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CATATAN GEOLOGI

(GEOLOGICAL NOTES)

AN EXPERIMENTAL HIGH-RESOLUTION SEISMIC SURVEY OVER TIN-MINE PONDS

SURENDRA Singh and G.A. van KLINKEN, School of Physics, Universiti Sains Malaysia, Penang, Malaysia.

Abstract

A study was carried out to investigate the usefulness and workability of employing high-resolution reflection seismics in tin-mine ponds of the Kinta Valley, Peninsular Malaysia. Results indicate that strong reflections can be obtained and a field procedure can be worked out for detailed mapping of the irregular topography of the limestone bedrock. It has not been possible to identify the sedimentary lithology and structure, with the present equipment. Appropriate updating of the acquisition system, especially the seismic source, is recommended. The routine use of a combination of seismic survey and drilling will result in cost- and time-savings and also enhance greatly the horizontal definition in the overall program of tin-ore reserve evaluation and mining.

Introduction

Some parts of the tin fields of the Kinta Valley, Peninsular Malaysia, which is one of the richest areas of placer-tin deposits, are covered by fresh-water ponds. These ponds are old tin mines which had been dredged out for alluvial placer tin and later abandoned. They have a fill of unconsolidated sand with gravel and clay. These mine ponds are scattered all over the tin fields in the country. Such old, dredged-out mines are still rich in tin ore, mostly embedded in crevasses and troughs of the limestone bedrock, and also in alluvial sand which was difficult to dredge out. The ponds can be mined in future for the remaining tin ore, using gravel-pump mining.

A review by Rajah (1979) describes the geology of the Kinta Valley in detail. For the purpose of our study, the cross-section in Fig. 1, based on drillhole data, typifies the geological situation in mine ponds of this area. The limestone bedrock has a characteristic trough-and-pinnacle topography, with steep slopes. The bedrock is overlain by old alluvial sand and unconsolidated fill of sand.

Estimating the tin-ore reserves and planning a gravel-pump mine to exploit the remaining ore, requires a reliable map of the bedrock's topography and the thicknesses of the overlying alluvium. Presently, this information is obtained by drilling to the bedrock. Depths to bedrock vary from 0 to almost 80 m. Though it depends upon the depth, a drillhole can cost, on the average, about M$900, all direct and indirect expenses included. In addition to being expensive and time-consuming, the horizontal definition of drilling is poor. Drillholes

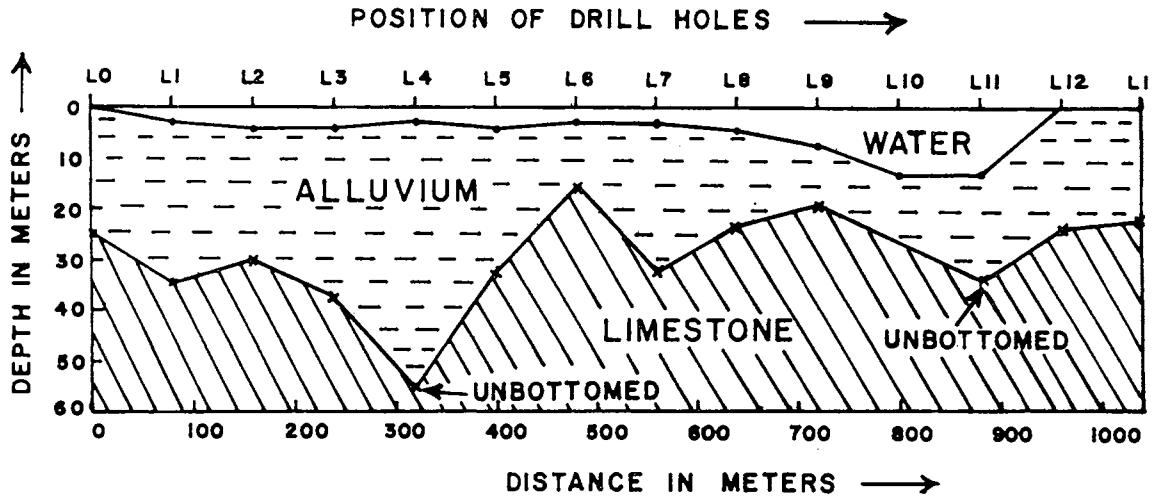

Fig. 1. Cross-section of a mine pond; based on drillhole data.

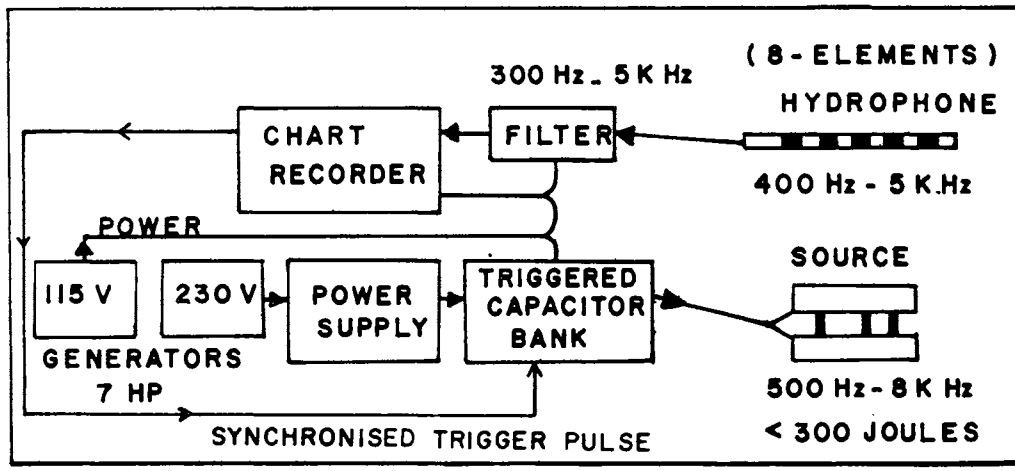

Fig. 2. Block diagram showing the components of the seismic data acquisition system.

in this area are usually put 80 m apart, in a grid pattern. It is not uncommon for the limestone bedrock here to find two pinnacles spaced only 10 m apart. Noting that placer tin is found in the alluvium as well as troughs of the bedrock, the poor horizontal definition with drilling can result in underestimation as well as overestimation of ore reserves; an overestimation can prove economically tragic to a miner. A detailed knowledge about the bedrock's topography is similarly useful in planning a mine operation. In mining operations, for example, the gravel pump should be ideally located at the lowest level of the bottom of minehole and as near to the processing plant as possible. The size of the processing plant and the machinery used depends on the amount of the ore reserve in a mine area. The thickness of the overburden and the depth of the mine hole are also important factors. A relatively thick overburden, which is to be thrown away, and a shallow mine hole will increase the cost of production. A detailed depth determination, therefore, is highly desirable for tin-ore reserve evaluation and mining.

Considering the economics, time and poor horizontal definition of using only drilling, the significance of using a suitable geophysical method along with drilling is obvious. An experimental study was carried out to investigate the feasibility of using a high-resolution reflection seismic survey for a detailed delineation of the bedrock's topography, and also to check the possibility of identifying the lithology and structure of the unconsolidated sediments overlying the bedrock. With a detailed knowledge of the topography, reserves can be assessed by drilling at potential locations such as at troughs located at L1, L4, L7, L11, etc. in Fig. 1.

The seismic instruments used for the survey are shown by a block diagram in Fig. 2. The data-acquisition system employed is a typical analogue seismic EG & G unit used in conventional high-resolution offshore marine seismic surveys. The seismic source consists of an electromechanical transducer which converts a high voltage (about 3500 volts) electrical pulse from the power-supply-capacitor-bank unit into an acoustic-pressure pulse, with a booming sound. The energy of the source is below 300 Joules and is quite sufficient for shallow depths encountered in the Kinta Valley. All the component parts of the system operate in the 300 Hz - 5 kHz range, making it a high-resolution survey. Time differences of up to 1 millisecond can be easily read off the seismic record. This implies that vertical depths can be determined within 0.85 m, using an upper velocity value of 1700 m/s for the alluvium velocity in this area. Wavelengths of the reflected signal would be less than 3.5 m for a signal frequency of 500 Hz. The radius of the central quarter-wavelength Fresnel zone (Sheriff, 1978, p. 125) will then be 9.4 m for a depth of 50 m and 6.7 m for a depth of 25 m. Theoretically, then, the energy at the hydrophone comes from a portion of the reflecting surface of 5 m - 10 m radius, for depths encountered in the Kinta Valley.

General survey considerations

The purpose of the survey, size of a pond, boat size and its speed, source type, and other similar variables make a survey over a mine pond somewhat different from the usual marine seismic surveys, as far as their problems and solutions are concerned. We discuss here the features of the seismic survey over a fresh-water mine pond.

Pond boundaries are mostly irregular, making it difficult to organize the survey lines. Size of a pond can be as long as 400 m in

any one direction. Irregular boundaries along with the small size of a pond require frequent turnarounds of the boat. Another important factor to consider in designing the survey is the depth of water. Water depths can vary from almost zero to more than 20 m. Weeds are commonly found around the perimeter of a pond, restricting the area accessible to the boat and equipment. It is usually necessary to have a second boat for clearing the weeds and for other chores. It is necessary to use the boat of a size and draft as small as possible. Small draft is very important, otherwise the boat is often stuck in the mud and also passage through shallow water is made difficult. The water surface of a pond is calm, mostly; we can, therefore, look for a boat with very slow speed, just enough to keep the cables of the source and hydrophone taut. A high-density seismic data can thus be obtained.

The boat used by us could go as slow as about 25 m/minute. A full survey line of 400 m length takes only about 16 minutes to complete. This results in frequent turnarounds. One person had to virtually reserve himself solely for maneuvering the hydrophone cable and heavy source at turns, to keep them from getting stuck in shallow mud or weeds. A wire cage around the propeller is highly recommended. At least three additional persons are required on the boat - a pilot, a position-fixing man and one for the equipment. Thus, the boat should be large enough to accomodate at least four persons and about a ton of equipment. As far as the total time of the survey is concerned, it takes about half a day to get the seismic gear in ready shape. Thereafter, it might take only a day to finish the survey for a pond.

For transfering the seismic results to the map of the pond, accurate positions of source-detector system should be known, every minute or less. Accurate and frequent positioning is important for detailed depth determination because the bedrock topography is highly irregular. Positioning by continuous radio-fixing, accurate to 1 m, is the best method, even though it is expensive to buy or rent. If all other things are in a ready-to-go state, it will be advisable to rent the radio-fixing equipment for the final stage of data collection. For the purpose of rough position fixing, like in our experimental study, three theodolites were used with fixed and accurately determined locations. Simultaneous measurement of two angles at the boat from these three theodolites can give the rough position of the boat at any time. This information is relayed, through walkie-talkie, to a person on the boat who then marks it on the seismic record. A third procedure, simple and cheap, is to lay down the survey lines in water with some thin, light string which is kept afloat with buoyant material. The boat runs as close and parallel to the line as possible. The problem with survey lines of this nature is that sufficiently long lines cannot be placed in all parts of the pond; further, entanglements at turnarounds are common and the boat cannot cross these lines as needed, for example, for turning.

