by promoting a feeling of brotherhood among scientists of all Pacific countries. In part these objectives are achieved through Pacific Science Congresses held at intervals of about four years. There have been fourteen Congresses and four inter-Congresses since the founding meeting. Pacific Science Congresses are open to anyone interested in the objectives of the Association.

Dates to remember

- 22 January 1983 - Some Pre-Congress tours begin
- 29 January 1983 - Registration begins in Dunedin
 - 1 February 1983 - Opening ceremonies
 - 2 February 1983 - Scientific Programme begins
- 5, 6 February 1983 - Mid-Congress excursions
- 11 February 1983 - Closing ceremonies
- 12 February 1983 - Post-Congress tours begin.

Address of Organizing Committee

The Secretary-General
15th Pacific Science Congress
P.O. Box 6063
Dunedin, New Zealand.

Section B: Solid Earth Sciences

Chairman: N.A. Shilo, USSR

Conveners: D.S. Coombs and C.A. Landis, Department of Geology,
University of Otago, Dunedin, New Zealand.

Keynote address: W.S. Fyfe, University of Western Ontario, London,
Ontario, Canada. "Exchanges between the crust, hydro-
sphere, and mantle".

1. History of Plate Movements in the Pacific
Organizer: R.I. Walcott, Geophysics Division, D.S.I.R.
P.O. Box 1320, Wellington, New Zealand.
2. Arc Volcanism, including the genesis of rhyolite-andesite associations
(jointly co-sponsored by WGB of the Inter-Union Commission on the
Lithosphere and the International Association of Volcanology and
Chemistry of the Earth's Interior)
Co-organizers: J.W. Cole, Department of Geology, Victoria
University of Wellington, Wellington, New Zealand
I.S.E. Smith, Department of Geology, University
of Auckland, Auckland, New Zealand
Speakers to include: W. Hildreth, U.S. Geological Survey, Menlo
Park, California, USA.

3. Subduction process, ophiolites and their relationship to island arcs
Organizer: R.J. Norris, Department of Geology, University of Otago,
Dunedin, New Zealand
4. Crustal and upper mantle structure and tectonics of the Pacific Basin and its margins
Organizer: F.J. Davey, Geophysics Division, D.S.I.R.
P.O. Box 1320, Wellington, New Zealand
5. Metamorphic processes, and their relation to tectonism
Organizer: A.F. Cooper, Department of Geology, University of Otago, Dunedin, New Zealand.
Speakers to include: W.G. Ernst, University of California, Los Angeles, USA.
6. Paleozoic and Mesozoic of the Circum-Pacific Belt, including Permian-Triassic relations
Co-organizers: C.A. Landis and J.D. Campbell, Department of Geology, University of Otago, Dunedin, New Zealand.
Speakers to include: N.J. Silberling, U.S. Geological Survey, Denver, Colorado, USA.
7. Paleontology, paleobiogeography and stratigraphic correlations in the Pacific region
Organizer: J.D. Campbell, Department of Geology, University of Otago, Dunedin, New Zealand
 - a. Faunal correlation: The Paleogene of the Pacific and circum-Pacific.
Organizers: R.E. Fordyce and D.E. Lee, Department of Geology, University of Otago, Dunedin, New Zealand.
 - b. Floral correlation: The development of southwest Pacific floras from the Paleozoic to Recent. (Under the auspices of the Palynological and Paleobotanical Association of Australasia).
Co-organizers: D.C. Mildenhall, New Zealand Geological Survey
P.O. Box 30-368, Lower Hutt, New Zealand
N.T. Moar, Botany Division, D.S.I.R.,
Private Bag, Christchurch, New Zealand.
Speaker: E.M. Truswell, BMR., Canberra, A.C.T., Australia.
(tentative).
8. Loess, Tephra and Aerosolic dust: Quaternary airfall deposits in the Circum-Pacific Region. (Regional meeting sponsored by the INQUA Loess Commission).
Co-organizers: I.J. Smalley, Soil Bureau, D.S.I.R., Private Bag, Lower Hutt, New Zealand
J.G. Bruce, Soil Survey, D.S.I.R., Private Bag, Gore, New Zealand.
9. Geological and geophysical hazards
 - a. Slope stability problems (with New Zealand Geomechanics Society)
Organizer: W.J. Henderson, City Engineer's Department, Dunedin City Corporation, Dunedin, New Zealand.
 - b. Volcanic risk
Organizer: V.E. Neall, Department of Soil Science, Massey University, Palmerston North, New Zealand
Speakers to include: R.W. Decker, Hawaiian Volcano Observatory
Hawaii 96718, USA
 - c. Seismic risk, seismicity patterns and earthquake prediction
Organizer: W. Smith, Seismological Observatory, D.S.I.R.
P.O. Box 1320, Wellington, New Zealand.