Discussion of seismic results

The geometry of the source-hydrophone system is shown in Fig. 3. Due to the slow speed of about 25 m/minute, there was almost no wake generated by the boat. Hydrophone and source were towed in parallel, about 6 m to 8 m behind the boat and with about 3 m separation from each other. The distance between the source and hydrophone should be less than the depth of water. Ideally, then, they may have to be fastened together and towed as one unit. However, towing them separately gives greater maneuverability at turning points.

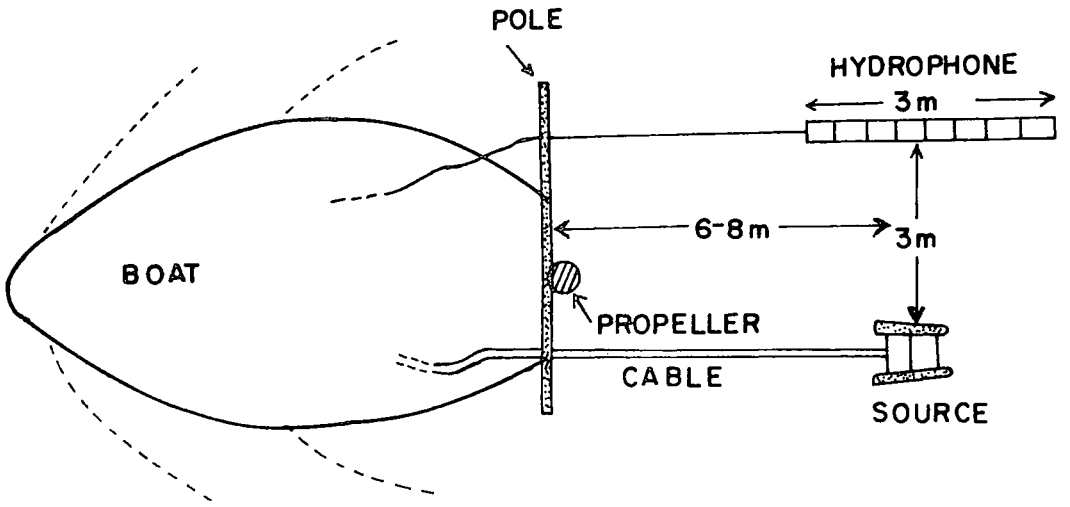

Fig. 3. Geometry of the relative positions of source, hydrophone and boat.

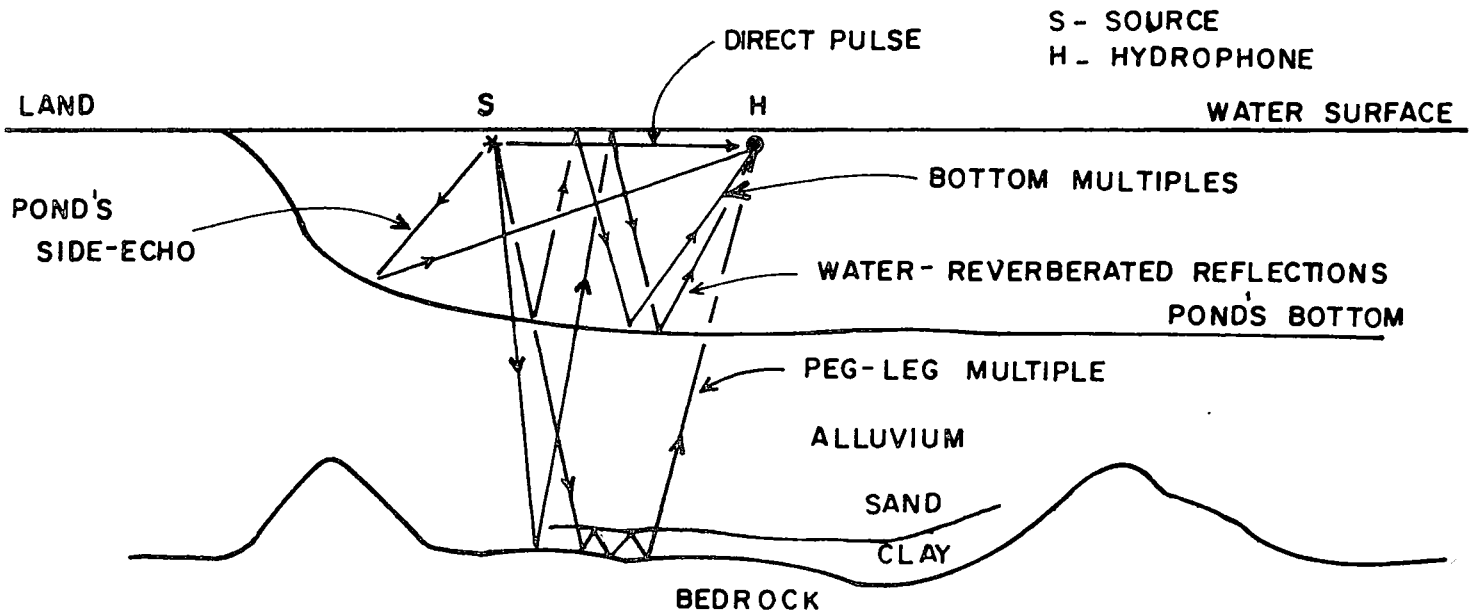

Fig. 4. Schematic diagram showing the cross-section of a mine pond and some relevant travel paths of the seismic energy.

Within a pond it is important for interpretation that one has a theoretical understanding of various possible paths along which the seismic energy can travel to the hydrophone. A typical cross-section of a pond and some possible seismic travel paths is given in Fig. 4. Of particular interest are the water multiples which are of two types - bottom multiples and water-reverberated reflections from the bedrock. Bottom multiples are caused by the energy multiply reflected from the water bottom. On the other hand, water reverberations are multiples in the water layer generated by the trapped energy of seismic reflections from the bedrock (Backus, 1959). Both types are characterized by their separation, on seismic record, equivalent to about two-way travel time in the water layer. Water reverberations, however, manifest their multiples which occur only below the bedrock's position on the record and conform to the 'bedrock' as given by unmigrated reflections. Bottom multiples conform to the water bottom. Both types can exist simultaneously and run at an angle with each other. A third type of multiple that can exist here is the peg-leg multiple, caused by a reflecting sedimentary layer above the bedrock, as shown in Fig. 4. Examples of such multiples can be seen in Figs. 5, 6, and 7, which are samples of the seismic records taken in a mine pond.

Even though good reflections can be obtained from the bedrock, the overall quality of the records is poor due to noise, see Figs. 5, 6 and 7. Part of the reason is the use of an 8-element hydrophone which acts like 8 separate detectors for reflections from the pond sides, shallow water bottom and water surface. But most of the noisy character is inherent in the topography and size of a mine pond. Weak signals and any fine lithological information is lost from the seismic records. A single-element hydrophone should remedy the situation to some extent.

The land seismic refraction studies in the area indicate that the seismic velocities for alluvium range between 1400 to 1700 m/s, depending upon the degree of compaction. Assuming a velocity of 1500 m/s for the top alluvium, 1510 m/s for fresh-water, and a density of top water-bottom alluvium to be of value 2 gm/cc, the water bottom will have a reflection coefficient of about 0.3. The water surface has a reflection coefficient of -1. The water layer is thus a good trap of energy, giving rise to multiples; sometimes almost all of the energy was trapped in the water layer resulting in opacity of the water bottom sediments. The estimated average seismic velocity of alluvium can be checked against drillhole data at some chosen locations. Any small error in the value of the average velocity should not cause any serious difficulty because its effect will only introduce a constant error in the computed depths and relative depths will still be correct, assuming, of course, that there are no lateral variations.

In contrast to most offshore surveys, seismic data from a pond survey represents a 3-dimensional geological picture projected seismically on to a 2-dimensional time-section. A sophisticated digital system and computer processing, as practised in oil industry, can be used to handle 3-dimensional situations. However, the seismic equipment used here does not allow for such a procedure. The interpretation can be helped by equivalently running several seismic lines and looking at them simultaneously. This procedure has limited application in our case due to the irregular pond boundary, small size, and further highly irregular bedrock topography. To illustrate this problem, look at Fig. 7. The deeper pinnacle, right under a shallower

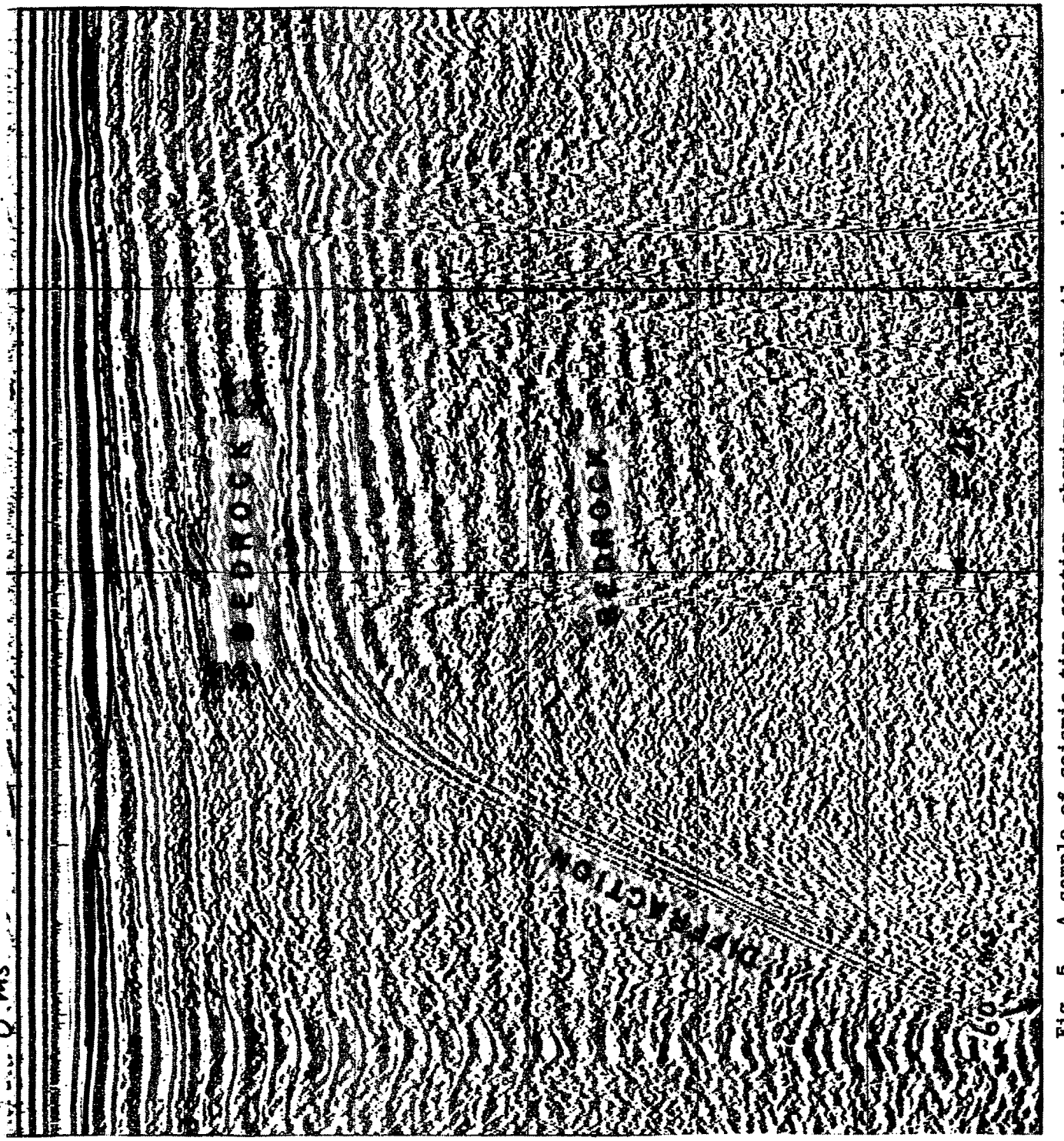

Fig. 5. A sample of seismic time-section, showing an abruptly ending bedrock.

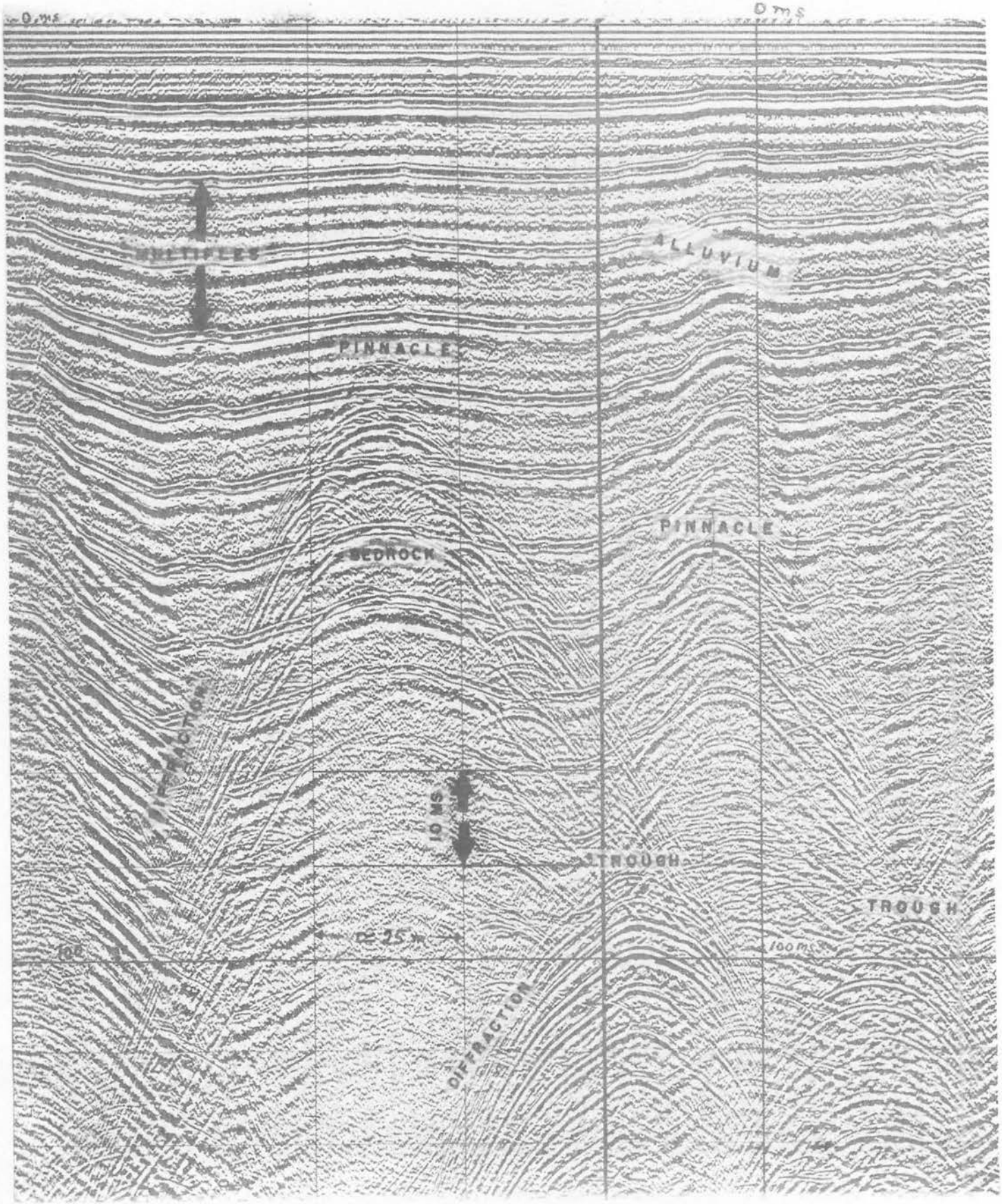

Fig. 6. A sample of seismic time-section, showing multiples, and bedrock's pinnacles and troughs.

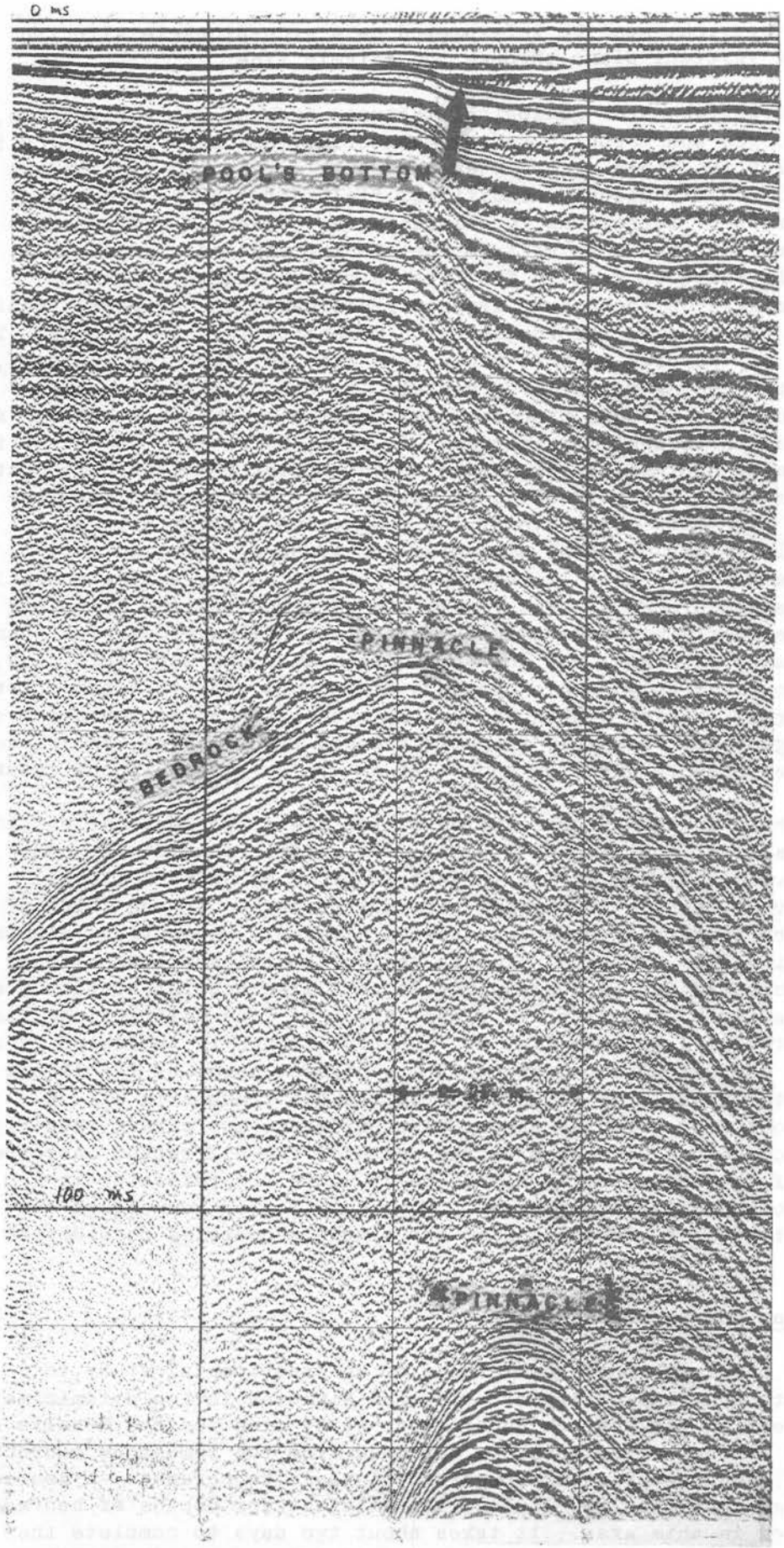

Fig. 7. A sample of seismic time-section, showing a bedrock's pinnacle, and a deeper pinnacle which is, most probably, a side-reflection.

pinnacled bedrock, must be interpreted as a side-pinnacle situated out of the vertical plane through the seismic line.

Diffractions from geological features such as sharp pinnacles, narrow troughs and abruptly ending geometries, can make it difficult to interpret the field record even though it may be a 2-dimensional situation. Under suitable conditions, field data can be processed with 'migration' techniques to eliminate the effect of diffractions and side-reflections such as from the sloping side of a pinnacle. Again, this would be greatly facilitated with a digital system. However, migration techniques are not practicable in our case. Besides, migrating the seismic records is not a necessity for our purpose. The locations of features such as pinnacles, troughs, see Figs. 6 and 7, and abruptly-ending reflectors, see Fig. 5, can be marked on the seismic records, without precisely delineating the bedrock between a pinnacle and a trough, for example. As an illustration, we notice in Fig. 6 that two pinnacles separated by only about 50 m and buried at about 45 m are clearly resolved to within 5 m, diffraction notwithstanding. The main objective of the geophysical survey here is to know the locations of these pinnacles and troughs, etc., so that drillholes can be placed at the appropriate sites, or a mine operation can be planned properly. The resolution of structure and lithology within the overlying unconsolidated material is less successful - an overabundance of signal due to water-bottom and 'peg-leg' multiples, and due to the highly complex pattern of bedrock echoes, swamp out the subtle signal arising within the softer material. An improved source-receiver geometry, possibly slightly reduced input energy, and above all more experience gives us hope that we can do better in the future.