Speakers to include: M.J. Berry, Division of Seismology,
Energy, Mines and Resources, Ottawa, Canada

- d. Planning and resource management of coastal environments
(joint with Section C2, Geography)
Co-organizers: R.M. Kirk, Department of Geography, University
of Canterbury, Christchurch, New Zealand
R.F. McLean, Department of Geography, University
of Auckland, Auckland, New Zealand
- e. Storm damage
Co-organizers: R. Howorth, Department of Geology, Victoria
University of Wellington, Wellington, New Zealand
T. Healy, Department of Earth Sciences, Waikato
University, Hamilton, New Zealand
10. Geothermal Activity and Deposition
Organizer: R.W. Henley, D.S.I.R., Private Bag, Taupo, New Zealand
Speakers to include: H. Sakai, Okayama University, Tottori, Japan
11. Mineral Resources of the Pacific Ocean Floor
Organizer: D.S. Cronan, Department of Geology
Imperial College, London, England
12. Soil Development in the Tropical Pacific
Co-organizers: I.J. Smalley, Soil Bureau, D.S.I.R., Private Bag,
Lower Hutt, New Zealand
J.G. Bruce, Soil Survey, D.S.I.R., Private Bag,
Gore, New Zealand
13. Third International Meeting of Pacific Neogene Stratigraphy
(Miocene-Pliocene). Correlation of Regional Stages, Zones, Datum-
Levels, Magnetostratigraphy, Paleoenvironments, Paleoceanography,
Global Neogene Events
Convener: N. de B. Hornibrook
Secretary: A.R. Edwards, New Zealand Geological Survey, P.O. Box
30-368, Lower Hutt, New Zealand.
14. Patterns of Sedimentation on Continental Shelves
Open sessions - topics relating to aspects of the Solid Earth
Sciences including Marine Geology not covered in Symposia 1 - 14.

Section F: Coral Reefs

Chairman : E.D. Gomez, Philippines.

Convener: E.W. Dawson, New Zealand Oceanographic Institute, D.S.I.R.,
P.O. Box 12-346, Wellington, New Zealand.

2. Ancient Reefs and Oil Exploration

Organizer: R. Riding, Department of Geology, University College,
Cardiff CF1 1XL, Wales.

7. Geological History of Reefs and Reef-Building Organisms

Organizer: T.P. Scoffin, Grant Institute of Geology, University
of Edinburgh, Edinburgh EH9 3JW, Scotland.

8. Physical and Chemical Processes

Organizer: R.W. Buddemeier, Lawrence Livermore National Laboratory,
P.O. Box 808, Livermore, California 945,550, USA.

General Symposia

III. Resources, Science, and the Law of the Sea

2. Mineral Resources

- a. Deep sea metallic deposits.
- b. International regulation of the resources from the seabed.
- c. Continental shelf resources.
- d. Pacific Ocean floor.

3RD INTERNATIONAL SYMPOSIUM OF HYDROMETALLURGY

112th AIME Annual Meeting, Atlanta, Georgia, USA, March 6-10
1983

About the Symposium

Since the last AIME symposium on hydrometallurgy in 1973, there have been numerous advances in both the fundamental and practical aspects. Among the major advances are the development of new solvent extraction reagents and the increasing role of solvent extraction in solution purification and concentration on a commercial basis; the development of commercially continuous ion exchange; the growth of chloride hydrometallurgy, both in leaching and electro-winning; the appearance of novel electrodes, such as the fluidized-bed electrode; improvements in electrode materials; the discovery of new chemistries, such as the cuprous acetonitrile/sulfate system; the commercialization of in-situ leaching; application of hydrometallurgical techniques to metal recovery from low-grade oxide ores, such as laterites and ocean nodules; uranium recovery from wet phosphoric acid; application of pressure leaching to zinc sulfide concentrates on a commercial scale; metal recovery from solid and aqueous effluents; and the growing interest in energy management.

In the case of basic studies, increasing attention has been paid to the thermodynamics of aqueous solutions; phase equilibria; rate mechanisms and reaction modeling; the role of electrochemical processes; applications of scanning electron microscopy; mineralogy and reactivity; modeling, design, and control of continuous unit operations. The 3rd International Symposium seeks to present a critical review of these advances and to provide a forum for cross-fertilization and technology transfer across unit processes and operations.