To help in the interpretation of the field records, one has to know the salient features of a diffracted seismic record. A good qualitative discussion on the subject is given by Sheriff (1978); some relevant results are briefly summarized here. We can think of the bedrock topography as being made up of simple geometrical elements such as pinnacles, troughs, sloping and horizontal surfaces with or without abrupt ends. A sharp pinnacle acts like a point scatterer and is accompanied by two sloping, almost straight line diffractions, as shown by two pinnacles in Fig. 6. A narrow trough is indicated by an inverted, convex upward, curve with its highest point at the lowest point of the trough, as illustrated by the two troughs in Fig. 6. Diffractions from abruptly-ending flat surfaces, are curves, see Fig. 5, whose curvature decreases as the depth of the diffractor increases. The end of the reflector is at the point where the reflector is tangent to the diffraction curve. More complicated geometries can be thought of as a combination of the simple geometries considered here.

Conclusions and recommendations

The paper presents the results of an experimental study to investigate the feasibility of using the high-resolution seismic method for delineating the bedrock under fresh-water mine ponds. Results show that very strong reflections are obtained from the limestone bedrock which has a characteristic trough-and-pinnacle topography. A source with energy less than 300 Joules is sufficient for depths of bedrock encountered in this area. It takes about two days to complete the seismic survey in a pond - starting from loading and ending with unloading the equipment from the boat. A 2-day survey may cost, under

routine conditions, about M$3000., including equipment rental, professional help, but not including the position-fixing gear.

There are some situations where difficulties can and do arise in interpreting the field data. Problems that exist can be put under four headings - source, multiples, diffractions, and 3-dimensional side-reflections. Multiples can be reduced by using a single-element hydrophone, and by towing the hydrophone close to the seismic source and also by scattering water-surface-reflections by generating a turbulence in the intervening medium between source and hydrophone. As far as the source is concerned, it must be light enough for maneuvering at turns. Further, to suppress diffractions and side-reflections, the best solution is to have a directional source with a narrow cone of energy radiating downwards. We have made a prototype of such a source. Essentially, the source is a sparker of about 0.3 m length and it can impart energy in the range of 100 to 300 Joules. The sparker is to be enclosed inside a sealed plastic bag with salt solution. The plastic bag, in turn, will be enclosed in a rectangular box of about 0.6 m x 0.6 m base and 1 m length, all to go inside the water of the pond. The energy will emerge only through the thin plastic bottom with a cone of about 20 degrees, and will be sufficiently attenuated by absorbers on four long vertical sides. It is very light and will be suitable especially for surveys in ponds.

Our studies have demonstrated that high-resolution reflection seismics can satisfactorily help in tin-ore reserve evaluation and exploitation of areas under mine ponds. A practical and inexpensive field procedure can be worked out. Besides the cost- and time-savings, a combination of seismic survey and drilling improves the overall evaluation and mining program.

Acknowledgements

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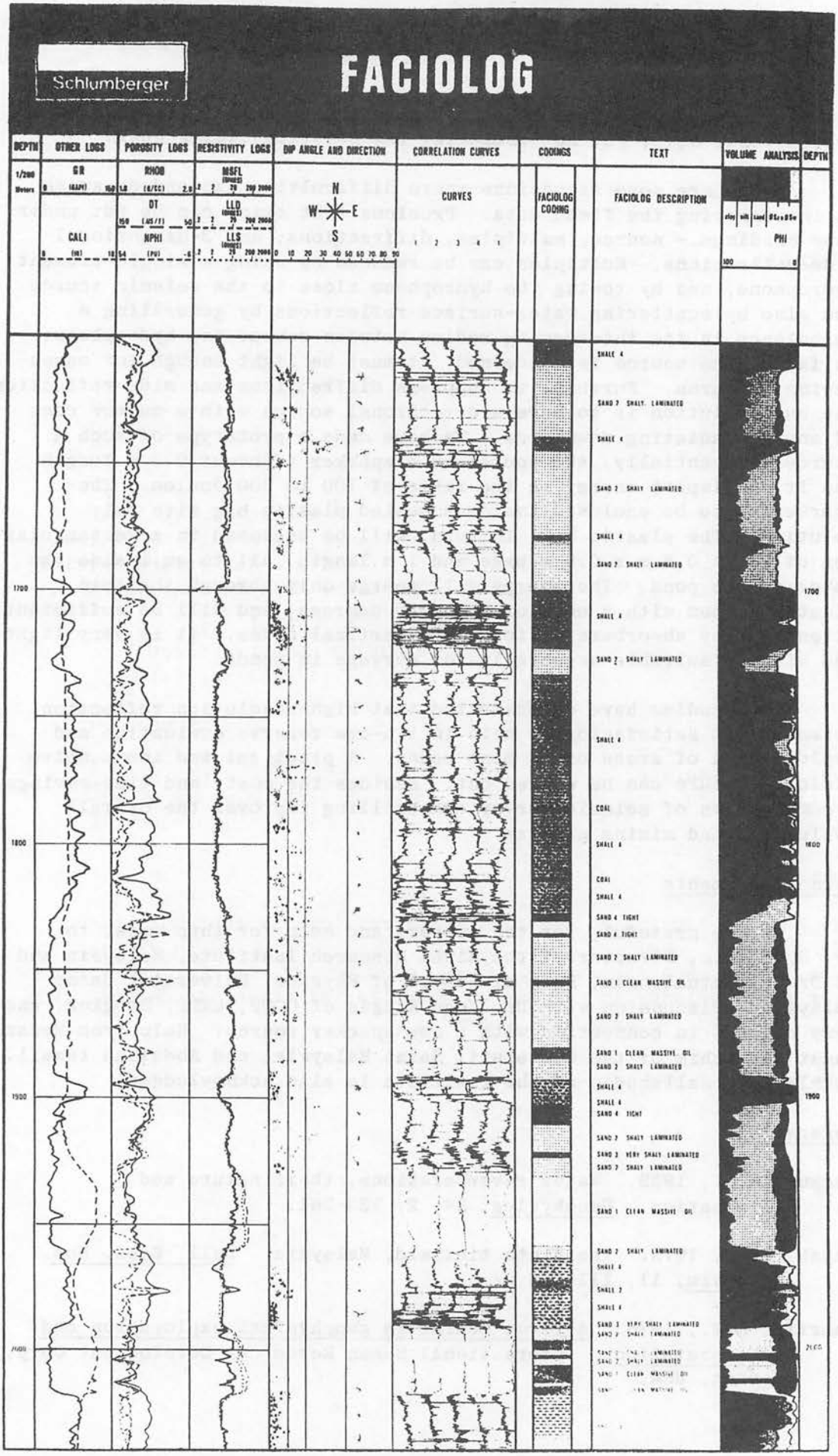

Wireline logging data is finding wider applications in sedimentology. This began with the study of log curve shapes to identify different depositional sequences. Recent developments have led to the use of logs to identify "electrofacies"—that is, a set of log responses that characterizes a sediment and distinguish it from others. The objective is to associate a certain type of lithofacies defined by core data with a set of log responses so that such a lithofacies can be identified in other wells without core data. This can also be used to guide the choice of interpretation model and in well to well correlations.

PERTEMUAN PERSATUAN

(MEETINGS OF THE SOCIETY)

TECHNICAL TALKS

J.V. WATSON: A deeply eroded collision orogen: the Caledonides of Britain

Prof. J.V. Watson, who is in Malaysia as External Examiner in Geology to the Department of Geology, University of Malaya, gave the above talk to an interested audience at the University on 21 March 1984.

Professor Watson started off her talk by mentioning that the Caledonian cycle ended in a collision orogeny involving the large continental plates of Europe and North America. The suture marking the former site of the Iapetus Ocean crosses Britain near the Scottish border and continues into Ireland via the Solway Firth.

After reviewing the geology of the European part south of the suture, Professor Watson then concentrated most of her talk on the "North American" part, in particular the Caledonian foldbelts of Scotland. The Southern Uplands of Scotland has been documented as an accretionary wedge deposited and deformed along the North American continental margin from 490 to 420 Ma ago. The Highland region was initially separated from the continental margin, firstly by a more stable block of continental crust analogous to that now underlying the Midland Valley, and secondly by the Southern Uplands accretionary prism. Caledonian deformation began in the weak Dalvadian Basin and extended northwestwards into the Moine. The Iapetus Ocean closed 420 Ma ago, causing an onset of sinistral transcurrent motions on NE-SW lines. Regional uplift of the thickened Dalvadian sedimentary pile led erosion and removal of 20 to 30 km thickness of overburden from the Highlands in Ordovician and Silurian times, as deduced from the uplifted metamorphic isograds.

Caledonian magmatism began with the development of the strike-slip faults. The positions of the granites were strongly influenced by transverse NW-SE dislocations in the lower crust as shown by the gravity anomalies. The deep seated dislocations acted as conduits for the melts over periods up to 25 Ma. The granites are of sub-crustal origin and magmatism was triggered by vertical and horizontal block movements.

C.S. HUTCHISON

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GEOSEA V - Laporan (Report)

After months of planning, eversince accepting to host GEOSEA V in the Philippines in November 1981, the triennial event was declared open by the Minister of Primary Industry, Datuk Paul Leong, at the Federal Hotel in Kuala Lumpur on the 9 April 1984.

A large gathering of over 300 participants included not only members of the GEOSEA core region, but also interested earth scientists from China, USA, Europe, Africa and Australia.

About 160 papers were presented. These included 2 keynote addresses and the rest had to be split into 2 parallel sessions running simultaneously for the 5-day period of the Congress (see Programme).

During the course of the Congress the participants not only renewed acquaintances, exchanged notes and ideas but also reviewed recent advances in the knowledge of geology, mineral and energy resources of the GEOSEA region.