Papers and Publications of Proceedings

Authors are invited to submit extended abstracts (minimum 600 words plus figures) which will be referred for selection. Papers obtained by this avenue will be supplemented by invited papers, and keynote lectures by distinguished hydrometallurgists. The proceedings of the Symposium will be published for distribution at the meeting.

Additional Information

For further details, please contact the Symposium Chairmen:

K. Osseo-Asare
Dept. of Materials Science &
Engineering
202A Steidle Building
The Pennsylvania State University
University Park, Pennsylvania 16802
telephone (814)865-5446

J.D. Miller
Dept. of Metallurgy &
Metallurgical Engineering
412 Browning Building
University of Utah
Salt Lake City, Utah 84112
telephone (801)581-5160

INTERNATIONAL HUMAN RESOURCES DEVELOPMENT CORPORATION (IHRDC) SHORT COURSES 1983 FOR THE PETROLEUM INDUSTRY

Courses available in Singapore/Jakarta

- Practical Seismic Interpretation: A workshop course.** Dr. Michael E. Badley, Consultant, Earth Sciences Ltd., England. Singapore: July 25-29 (US\$900).
- Introduction to Seismic Interpretation.** Dr. Robert E. Sheriff, Professor of Geophysics, University of Houston. Jakarta, December 12-14 (US\$775).
- Seismic Stratigraphy.** Dr. Robert E. Sheriff, Professor of Geophysics, University of Houston. Jakarta, December 14-16 (US\$775).
- Introduction to Seismic Interpretation & Seismic Stratigraphy.** Dr. Robert E. Sheriff, Professor of Geophysics, University of Houston. Jakarta, December 12-16 (US\$875).
- Applied Reservoir Engineering, Reserves and Production Estimates, Well Testing.** Dr. A.K. Kotb, President, International Petroleum Consulting Services, Washington, D.C., Jakarta, March 21-25 (US\$875).
- Drilling Engineering with Offshore Considerations.** Dr. Ellis H. Austin, Petroleum Consultant, Dallas. Jakarta, Nov. 14-18 (US\$875).
- Introduction to Enhanced Oil Recovery.** Dr. A.K. Kotb, President, International Petroleum Consulting Services, Washington, D.C. Jakarta, March 28-Apr 1 (US\$825).
- Decision Methods in Petroleum Exploration.** Dr. A.K. Kotb, President, International Consulting Services, Washington, D.C., Singapore, October 24-26 (US\$775).
- Introduction to Petroleum Technology.** Dr. David A.T. Donohere, President, IHRDC, Boston & David C. Morrill, Partner, Donohere, Ausley & Morrill, Boston, Jakarta, October 3-6 (US\$750).

For further information contact:

Cherry C.K. Locke
Manager, Instructional Programs IHRDC
137 Newbury Street
Boston, MA02116
Tel: (617) 536-0202
Telex: 94-0557 IHRDC-BSN.

MALAYSIA'S OIL PRODUCTION, OIL RESERVES, EXPLORATION

Malaysia Oil production, 1st half 1981

Malaysia has earned about \$4,66 billion from the sale of crude oil in the first half of this year. About 2.35 million barrels were sold during the period. The country exported the most crude in June - 283,100 barrels.

The highest income from the sale of crude was in April - \$631 million - with the sale of 271,000 barrels.

(Malaysian Digest 15 Dec 1981)

Malaysia's oil reserves to last next 20 years

Malaysia's potential oil reserves stood at 2.5 billion barrels at the start of this year, Prime Minister Dato' Seri Dr. Mahathir Mohamad told the House of Representatives. He said the reserves were sufficient for the next 20 years.

The Prime Minister said 96 wells had been dug since January last year during exploration activities. Ten of these wells were found to have oil while 16 had gas.

He said Petronas (National Petroleum Corporation), through its subsidiary Petronas Carigali, was now carrying out exploration activities off the coast of Sabah and Trengganu.

He added that the setting up of the Petronas refinery in Trengganu, which has a capacity to process 30,000 barrels a day, would help maintain Malaysia's status as a net importer. This would enable the country to cut its import of petroleum products while reducing its crude oil exports.

(Malaysian Digest 30 Nov 1981)

Pact to set up a 'gas grid' in Sabah

The Sabah Government has signed an agreement with two oil companies paving the way for commercial utilisation of gas now being flared in the State's off-shore oil fields.

An estimated \$600,000 worth of associated gas is being flared daily at the Semarang, Erb West and Ketam fields.

Called the 'gas grid' project, the agreement was signed in Labuan by Deputy Chief Minister Datuk James Ongkili and the managing director of Sabah Shell Petroleum Co. Ltd., Mr. George Band, who also represented Pecten Malaysia Company.

(Malaysian Digest 30 Nov 1981)

Off-shore oil — there's plenty yet to explore

About two thirds of Malaysia's oil yielding offshore areas remain to be explored, Energy Telecommunications & Posts Minister Datuk Leo Moggie said.

While about 160,000 square miles of the country's sedimentary basins are believed to contain petroleum deposits, 63 per cent of this or more than 100,000 square miles has yet to be explored.

Datuk Moggie, in his speech at the opening of, a petroleum geology seminar in Kuala Lumpur, said the chances of striking oil was one in six.

This rate is based on the high rate of success achieved so far in Malaysia's exploration activities and reflects the fact that oil exploration has largely been concentrated in the more accessible areas, he said.

Prospects for additional reserves, given increased exploration capacity and 'second phase discoveries' in established basins, were good, he felt. During the first phase, it is usual that 10-30 per cent of the oil is recovered.

(Malaysian Digest 31 Dec 1981)

TRAINING COURSES

September - October 1982

Geothermal Energy (Kyushu, Japan): Short course organized by Japan in cooperation with Unesco. English. For information: UNESCO, 7 place de Fontenoy, 75700, Paris, France.

September 1982 - August 1983

Mining Exploration and Exploration Geophysics (Delft, The Netherlands): Diploma courses organized by the International Institute for Aerial Survey and Earth Sciences. Sponsored by Unesco, English. For information: ITC Student Affairs, P.O. Box 6, 7500 AA Enschede, The Netherlands.

September 27 - October 15, 1982

Geological Interpretation of Remotely Sensed Data (Nairobi, Kenya): A regional training workshop sponsored by Unesco and the regional Remote Sensing Facility of the Regional Center for Services and Mapping, Nairobi, Kenya. English. For information: Unesco, Regional Office for Science and Technology for Africa, P.O. Box 30592, Nairobi, Kenya.

October 1982 - September 1984

Fundamental and Applied Geology (Brussels, Belgium): M.Sc. course organized by the Institute of Fundamental and Applied Quaternary Geology (IFAQ) at Vrije Universiteit Brussel. Sponsored by Unesco and Belgium, English. For information: Prof. Dr. R. Paepe, Director of IFAQ, Kwartairgeologie, Vrije Universiteit Brussel, Pleinlaan 2, B-1050, Brussels, Belgium.

October - November 1982

Training Course on Seismology and Geophysics (Potsdam, G.D.R.): Short course organized by East German Academy of Sciences and in collaboration with Unesco. English. For information: Prof. Dr. H. Kautzleben, Director, Central Earth's Physics Institute, Academy of Sciences of the German Democratic Republic, Telegraphenberg, DDR 1500 Potsdam, GDR.

October 4 - November 5, 1982

Remote Sensing: Geologic Interpretation (Flagstaff, Arizona, USA): Advanced training course for foreign nationals. English. For information: Training Section, Office of International Geology, U.S. Geological Survey, 917 National Center, Reston, Virginia 22092, USA.

November - December 1982

Methods and Techniques in Exploration Geophysics (Hyderabad, India): Diploma course sponsored by Unesco and India. English. For information: The Director, Regional Training Courses, National Geophysical Research Institute, Hyderabad, 500 007 (A.P.) India.

November 18 - December 9, 1982

Small Scale Mining (Bangalore, India): An international short course with 10 days lectures and seminars and 10 days field trips. Sponsored by AGID and Bangalore University. English. For information: C. Naganna, Director School of Earth Sciences, Bangalore University Jnana Bharati, Bangalore 560056, India.

November 26 - December 6 1982

Rock as Construction Materials (Kuala Lumpur, Malaysia): A short course, sponsored by AGID, to help professionals and semi-professionals involved in the construction industry learn about types and sources of rock materials used for construction. English. For information: The Organizing Secretary, ROCKCON, Geological Society of Malaysia, c/o Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.

December 6 - 10, 1982.

Soil and Rock Improvement Techniques including Geotextiles, Reinforced Earth and Modern Piling Methods (Bangkok, Thailand): A short course organized by Asian Institute of Technology and co-sponsored by SE Asian Geotechnical Society. English. For information: Prof. A.S. Balasubramaniam, Division of Geotechnical & Transportation Engineering, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand 10501.