A number of Training/Continuing Education Cources were held and were well attended. These included the CCOP-ASCOPE-GEOSEA Course on Carbonate Diagenesis, the RMRDC-SEATRAD-GEOSEA Course on Geochemical Exploration in Tropical Terrain, GEOSEA Course on Alluvial Deposits Evaluation, GEOSEA Course on Current Concepts in Tectonics, GEOSEA Course on Geochemistry of Granite, AMF-GEOSEA Course on Coal Deposits - Exploration & Assessment and the SEATRAD-GEOSEA Course on District Analysis as a Process for Target Generation and Exploration Design for Sn/W Deposits.

At the closing ceremony on the afternoon of 13 April, Dr. Delaney on behalf of the participants complimented Dr. T.T. Khoo the GEOSEA V organising chairman for the excellent organisation and the ladies at the registration counter for their outstanding hospitality. In his closing address, Dr. Khoo thanked all participants and those who have helped in the organisation in one way or another and apologised for any unforeseen shortcomings and inconvenience. He then announced that Indonesia has agreed to host GEOSEA VI. The Indonesian representative on accepting the responsibility extended his invitation to the participants to Bali (?) in 1987.

Those interested in seeing the country and its geology and economic deposits were able to participate in the post-Congress fieldtrips which included Kuala Lumpur Tin Field/Genting Highlands, Langkawi Islands, and the Lupar Line - Bau, Sarawak (see GEOSEA V Field Trips).

G.H. TEH

GEOSEA V Captions of photos

1. At the GEOSEA V Registration Desk.
2. Participants at SEATRAD Centre's Exhibition.
3. GSM President, Dr. T.T. Khoo, with his welcoming address.
4. YB Dato' Paul Leong with his speech.
5. The large turnout at the Opening Ceremony.
6. YB Dato' Paul Leong declaring the Congress open.
7. Sections of the participants at the Opening Ceremony.
8. Sections of the participants at the Opening Ceremony.
9. Participants showing keen interest at the New Maps display.
10. Prof. R.W. Hutchison with his keynote address on "Massive Sulphide Deposits".

11. Prof. W.S. Fyfe with the other keynote address on "Global Tectonics and Resources".
12. M.G. Andley-Charles with his presentation on the Banda Arc.
13. S. Bunopas of Thailand on the Phuket-Kaeng Krachar Groups.
14. K. Kanehira of Japan on the Metallogenic Map of South and East Asia.
15. R.G. Taylor of Australia on Exploration Modelling for Tin Deposits.
16. R. Soeria-Atmadja of Indonesia on Tin Mineralisation in Bangka.
17. A.J. Barber of U.K. on Hydrocarbon occurrences and Tectonics in S.E. Asia.
18. D.B. Dow on Irian Jaya.
19. L.H. Chu of Geological Survey Malaysia on Gold Mineralisation in Kelantan.
20. T.A.P. Kwak of Australia on Sn-sulphide Replacement Style Deposits.
21. Xu Kegin of China on Tin-Tungsten Granites.
22. W.S. Ong of Geological Survey Malaysia on gold investigation in the Mengapur Base Metal District.
23. C.K. Burton on the Kanchanaburi Supergroup of Thailand.
24. S. Paramanathan of Universiti Pertanian Malaysia on Soil Landscapes in Peninsular Malaysia.
25. P.M. Afenya of Papua New Guinea on PNG Chromites.
26. C.A. Foss of University of Malaya on Gravity Survey in the K.L. area.
27. T. Suntharalingan of Geological Survey Malaysia on Placer Tin Deposits in the Kuantan area.
28. H.S. Weber on the Base Metal Exploration in Sabah.
29. C.S. Hutchison on Tertiary Basins of SE Asia.
30. P. Birt ably presenting his paper West Timur.
31. K.K. Cheang on Processing of Columbite Concentrate from Bakri.
32. Tea time in-between sessions, fully utilised for discussion and exchange of notes.
33. W.K. Fletcher of SEATRAD Centre on Tin and associated elements in a mountain stream, Bujang Melaka.
34. S.P. Chen on Coal Potential and Exploration in Sarawak.
35. J.H.A. Bosch on Sedimentary Environment and Paleogeography of the Holocene.
36. B. Ratanasthien of Thailand on Spontaneous Fires in Northern Thailand coals.
37. P. Rao on Permo-Triassic Carbonates of Malaysia.
38. I. Metcalfe of University of Malaya on Late Palaeozoic Palaeo-geography of SE Asia.
39. G.A.M. Kruse of Netherlands on Pleistocene gravel, Phuket Island.
40. L.S. Leong of Universiti Sains Malaysia on Seismic Risk Parameters.
41. Visut Pisutha-Arnond of Thailand on the Evaporitic Anhydrite of NE Thailand.
42. M.P. Atherton on the Tak Batholith, Thailand.
43. Surendra Singh of USM on Reflection Seismics in Tin Exploration.
44. P.C. Aw of Geological Survey Malaysia on Kaolin Deposits.
45. Tan Boon Kong of Universiti Kebangsaan Malaysia on the Standard Penetration Test.
46. T.S. Kwan of Geological Survey Malaysia on the K/Ar ages of biotites.
47. J. Pitts of Singapore on Residual Soil Formation.
48. N. Oba of Japan on the geologic significance of granite fragments.
49. F.L. Yap of Geological Survey Malaysia on age determination.
50. K.R. Chakraborty of Universiti Malaya on the Alkaline Basaltic Rocks of Kuantan.

51-53. The participants are treated to a sumptuous 10-course dinner.

54. The Organising Chairman declaring GEOSEA V over.
55. Dr. Delaney with her speech on behalf of the participants.
56. The crowd at the closing ceremony.
57. The enthusiastic Thais with a picture for the album.
58. Sections of the crowd at the Closing Ceremony.
59. A last cup of tea and some final discussions before departure.

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PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)

FIFTH REGIONAL CONGRESS ON THE GEOLOGY, MINERAL AND ENERGY RESOURCES OF SOUTHEAST ASIA

GEOSEA V

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PROGRAMME

9 April 1984 Opening Ceremony

0910-0920 Welcoming Address by Dr. T.T. KHOO, President, Geological Society of Malaysia and Organizing Chairman, GEOSEA V.

0920-0950 Opening Address by The Honourable Dato' Paul Leong Khee Seong, Minister of Primary Industries Malaysia.

9 April 1984 Keynote Addresses

1030-1130 Prof. W.S. FYFE, Dept. of Geology, Univ. of Western Ontario, London, Canada.
Global tectonics and resources

1130-1230 Prof. R.W. HUTCHINSON, Geology Dept., Colorado School of Mines, Golden, Co. 80401, USA
Massive sulphide deposits and their significance to other ores

9 April 1984 Geological Evolution

1400-1420 KHOO, T.T., Dept. of Geology, University of Malaya, Kuala Lumpur.
Contact Metamorphism in the Patani Metamorphic Terrane, Northwest Peninsular Malaysia

1420-1440 HELMCKE, DIETRICH, Inst. Applied Geology, FUB, Wichernstt. 16, D-1000 Berlin 33, West Germany.
On the Geology of the Petchabun Fold-Belt (Central Thailand) - Implications on the Geodynamics Evolution of Mainland SE Asia

1440-1500 BURRETT, CLIVE and STAIT, BRYAN, Geology Department, University of Tasmania, Box 252C, Hobart, Tasmania, Australia 7001.
South East Asia as a Part of an Early Palaeozoic Gondwanaland

1500-1520 BUNOPAS, S.[1] and VELLA, P.[2]
[1]Geological Survey Div,. Dept. of Mineral Resources, Rama VI Rd., Bangkok. [2]Department of Geology, Victoria University of Wellington, Wellington, New Zealand.
Phuket-Kaeng Krachan Groups, a rifted continental margin deposit with effect of ice-rafting megaclasts from Gondwana

1550-1610 FULLER, M. and JIN-LU LIN, Dept. of Geological Science, University of California, Santa Barbara, California 93106, U.S.A.
Paleomagnetism of an Accrectionary Margin: S. China and S.E. Asia

1610-1630 TJIA, H.D., Department of Geology, University Kebangsaan Malaysia, Bangi, Malaysia.
Directions of Geologic Transport in Peninsular Malaysia

1630-1650 METCALFE, I., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.
Late Palaeozoic Palaeogeography of Southeast Asia: Some Stratigraphical, Palaeontological and Palaeomagnetic Constraints

1650-1710 **NGUYEN XUAN TUNG, Institute of Geology & Mineral Resources, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Geodynamic Evolution of Southeast Asia in the Context of New Global Tectonics

1710-1730 **HOANG HUU QUY, Institute of Geology & Mineral Resources, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Tectono-Magmatism Evolution in Criptozoic of South Vietnam

9 April 1984 Economic Geology

1400-1420 **YEAP E.B., Department of Geology, University of Malaya, Kuala Lumpur.**
Geology of some Malaysian Fe-Sn Deposits and Their Significance

1420-1440 **TAYLOR, R.G. and POLLARD, P.J., Geology Department, James Cook University, Townsville, Q4811, Australia.**
Recent Advances in Exploration Modelling for Tin Deposits, and Their Application to the S.E. Asian Environment

1440-1500 **WAN FUAD HASSAN, Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi, Malaysia.**
Aspects on the Geochemistry of Malaysian Cassiterites

1500-1520 **KWAK, T.A.P., Dept. of Geology, La Trobe University, Bundoora, Victoria, Australia.**
An Overview of Sn-Sulphide Replacement Style Deposits in Australia

1550-1610 **MOH, GUNTER H., Mineralogisches Institute, Postfach 10-4040, 6900 Heidelberg, Germany.**
Complex Tin-Bearing Sulfides of the South Chinese Ore Type

1610-1630 **NGUYEN VAN NGOAN and NGUYEN KIM HOAN, Institute of Geology & Mineral Resources, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Element-Impurities in Cassiterites of Vietnam and Their Indicating Value

1630-1650 **LE THAC XINH, General Dept. of Geology, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Metallogeny of Hoang Lien Son Subduction-Like Zone, North Vietnam

1650-1710 **ASNACHINDA P. and CHANTARAMEE, S., Dept. of Geological Sciences, Chiangmai University, Chiangmai, Thailand.**
Regional Control of Hydrothermal Ore Localization in Northern Thailand

10 April 1984 Geological Evolution

0850-0910 **MURPHY, R.W., 8, Ashley Drive, Walton on Thames, Surrey KT121JL, United Kingdom.**
Taiwan: Symmetry Axis of East Asia

0910-0930 **BARBER, A.J.[1] and MURPHY, R.W.[2]**
[1]Dept. of Geology, Chelsea College, University of London, U.K.
[2]Consulting Petroleum Geologist, Walton-on-Thames, Surrey, U.K.
The Relationship between Hydrocarbon Occurrences and Tectonics in Southeast Asia

0930-0950 **AUDLEY-CHARLES, M.G., Dept. of Geology, University College London, Gower Street, London, WCIE 6BT, U.K.**
Forearc or Foredeep: Tectonic Controversy Concerning Structure of Banda Arc

0950-1010 **PHAM HUY LONG and NGUYEN VAN LIEN, Mine and Geology National College, 6, Pham Ngu Lao, Hanoi, Vietnam.**
About the Rift Regime on the Vietnam Territory

1010-1030 **RATMAN, N. and ATMAWINATA, S., Pusat Penelitian dan Pengembangan Geologi, Jalan Dipenegoro 57, Bandung, Indonesia.**
The Yapen Fault Zone

1100-1120 **LETOUZEY, J.[1], MULLER, C.[1], PELLETIER, B.[2], RANGIN, C.[1,3], and STEPHEN, J.F.[2]**
[1]Inst. Francais du Petrole, 1.4 Ave de Bois, Prean, Rueil Maimaison.
[2]Universite Bretagne Occidentale & GIS II, Brest.
[3]CNRS-LA215, France.
Middle Miocene (NN5), a Main Kinematic Reorganisation Period for the South China Sea Region

1120-1200 **DOW, DUNCAN B. and HARTONO, UDI., Indonesia-Australia Geological Mapping Project, Bureau of Mineral Resources Australia, Jalan Cilaki 49, Bandung, Indonesia.**
Irian Jaya - The End-Product of Convergence between the Australian and Pacific Plates during the Pliocene

1200-1220 **FRANCIS, G.[1], ROGERSON, R.[1], HAIG, D.W.[2] and SARI.J.[1]**
[1]Geological Survey of Papua New Guinea, Papua New Guinea.
[2]Department of Geology, University of Papua New Guinea, Papua New Guinea.
Neogene Stratigraphy, Structure and Petroleum Potential of the S.E. Margin of the Papuan Fold Belt, Papua New Guinea

1220-1240 **HARTONO, H.M.S. and TJOKROSAPOETRO, S., Geological Research and Development Centre, Bandung, Indonesia.**
Geological evolution of the Indonesian archipelago

1240-1300 **HUTCHISON, CHARLES S., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Tertiary Basins of Southeast Asia - Their Disparate Tectonic Origins and Eustatic Stratigraphic Similarities

1400-1420 **TAIYAQUPT, M. and CHARUSIRI, P., Dept. of Geology, Faculty of Science, Chulalongkorn University, Thailand.**
Geology and Stratigraphy of Sri Racha Area, Chonburi Province, Eastern Thailand

1420-1440 **BURTON, C.K., BP, Tanglin P.O. Box 288, Singapore 9124.**
The Kanchanaburi Supergroup of Peninsular and Western Thailand

1440-1500 **WYATT, D., PRASADA RAO, C. and BURRETT, C.F., Department of Geology, University of Tasmania, Hobart, Tasmania, Australia.**
Sedimentology of the Ordovician Setul Limestone, Pulau Langkawi, Kedah, Malaysia

1500-1520: **WORKMAN, D.R., ADDISON, R., BENNETT, J.D. and BURNETT, A.D. Dept. of Geography and Geology, University of Hong Kong, Hong Kong.**
Present understanding of the Pre-Cenozoic stratigraphy of Hong Kong

1550-1610 **ABDUL HALIM QUAZI, School of Physics, Universiti Sains Malaysia, Penang, Malaysia.**
Geological Framework of Bangladesh

1610-1630 **NANDY, D.R., Geological Survey India, 29 J.L. Nehru Road, Calcutta-700016, India.**
Geology and Tectonics of Arakan Yoma - A Reappraisal

1630-1650 **VENKATARAMANA, P. and DATTA, A.K., Geological Survey of India, 27, Jawaharlal Nehru Road, Calcutta 700016, India.**
Contrasting Volcanic Suites in Naga Hills and their Significance in the Evolution of Indo-Burman Ophiolites

1650-1710 **GATINSKY, YURI G.[1] and HUTCHISON, CHARLES S.[2]**
[1]All-Union Scientific Research, Institute of Geology of foreign Countries, Dimitrova 7, Moscow, U.S.S.R.
[2]Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.
Cathaysia, Gondwanaland and the Paleotethys in the Evolution of Continental Southeast Asia

1710-1730 **SINGH, S.K., DUNCON BOSTI, Circular Road, Dimapur-797112, Nagaland, India.**
A Geosynclinal Model For Indo-Burmese Range

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0850-0910 **RMRDC staff, RMRDC, Bandung, Indonesia.**
Regional Cooperation in Mineral Development in Asia: The Role of the RMRDC

0910-0930 **KANEHIRA, KEIICHIRO., Dept. of Earth Sciences, Chiba University, Chiba, 260 Japan.**
Metallogenic Framework and Metallogenic Map of South And East Asia

0930-0950 **SOERIA-ATMADJA, R.[1]; DARDA, D.[2] and HASANUDDIN[1]**
[1]Dept. of Geology, Institute of Technology Bandung, Bandung, Indonesia.
[2]Geological Research & Development Centre, Bandung, Indonesia.
Some Aspects of Southern Granitoid Complex and Tin Mineralization in the Northern Part of Bangka, Indonesia

0950-1010 **XU KEGIN and ZHU JINCHU, Geology Department, Nanjing University, Nanjing, China.**
Tin-tungsten granites and controlling factors of mineralizations in S. China

1010-1030 **MITCHELL, A.H.G., c/o UNDP, P.O. Box 7285 ADC, MIA Road, Metro Manila, Philippines.**
Mesozoic and Cenozoic Regional Tectonics and Metallogenesis in Mainland SE Asia

1100-1120 **SITANGGANG, J.M., KOMPL. S.D., 8 Telandan, Sungai Liat, Bangka, Indonesia.**
Distribution of Major and Some Trace Elements of some Granites from Bangka, Indonesia

1120-1140 **HANSAWEK, R.,[1] PONGSAPICH, W.[2] and VEDCHAKANCHANA, S.[2]**
[1]Economic Geology Division, Dept. of Mineral Resources, Bangkok, Thailand.
[2]Department of Geology, Chulalongkorn University, Bangkok, Thailand.
Tin-Tungsten Mineralized Granite at Mae Chedi Area, Wiang Pa Pao District, Chiang Rai Province, Northern Thailand

1140-1200 **CHEANG, K.K.[1] and LOKE, M.H.[2]**
[1]School of Applied Science, University Sains Malaysia, Penang, Malaysia.
[2]School of Physics, University Sains Malaysia, Penang, Malaysia.
Preliminary Studies of some Malaysian Granites and related Ore Mineralization

1200-1220 **CHARUSIRI, P., PONGSAPICH, W. and VEDCHAKANCHANA, S., Dept. of Geology, Faculty of Science, Chulalongkorn University.**
Petrological and Geochemical Studies of Granites of Kathu Plutons of Phuket Island, Southern Thailand

1220-1240 **YUAN ZHONGXIN and BAI GE, Inst. of Mineral Deposits, Chinese Academy of Geological Science.**
The rare earth elements geochemistry of Lingshan W-Sn bearing granites and their applications to petrogenesis of the granites

1400-1420 **CHU LING HENG[1] and SANTOKH SINGH, D.[2]**
[1]Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.
[2]Geological Survey Malaysia, Bangunan Ukur, Jalan Gurney, Kuala Lumpur, Malaysia.
The nature and Potential of Gold Mineralization in Kelantan, Peninsular Malaysia

1420-1440 **DEKA, P.J., Dept. of Geology, Gauhati University, Gauhati-781014, Assam, India.**
Nature of Gold Mineralization in certain areas in East Manipur, India, within the Burma-India Ophiolite Belt

1440-1500 **ONG, W.S. and LEE, A.K., Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Gold Investigation in the Sungai Luit Area, Mengapur Base Metal District, Pahang.

1500-1520 **VU NGOC HAI, Mine & Geology National College, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Metallogenic Epochs of Endogenic Deposits in Vietnam

1550-1610 **HEESTERMAN, L.J.L., Chelsea College, University of London, 552 King's Road, London SW10 OUA, U.K.**
Geology and Mineralization of the Mangani area, West Sumatra, Indonesia

1610-1630 **CHU, L.H. and CHAND, F., Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Status of Uranium Exploration in Peninsular Malaysia

1630-1650 **AFENYA, P.M., University of Technology, Lae, Papua New Guinea.**
Papua New Guinea Chromites - A Future Potential Source of Chrome.

1650-1710 **LEE THIEN CHOI and WEBER, H.S., Geological Survey Malaysia, Kota Kinabalu, Sabah.**
Base Metal Exploration in Sabah

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0830-0850 **PHAN CU TIEN, Inst. of Geology & Mineral Resources, Hanoi, Vietnam.**
A Geological Correlation of Permo-Triassic Formations in Vietnam and Neighbouring territories

0850-0910 **COOK, SARAH E., Chelsea College, University of London, United Kingdom.**
Triassic Turbidites in the Kekneno Area, West Timor, Indonesia

0910-0930 **STAUFFER, P.H.[1] and LEE CHAI PENG[2]**
[1]Palo Alto, California 94303, U.S.A.
[2]Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.
Late Paleozoic Glacial Marine Facies in Southeast Asia and Its Implications

0930-0950 **FONTAINE, H., CCOP, c/o ESCAP, UN Building, Bangkok, Thailand.**
Discovery of Lower Permian Corals in Sumatra

0950-1010 **WAJZER, M.R., Chelsea College, University of London, 552 King's Road, London SW10 OUA, U.K.**
The Tectonic Evolution of the Natal Area, North Sumatra

1010-1030 **BIRD, PATRICK R., Chelsea College, University of London, United Kingdom.**
Stratigraphy and structural evolution of Permo-Triassic formations in the Kekneno Area, West Timor

1100-1120 **METCALFE, I., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Conodont Biostratigraphic Studies in Sumatra: Preliminary Results

1120-1140 **PRASADA RAO, C., Dept. of Geology, University of Tasmania, Hobart, Tasmania, Auatralia 7001.**
Sedimentology of Some Permo-Triassic Carbonates of Malaysia

1140-1200 **CHONGLAKMANI, C., Geological Survey Division, Dept. of Mineral Resources, Bangkok, Thailand.**
Upper Permian and Lower Triassic sequence in Amphoe Ngao, Changwat Lampang, Northern Thailand

1200-1220 **BUFFETAUT, E[1] and INGAVAT, RUCHA[2]**
[1]C.N.R.S., Paris
[2]Department of Mineral Resources, Bangkok, Thailand.
The Succession of Vertebrate Faunas in the Continental Mesozoic of Thailand

1220-1240 **MONGKOLTIP, PANJAWAN, Dept. of Geological Sciences, Chiang Mai University, Chiang Mai, Thailand.**
Metamorphic Mineral Assembalges of Doi-Inthanon Gneiss, Northern Thailand