January 1983

Modern methods of capture, storage and evaluation of Geological, Geochemical and Resource Data (Arusha, Tanzania). A two-week training course sponsored by COGEO DATA and Unesco. For information: G. Gabert, Federal Institute for Geosciences and Natural Resources, Stilleweg 2, Postfach 51 01 51, D-3000 Hannover 51, F.R.G.

January - March 1983

Remote Sensing Application (Enschede, The Netherlands): Certificate course on techniques for national resources surveys, organized by the International Institute of Aerial Surveys and Earth Sciences (ITC), sponsored by Unesco. English. For information: ITC Student Affairs Office, P.O. Box 6, 7500 AA Enschede, The Netherlands.

January 24 - January 28 1983

Principles of Data Processing for Earth Scientists (Reston, Virginia, USA): Training Course for international scientists. English. For information: Training Section, Office of International Geology, U.S. Geological Survey, 917 National Center, Reston, VA 22092, USA.

January 31 - February 25, 1983

Remote Sensing: Digital Image Processing (Flagstaff, Arizona, USA): Advanced training course for foreign nationals. English. For information: Training Section, Office of International Geology, U.S. Geological Survey, 917 National Center, Reston, Virginia 22092, USA.

February - November 1983

Geothermal Technology (Auckland, New Zealand): Post-graduate course on utilization of geothermal energy for power generation. For nationals of developing countries or N.Z. with B.Sc. or B. Eng. degrees. Leads to Diploma in Energy Technology (Geothermal). UNDP fellowships available. English. For information: Director, Geothermal Institute, University of Auckland, Private Bag, Auckland, New Zealand.

February - November 1983

Photointerpretation Applied to Geology and Geotechnics (Bogota, Colombia): Short course organized by the Interamerican Centre of Photo-interpretation (CIAF) in cooperation with ITC and Unesco. Spanish. For information: Academic Secretariat of the CIAF, Apartado Aereo 53754, Bogota, Colombia.

February - June 30 1983

Mineral Exploration (Leoben, Austria): Diploma course sponsored by Unesco. English. For information: University for Mining and Metallurgy, Postgraduate course on Mineral Exploration, Montanuniversität, Leoben, A 8700, Austria.

February 15 - December 15 1983

Geothermics (Pisa, Italy): Certificate course on geothermal energy sponsored by Unesco, UNDP and Italy. Spanish. For information: Istituto Internazionale per le Ricerche Geotermiche, 1, Via Buongusto, 56100 Pisa, Italy.

March - April 1983

Mineral Exploration (Paris, France): Short course sponsored by Unesco. French. For information: Prof. H. Pelissonnier, Ecole des Mines, 60 Bd Saint Michel, 75272 Paris, Cedex 06, France.

June - August 1983

Principles and Methods of Engineering Geology (Budapest, Hungary): Certificate course sponsored by Unesco. English. For information: Hungarian Geological Institute, Nepstadion ut 14, P.O. Box 106, H 1142 Budapest, Hungary.

July - August 1983

Summer course on Earth Sciences: Crystallography, Mineralogy, Metallogeny (Madrid, Spain): Short course sponsored by Unesco. Spanish. For information: Departamento de Geologia y Geoquimica, Facultad de Ciencias, Universidad Autonoma de Madrid, Canto Blanco, Madrid 34, Spain.

August - October 1983

Geochemical Prospecting Methods (Prague, Czechoslovakia): Certificate course organized by Geological Survey of Czechoslovakia and sponsored by Unesco, IAGC and Czechoslovakia. English. For information: GEOCHIM CSSR UNESCO, Geological Survey, Malostranske nam. 19, 118 21 Prague, Czechoslovakia.

KALENDAR (CALENDAR)

A bracketed date (Mar-Apr 1982) denotes entry in that issue carried additional information.