1240-1300 **PHAN TRUONG THI, Dept. of Geology, Hanoi University, Hanoi, Vietnam.**
Physico-Chemical Condition Analysis of Regional Metamorphic Processes in the Evolution of Continental Crust on the Territory of Socialist Republic of Vietnam

1400-1420 **HUTCHISON, CHARLES S., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Marginal Sea Formation by Rifting of the Chinese and Australian Continental Margins and implications for Borneo

1420-1440 **WILLIAMS, P.R., SUPRIATNA, S. and HARAHAP, B., Indonesia-Australia Geological Mapping Project, Jln. Cilaki 49, Bandung, Indonesia.**
Cretaceous Melange in West Kalimantan and Its Tectonic Implications

1440-1500 **TAN, DENIS N.K., Geological Survey Malaysia, Kuching, Sarawak.**
Palaeogeographic Development of West Sarawak

1500-1520 **TRAIL, D.S., HERYANTO, R. and WILLIAMS, P.R., Indonesia-Australia Geological Mapping Project, Jln. Cilaki 49, Bandung, Indonesia.**
Palaegeography and Tectonic Development of the Tertiary Basins in Kalimantan Barat

1550-1610 **SUPRIATNA, S.[1], SUPARKA, E.[2] and SOERIA-ATMADJA, R.[2]**
[1]Geological Research & Development Centre, Bandung, Indonesia.
[2]Dept. of Geology, Institute of Technology Bandung, Bandung, Indonesia.
Basic and Acid Rock Associations Along the Western Coast of West Kalimantan

1610-1630 **SIKUMBANG, N., Chelsea College, University of London, 552 King's Road, London SW10 OUA, United Kingdom.**
The Geology and Tectonics of the Meratus Range, Southeast Kalimantan, Indonesia

1630-1650 **McMANUS, J.[1] and TATE, R.B.[2]**
[1]Dept. of Geology, University of Dundee, Dundee, Scotland.
[2]c/o New House Farm, Hatton, Warrington, Cheshire, U.K.
Mud Volcanoes and the Origin of Chaotic Deposits in Sabah, East Malaysia

1650-1710 **BURTON, C.K., BP, Tanglin P.O. Box 288, Singapore 9124.**
Geological Evolution of the Southern Philippines

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0850-0910 **YEAP, E.B., Dept. of Geology, University of Malaya, Kuala Lumpur.**
The Nature, Characteristics and Genesis of the Kuala Lumpur Tinfield Alluvium

0910-0930 **TAYLOR, D., 106 Duffy Street, Ainslie, ACT 2602, Australia.**
Some Thoughts on the Development of the Alluvial Tinfields of the Malay-Thai Peninsula

0930-0950 **SUNTHARALINGAM, T. and GHANI AMBAK, Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Quaternary Stratigraphy and Prospects for Placer Tin Deposits in the Kuantan Area, Pahang

0950-1010 **HOSKING, K.F.G., IB, Penlu, Tuckingmill, Camborne, TR14 8NL, United Kingdom.**
A review of what is presently known about the nature distribution and genesis of certain authigenic minerals in the stanniferous alluvial deposits of Southeast Asia.

1010-1030 **YIM, W.S., Department of Geography & Geology, University of Hong Kong, Hong Kong.**
Application of the Zeiss TGA 10 Particle Size Analyzer in the Exploration of Tin Placers

1100-1120 **FLETCHER, W.K.[1], DOUSSET, P.E.[1] and YUSOFF BIN ISMAIL[2]**
[1]SEATRAD Centre, Ipoh, Perak, Malaysia.
[2]Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.
Behavious of Tin and Associated Elements in a Mountain Stream, Bujang Melaka, Malaysia

1120-1140 **WIN HTEIN and NANDAR OO, Applied Geology Department, Rangoon University (Hline Campus) 6½ miles, Prome Road, Post Code 11052, Rangoon, Burma.**
On a Tin-Bearing Garnet from the Heinda Tin Deposit, Burma

1140-1200 **CHEN SHICK PEI, Geological Survey of Malaysia, Kuching, Sarawak, Malaysia.**
Coal Potential and Exploration in Sarawak

1200-1220 **RATNASTHIEN, BENJAVUN, Dept. of Geological Sciences, Faculty of Sciences, Chiang Mai University, Chiang Mai, Thailand.**
Factors Concerning with Spontaneous Fires in Northern Thailand Coals

1220-1240 **TEH, G.H., Department of Geology, University of Malaya, Kuala Lumpur, Malaysia.**
The Chederong tungsten-tin deposit, Trengganu, Peninsular Malaysia

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0850-0910 **AW PECK CHIN, Geological Survey of Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Geology of the Kaolin Deposits and their Exploitation in the Bidor-Tapah Area, Perak, Peninsular Malaysia

0910-0930 **SENATHI RAJAH, S., Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Bauxite in the Kuantan Area, Peninsular Malaysia

0930-0950 **U KO KO, SEATRAD Centre, Tiger Lane, Ipoh, Perak, Malaysia.**
Preliminary Synthesis of the Geology of Bangka Island, Indonesia

0950-1010 **ROGERSON, R. and WILLIAMSON, A., Geological Survey, Port Moresby, Papua New Guinea.**
Occurrence, Petrology, Age and Mineralization Associated with Neogene Intrusive Rocks in the Eastern Highlands of Papua New Guinea

1010-1030 **JUNHAVAT, S., LERDTHUSNEE, S. and UTTAMO, W., Dept. of Geological Sciences, Chiang Mai University, Chiang Mai, Thailand.**
Study of Chemical Properties of Carbonate Rocks in Northern Thailand

1100-1120 **YUMUANG, S., KHANTAPRAB, C. and TAIYAQUPT, M., Geology Department, Chulalongkorn University, Bangkok 10500, Thailand.**
On the Evaporite Deposits in Bamnet Narong Area, Northeastern Thailand

1120-1140 **PISUTHA-ARNOND, VISUT[1], HITOSHI CHIBA[2] and SOMBAT YUMUANG[1]**
[1]Geology Dept., Chulalangkorn University, Bangkok 10500, Thailand.
[2]Institute for Thermal Spring Research, Okayama University, Misasa, Totori-ken 682-02, Japan.
A Preliminary Sulfur and Oxygen Isotope Study of the Maha Sarakham Evaporitic Anhydrite from Bamnet Narong Area of Northeastern Thailand

1140-1200 SERTSRIVANIT, S.[1], TANTISUKRIT, C.[1] and PRASERTVIKAI, S.[2]
[1]Dept. of Geological Sciences, Chiang Mai University, Chiang Mai, Thailand.
[2]Special Energy Division, Energy Technology Dept., Electricity Generating Authority of Thailand.
Magnetic Spectrum of the San Kampaeng Geothermal area, Northern Thailand

1200-1220 SURENDRA SINGH and YUSUFF MAHAMOD, School of Physics, Universiti Sains Malaysia, Minden, Penang, Malaysia.
Some Problems of Reflection Seismics for Tin Exploration/ Exploitation in Kinta Valley

1220-1240 CHEANG, K.K., School of Applied Science, Universiti Sains Malaysia, Penang, Malaysia.
Processing of a Columbite Concentrate From Bakri, Muar, Johore, Malaysia

1240-1300 RAMINGWONG, T., Dept. of Geological Sciences, Chiangmai University, Chiangmai, Thailand.
Development of the San Kampaeng Geothermal area, Thailand

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Recent Advances in the Knowledge of Geology, Mineral and Energy Resources since 1981.

1400-1420 MALAYSIA

1420-1440 THAILAND

1440-1500 SINGAPORE

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1550-1610 VIETNAM

1610-1630 PAPUA NEW GUINEA

1630-1650 PHILIPPINES

12 April 1984 Quaternary - Processes, Events & Applications

0850-0910 TEN CATE, J.A.M., CCOP Project Office, 41 Sukhumvit 4, Bangkok, Thailand.
Progress in Quaternary Geological Investigations in South-east Asian Countries since GEOSEA IV, Manila 1981

0910-0930 HILLEN, R., CCOP Project Office, 41 Sukhumvit 4, Bangkok, Thailand.
Palynology as a tool in delineating tropical lowland depositional environments of Late Quaternary age

0930-0950 BOSCH, J.H.A., Geological Survey of Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.
Sedimentary Environments and Palaeogeography of the Holocene in Lower Perak and Kelantan

0950-1010 KRUSE, G.A.M., Comparative Sedimentology Division, State University, Utrecht, Netherlands.
On a Pleistocene gravel beach sequence exposed in coastal plain tin mines, Phuket Island, Thailand

1010-1030 PRAMOJANEE, PAIBOON and HASTINGS, PAUL J., Soil Survey Division, Dept. of Land Development, Bangkok, Thailand.
The Holocene Transgression in Peninsular Thailand

1100-1120 **BEAUMONT, T.E., and HUNT, T., Scott Wilson Kirkpatrick and Partners, Scott House, Basingstoke, Hampshire, RG21 2JG, England.**
The Integration of Remote Sensing, Terrain Evaluation and Engineering Geology in Southeast Asia

1120-1140 **LEONG LAP SAU[1] and BURTON, PAUL W.[2]**
[1]School of Physics, Universiti Sains Malaysia, Minden, Penang, Malaysia.
[2]Global Seismology Unit, Institute of Geological Sciences, Murchison House, West Mains Road, Edinburgh, EH9 3LA.
Seismic Risk Parameters from Cumulative Frequency Estimates in SE Asia

1140-1200 **DE NEVE, G.A., Jalan Taman Cibeunying Selatan No. 37, Bandung, Indonesia.**
Quaternary Volcanism and Other Phenomena Attributed to Volcanicity in the Aceh Region, Indonesia

1200-1220 **DEBAVEYE, J.[1], DE DAPPER, M.[1], DE PAEPE, P.[1] and GIJBELS, R.[2]**
[1]Geological Institute, State University, Krijgslaan 281, B-9000 GENT, Belgium.
[2]Dept. of Chemistry, University of Antwerp, B-2610 WILRIJK, Belgium.
Quaternary Volcanic Ash Deposits in the Padang Terap District, Kedah State, Peninsular Malaysia

1220-1240 **DE DAPPER, M.[1] and DEBAVEYE, J.[2]**
[1]Laboratory for Physical Geography, Geological Institute, State University Ghent, Krijgslaan 281, B-9000 GENT, Belgium.
[2]Chair for Tropical Pedology, Geological Institute, State University Ghent, Krijgslaan 281, B-9000 GENT, Belgium.
Geomorphology and Soil of Padang Terap District, Kedah State, Peninsular Malaysia