1982

- Oct 25 : Economic Geology Seminar 82, Hotel Merlin, Kuala Lumpur. (Contact: A. Spykerman, Economic Geology Seminar, Geological Society of Malaysia, c/o Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia). (Mar-Apr & May-Jun 1982).
- Oct 27 - 29 : New Paths to Mineral Exploration, (3rd International Symposium on Mineral Resources), Hannover, F.R.G. (R. Weber, Federal Institute for Geosciences and Natural Resources, Postfach 51 01 53, D-3000 Hannover 51, FRG).
- Nov 1 - 6 : RMRDC Workshop on the Importance of Mining to Industrial Development, Bandung (Contact: Dr. Herman Stigzelius, RMRDC, Jalan Jenderal Sudirman 623, Bandung, Indonesia). (May-Jun 1982).
- Nov 14 - 19 : Coastal Engineering (International Conference), Cape Town, Republic of South Africa. (B.L. Edge, Coastal Engineering, Clemson University, Clemson, South Carolina 29631, USA).
- Nov 17 - 19 : Ophiolites and Oceanic Lithosphere (meeting), London, England. (S. Lippard, Department of Earth Sciences, Open University, Milton Keynes MK7 6AA, UK).
- Nov 17 - 24 : Phosphorites, (Fifth International Field Workshop and Seminar), Kunming, China. (Wang Daxion, Secretary-General, Organizing Committee of the Fifth International Field Workshop and Seminar on Phosphorites, c/o Ministry of Geology, Beijing, China).

- Nov 22 - 26 : 7th Southeast Asian Geotechnical Conference, Hong Kong.
(VII SEAGC, c/o Hong Kong Institution of Engineers, P.O. Box 13987, Hong Kong).
- Nov 22 - 23 : Theory, Application and Comparison of Stratigraphic Correlation Methods (International Meeting), Geneva, Switzerland. Sponsored by IGCP Project 148. (F.P. Agterberg, Geological Survey of Canada, 601 Booth Street, Ottawa K1A 0E8, Canada).
- Nov 24 : Application of Electron Microscopy in Metamorphic and Structural Geology, (Meeting organized by Metamorphic and Tectonics Study Groups), London, U.K. (J.H. White, Dept. of Geology, Imperial College of Science and Technology, London SW7 2BP, U.K.).
- Nov 24 - 26 : Petroleum Geology of the SE North Sea, (International Conference), The Hague, The Netherlands. (Netherlands Congress Centre, P.O. Box 82000, 2508 EA The Hague, The Netherlands).
- Nov 26 - Dec 6 : Rock as Construction Materials (ROCKCON) Symposium, Federal Hotel, Kuala Lumpur. (Contact: Organizing Secretary ROCKCON, Geological Society of Malaysia, Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia). (Mar-Apr & Jul-Aug 1982).
- Nov 29 - Dec 4 : RMRDC Workshop on Biogeochemical Mineral Exploration in Tropical Rainforest Environment, Bandung. (Contact: Director, RMRDC, Jalan Jenderal Sudirman 623, Bandung, Indonesia). (May-Jun 1982).
- Nov 29 - Dec 3 : Symposium on Soil & Rock Improvement Techniques including Geotextiles, Reinforced Earth and Modern Piling Methods, Bangkok. (Contact: Prof. Balasubramaniam, AIT, P.O. Box 2754, Bangkok, Thailand 10501). (May-Jun 1982).
- Dec : Construction Practices and Instrumentation in Geotechnical Engineering, (International Conference), Surat, India. Post-Conference tours. (M. Desai, Convenor, 1982 IGS Conference, S.V.R. College of Engineering and Technology, Surat 395007, India).
- Dec : The Palaeoenvironment of East Asia from the Mid-Tertiary, (Conference), Hong Kong. (E.K.Y. Chen, Director, Centre of Asian Studies, University of Hong Kong, Hong Kong).
- Dec 1 - 2 : Sedimentary Processes & Stability on the Continental Slope, (Meeting), London, U.K. Sponsored by the Geological Society. (N.H. Kenyon, Institute of Oceanographic Sciences, Wormley, Surrey GU8 5UB, U.K.).
- Dec 1 - 6 : 4th International Congress of Engineering Geology, New Delhi. Contact: G. Pant, Geological Survey of India, 47-48 Pragati Bhawan, Nehru Place, New Delhi 110019, India. (May-Jun 1982).
- Dec 5 - 10 : Mineral Technology in the Southern Hemisphere (1st Meeting), Rio de Janeiro, Brazil. (Brasenco, Assessoria de Congressos Ltda., Rua Almirante Cochrane, 202, CEP 20550-Rio de Janeiro-RJ, Brazil). (May-Jun 1982).
- Dec 6 - 7 : Petroleum Geology Seminar 1982, Hotel Merlin, Kuala Lumpur 22-11, Malaysia. Contact: Mr. Michael Leong, Organising Chairman, PGS, Geological Society of Malaysia, Kuala Lumpur 22-11.

- Dec 16 - 17 : Palaeogene/Neogene (4th Meeting), Milan, Italy. Sponsored by IUGS Commission on Stratigraphy Working Group on the Palaeogene Neogene Boundary. (F. Sleiningner, Institute for Paleontology, University of Vienna, Universitaetsstr. 7/11, A-1010 Vienna, Austria).

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- Jan 10 - 15 : Commission for the Geological Map of the World, (Plenary Assembly), Paris, France. (M. Delany, CGMW, 51 Boulevard de Montmorency, 75016, Paris, France).
- Jan 13 - 14 : Sulphide Mineralogy and Petrology (Meeting with special reference to metamorphic rocks), London, U.K. Sponsored by Mineralogical Society and Metamorphic Studies Group. (D.J. Vaughan, Dept. of Geological Sciences, University of Aston in Birmingham, Birmingham B4 7ET, U.K.).
- Jan 16 - 22 : Soil Erosion and Conservation, (2nd International Conference), Honolulu, Hawaii, USA. (S.A. El-Swaify, Dept. of Agronomy and Soil Science, College of Tropical Agriculture and Human Resources, University of Hawaii, 3190 Maile Way, Honolulu, Hawaii 96822, USA).
- Jan 24 - 25 : Development and Coordination of Regional Geological Activities in Developing Countries (IUGS Seminar), Bangkok, Thailand. (C.C. Weber, IUGS Secretary-General, Maison de la Geologie, 77 rue Claude Bernard, 75005 Paris, France). (Jul-Aug 1982).
- Jan 30 - 31 : Workshop on Geoscience Curriculum Development in Southeast Asia, Chiangmai, Thailand. Contact: Dr. T. Ramingwong, Dept. of Geological Sciences, Chiangmai University, Chiangmai 50000, Thailand. (Jul-Aug 1982).
- Feb 1 - 11 : XV Pacific Science Congress, Dunedin, New Zealand. (Secretary-General, 15th Pacific Science Congress, P.O. Box 6063, Dunedin, New Zealand). (Jan-Feb 1982).
- Feb 1 - 11 : Pacific Neogene Stratigraphy, (3rd International Meeting), Dunedin, New Zealand. Sponsored by the Royal Society of New Zealand and IUGS. (A.R. Edwards, Secretary, N.Z. Geological Survey, P.O. Box 30-368, Lower Hutt, New Zealand).
- Feb 20 - 25 : Lithospheric dynamics and evolution of continental crust (6th Convention), Canberra, Australia. (M.B. Duggan, Organizing Secretary, 6th Australian Geological Convention, P.O. Box 1923, Canberra City, ACT 2601, Australia).
- Mar 6 - 10 : 3rd International Symposium on Hydrometallurgy, Atlanta, Georgia, USA. K. Osseo-Asare, Dept. of Materials, Science and Engineering, 202A, Steidle Building, The Pennsylvania State University, University Park, Pennsylvania 16802, USA). (Jul-Aug 1982).
- Mar 16 : Metamorphic Studies Research in Progress, (Meeting), London, U.K. (M. Brown, Honorary Secretary, Metamorphic Studies Group, Dept. of Geology & Physical Sciences, Oxford Polytechnic, Headington, Oxford OX3 0BP, UK).
- Apr 10 - 15 : Rock Mechanics (5th International Congress), Melbourne, Australia. (Australian Geomechanics Society Institution of Engineers, Australia, 11 National Circuit, Barton, ACT 2600, Australia).

- Apr 11 - 13 : Proterozoic '83 (1st International Conference), Lusaka, Zambia. Field trips. Sponsored by Geological Survey of Zambia and GSA. Languages: English and French. (The Secretariat, Proterozoic '83, P.O. Box 50135, Lusaka, Zambia).
- Apr 11 - 15 : Benthos '83 (2nd International Symposium on Benthonic Foraminifera), Pau, France. Sponsored by French Academy of Sciences and French Paleontological Association. (M. Hamaoui, SNEA(P), Direction Exploration, Centre Micoulau, B.P. 65, 64018 Pau, France).
- Apr - May : International Association of Sedimentologists, (4th European Meeting), Split, Yugoslavia. Pre- and post-Conference field trips. (V. Jelaska, Geoloski Zavod, Sachsova 2, 41000 Zagreb, Yugoslavia).
- May : Soil Mechanics and Foundation Engineering, (8th European Conference), Helsinki, Finland. (Secretary-General, VIII ECSMFE, c/o VTT/GEO, SF-02150 Espoo 15, Finland).
- May 2 - 6 : Methods and Instruments for the Investigation of Ground-water Systems, (International Symposium), Noordwijkerhout, The Netherlands. Co-sponsored by UNESCO, IHP, IAHS and IAH. Languages: English and French. (Secretary, Organizing Committee, Congress Bureau of the Corporate, Communication Dept. TNO, 148 Juliana van Stolberglaan, 2595 CL The Hague, The Netherlands).
- Aug 7 - 12 : Fossil Corals (Symposium), Washington, D.C. (W.A. Oliver, Jr., U.S. Geological Survey, E-305 Natural History Building, Smithsonian Institution, Washington, D.C. 20560, USA).
- Aug 27 : Krakatau Eruption (Centennial Symposium), Jakarta, Indonesia. (D. Sastrapradja, Indonesia Institute of Sciences, Box 250, Jakarta, Indonesia).
- Aug 29 - Sep 8 : International Association of Geochemistry and Cosmochemistry, (4th International Symposium of Water-Rock Interaction), Misasa, Japan. Technical sessions and post-Symposium field trips. Sponsored by Institute for Thermal Spring Research, Geochemical Society of Japan and Geothermal Research Society of Japan. (H. Sakai, Secretary-General, WRI-4, Institute for Thermal Spring Research, Okayama University, Misasa, Tottori-ken 682-02, Japan).
- Sep : International Symposium on Engineering Geology and Underground Construction, Lisbon, Portugal. (Sociedade Portuguesa de Geotecnia, c/o L.N.E.C., Av. Brasil, 101, 1799 Lisboa Codex, Portugal).
- Sep : Geomaterials: Rocks, Concretes, Soils, (Meeting), Evanston, Illinois, USA. (Secretary-General, IUTAM, Chalmers University of Technology, Fack, S-40220 Gothenburg 5, Sweden).
- Sep 12 - 17 : Carboniferous Stratigraphy and Geology, (10th International Congress), Madrid, Spain. (Comite organizador del X Congreso Internacional de Estratigrafia y Geologia del Carbonifero, Instituto Geologico Minero de Espana, Rios Rosas, 23-Madrid - 3, Espana).

- Sep 19 - 23 : World Energy, (12th Conference), New Delhi, India. (E. Ruttley, World Energy Conference, 34 St. James Street, London SW1A 1HD, U.K.).
- Sep 19 - 24 : Quaternary, (6th Meeting), Galicia, Spain. (Sr. Secretario del Grupo Espanol de Trabajo del Cuaternario, Instituto de Edafologia y Biologia Vegetal, Serrano, 115 duplicado, Madrid-6, Spain).
- Dec : Groundwater 1983 (IAH Symposium), Sydney, Australia. (W. Williamson, Ibis House, 201/211 Miller St., P.O. Box 952, North Sydney, NSW 2060, Australia).

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- Mar/Apr : Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA V), Kuala Lumpur, Malaysia. (T.T. Khoo, Geological Society of Malaysia, Dept. of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia).
- Mar 26 - 30 : Computer applications in the mineral industries (18th International Symposium), London, U.K. Organized by the Institution of Mining and Metallurgy. (The Conference Office, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK).
- Aug 4 - 14 : 27th International Geological Congress, Moscow, USSR. (N.A. Bogdanov, General Secretary, Organizing Committee of the 27th IGC, Staromonetny per. 22, Moscow 109180, USSR).
- Aug 9 - 18 : Crystallography, (13th General Assembly and International Congress), Hamburg, F.R.G. (E.E. Snider, American Crystallographic Association, 335 East 45th Street, New York, NY 10017, USA),
- Aug 24 - 30 : 6th International Palynological Conference, Calgary, Canada. Sponsored by ICP, CAP, CSPG, the University of Calgary, and Arctic Institute of North America. Pre- and post-Conference excursions. (L. Kokoski, Conference Office, Faculty of Continuing Education, Education Tower Room 102, Calgary, Alberta, Canada T2N 1N4).
- Sep : Caledonide Orogen, (IGCP Project 27, Working Group Meeting), Edinburgh, Scotland. Pre-Meeting excursions in Ireland, Scotland, England and Wales. (A.L. Harris, The University of Liverpool, Jame Herdman Laboratories of Geology, Brownlow Street, P.O. Box 147, Liverpool L69 3BX, UK).
- Nov 5 - 8 : Geological Society of America, (Annual Meeting), Reno, USA. (S.S. Beggs, Geological Society of America, P.O. Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, USA).
- Dec 2 - 6 : Society of Exploration Geophysicists, (54th Annual Meeting), Atlanta, Georgia, USA. (J. Hyden, SEG, Box 3098, Tulsa, Oklahoma 74101, USA).