1240-1300 **DHEERADILOK, P., and KAEWYANA, W., Geological Survey Division, Dept. of Mineral Resources, Rama VI Road, Bangkok 10400, Thailand.**
On the Quaternary deposits of Thailand

1400-1420 **SUDRADJAT, A., The volcanological Survey of Indonesia, Dept. of Mines & Energy, Indonesia.**
The 1982 Galunggung Volcanic Eruption, Indonesia

1420-1440 **GRELOU-ORSINI, C., Universite Pierre et Marie Curie, Geologie Appliquee, Paris, France.**
Weathering of Granites in Southeastern China

1440-1500 **ISMAIL MOHD. NOOR and LLOYD, J.W., Dept. of Geology, National University of Malaysia, Bangi, Selangor.**
Hydrochemistry of Kelantan alluvial Aquifer

1500-1520 **CHONG, F.S.[1] and TAN, DENIS N.K.[2]**
[1]Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.
[2]Geological Survey Malaysia, Kuching, Sarawak.
Hydrogeological Activities in Peninsular Malaysia and Sarawak

1550-1610 **PEH CHENG HOCK, Department of Geography, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Catchment Geomorphology and Its Relationship with Streamflow - A Case Study of Some Selected Drainage Basins in Peninsular Malaysia

1610-1630 **MOHAMAD ALI HASAN, Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
On the Needs of National Groundwater Observational Network in Peninsular Malaysia

1630-1650 **DE NEVE, G.A., Jalan Taman Cibeunying Selatan No. 37, Bandung, Indonesia.**
Aspects of Geohydrology in Coral Reef Atolls of the Kai and Tanimbar Islands in the Southern Moluccas

1650-1710 **ISMAIL MOHD. NOOR, Dept. of Geology, National University of Malaysia, Bangi, Selangor, Malaysia.**
Groundwater Development Potential of Kluang District, Johor

13 April 1984 Geological Evolution

0850-0910 **NOZAWA, TAMOTSU, Geological Survey of Japan, 1-1-3 Higashi, Yatabe, Ibaraki, 305 Japan.**
Tectonics and Plutonism in Western Pacific

0910-0930 **MAHAWAT, C.[1], ATHERTON, M.P.[2] and BROTHERTON, M.S.[2]**
[1]Dept. of Mineral Resources, Geological Survey Division, Bangkok, Thailand.
[2]Dept. of Geology, University of Liverpool, England.
Aspects of Zonation in the Acidic Igneous Rocks of the Tak Batholith, Northern Thailand

0930-0950 **OBA, N.[1], TOMITA, K.[1], YAMAMOTO, M.[1], ISTIDJAB, M.[2], SUDRAJAT, A.[2] and SUHANDA, T.[2]**
[1]Inst. of Earth Sciences, Faculty of Science, Kagoshima University, Kagoshima, Japan.
[2]Volcanological Survey of Indonesia, Bandung, Indonesia.
Geologic Significance of Granite Fragments found from Pumice Flow of 1883 Eruption at the Krakatau Group, Indonesia

0950-1010 **HUYNH TRUNG[1] and NGUYEN XUAN BAO[2]**
[1]Geology Department, University, 227 Nguyen Van Cu, Ho Chi Minh City, Vietnam.
[2]General Dept. of Geology, 6 Pham Ngu Lao, Vietnam.
Classification of Intrusive Magmatic Formations in South Vietnam

1010-1030 **KWAN, T.S. and YAP, F.L., Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
K/Ar Ages of Biotites from the Granites of Penang, Malaysia

1100-1120 **YAP, F.L., Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Age Determination on the Kuantan Granite and Dolerite Dykes

1120-1140 **THANASUTHIPITAK, T.[1] and SIRINAWIN, T.[2]**
[1]Dept. of Geological Sciences, Chiang Mai University, Chiang Mai 50002, Thailand.
[2]SEATRAD Centre, Tiger Lane, Ipoh, Perak, Malaysia.
Petrochemistry of Gem-Bearing Basalt in Nong Bon, Trat Province, Eastern Thailand

1140-1200 **PANJASAWATWONG, Y. and YAOWANOIYOTHIN, W., Department of Geological Sciences, Chiang Mai University, Chiang Mai 50002, Thailand.**
Petrochemistry of Basaltic Rocks at Km 567.5 Pahonyothin Highway, Northern Thailand

1200-1220 **CHAKRABORTY, K.R., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Geochemistry and Petrogenesis of Alkaline Basaltic Rocks of Kuantan, Peninsular Malaysia

1220-1240 **NGUYEN KINH QUOC and NGUYEN TRONG CHI, General Dept. of Geology, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Paleozoic Volcanic Formations in Vietnam

1400-1420 **FOSS, C.A., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
A Study of Altimeter Height Control in a Gravity Survey Around Kuala Pilah, Central Malaysia

1420-1440 **LOKE MENG HENG, School of Physics, Universiti Sains Malaysia, Minden, Penang, Malaysia.**
Geophysical Studies of some Ultrabasic Bodies in the Telok Mas Area, Malacca, Peninsular Malaysia

1440-1500 **FOSS, C.A., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Results of a Gravity Survey in the Kuala Lumpur Area

1500-1520 **LEONG LAP SAU[1] and BURTON, PAUL W.[2]**
[1]School of Physics, Universiti Sains Malaysia, Minden, Penang, Malaysia.
[2]Global Seismology Unit, Institute of Geological Sciences, Murchison House, West Mains Road, Edinburgh, EH9 3LA.
The Seismic Record in SE Asia: Some Distribution Characteristics in Time

1550-1610 **TRAN QUOC HAI, Institute of Geology & Mineral Resources, 6, Pham Ngu Lao, Hanoi, Vietnam.**
Archean Plutonic Rocks of Kontum Massif, South Vietnam

1610-1630 **NGUYEN XUAN BAO and TRAN TAT THANG, General Dept. of Geology, Hanoi, Vietnam.**
Granulite Complex in the Southern Vietnam

1630-1650 **PHAM VAN QUANG, Institute of Geology & Mineral Resources, 6, Pham Ngu Lao, Hanoi, Vietnam.**
The Indosinian Median Massif

13 April 1984 Quaternary - Processes, Events and Application

0850-0910 **SHAMSHUDDIN J., Jabatan Sains Tanah, Universiti Pertanian Malaysia, Serdang, Malaysia.**
Clay Mineralogy of Selected Alluvial Soils from Peninsular Malaysia

0910-0930 **PARAMANATHAN, S. and ZAUYAH, S., Soil Science Department, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.**
Soil Landscapes in Peninsular Malaysia

0930-0950 **FYFE, W.S. and KRONBERG, B.I., Dept. of Geology, University of Western Ontario, Canada N6A 5B7.**
The Chemistry of Lateritic Soils: The Search for New Agricultural Technology

0950-1010 **PITTS, JOHN, School of Civil and Structural Engineering. Nanyang Technological Institute, Singapore 2263.**
Slope Stability Problems in a part of Western Singapore

1010-1030 **TAN BOCK KANG, Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Cavities in Limestone, Peninsular Malaysia

1100-1120 **TAN BOON KONG, Dept. of Geology, National University of Malaysia, Bangi, Selangor, Malaysia.**
Use of the Standard Penetration Test for Ground Interpretations - Some Examples from Peninsular Malaysia

1120-1140 **TANDICUL, W., MUANGNOICHAROEN, N., and GUMPERAYARNNONT, N., Faculty of Science, Chulalongkorn University, Bangkok 5, Thailand.**
The Slope Stability Problems at Mae Moh Lignite Mine, Lampang Province, Northern Thailand

1140-1200 **PITTS, JOHN and KANNAN, R., School of Civil and Structural Engineering, Nanyang Technological Institute, Singapore 2263.**
Residual Soil Formation on Sedimentary Rocks of the Jurong Formation in Singapore

1200-1220 **IBRAHIM KOMOO, Jabatan Geologi, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia.**
Engineering Geological Aspects of Clastic Metasediments in Kuala Lumpur Area

1220-1240 **SAIM SURATMAN, Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak, Malaysia.**
Engineering Geology of Sg. Piah Hydro-Electric Project, Perak, Peninsular Malaysia

1400-1420 **DE NEVE, G.A., Jalan Taman Cibeunying Selatan No. 37, Bandung, Indonesia.**
Geohazards of the Galunggung 1982 aftermath

1420-1440 **RAMESH, N.R., Geological Survey of India, Northeastern Region, La Chaumiere, Shillong-793001, India.**
Discovery of Stone Age Tools from Tripura and Its Relevance to Prehistory of Southeast Asia

1440-1500 **SARTONO, S., Dept. of Geology, Inst. Technology Bandung, Bandung, Indonesia.**
New Lights on Human Evolution in Southeast Asia

1500-1520 **GANDADHARAM, ESWARA V., Department of Geology, University of Malaya, Kuala Lumpur 22-11, Malaysia.**
Physical and Chemical Characteristics of Malayanites-Tektites from Peninsular Malaysia

1520 **CLOSING CEREMONY**

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BENGKEL PENULISAN/PENTERJEMAHAAN BUKU TEKS ASAS GEOSAINS PENGAJIAN TINGGI

(27-28 April, 1984 - Jabatan Geologi, Universiti Malaya)

Anjuran Persatuan Geologi Malaysia dengan kerjasama Dewan Bahasa dan Pustaka

Pendahuluan

Tugas melaksanakan Dasar Pelajaran Kebangsaan, yang berteraskan penggunaan Bahasa Malaysia di dalam pengajaran, bukanlah terletak di atas bahu pihak-pihak yang tertentu sahaja. Persatuan Geologi Malaysia telah lama menyedari bahawa ia boleh ikut serta memberikan sumbangan yang bermakna di dalam membantu usaha melengkapkan buku-buku ilmiah dalam Bahasa Malaysia untuk kegunaan institusi-institusi pengajian tinggi, khasnya bagi bidang geosains. Persatuan ini, dengan kerjasama Dewan Bahasa, pernah mengadakan "Bengkel Penggunaan dan Pelaksanaan Bahasa Malaysia Dalam Bidang Geosains" tidak lama dahulu sebagai usaha awal ke arah penglibatan ini. Khusus mengenai masalah kekurangan buku dalam Bahasa Malaysia untuk institusi-institusi pengajian tinggi, khasnya dalam bidang geosains, bengkel ini menyarankan supaya pihak Dewan Bahasa mengadakan lebih banyak bengkel-bengkel Bahasa, penterjemahan, penulisan dan pentasyihan bagi bakal-bakal penulis dan penterjemaha. "Bengkel Penulisan/Penterjemahan Buku-buku Teks Asas Geosains Pengajian Tinggi" ini diadakan sebagai memenuhi keperluan yang telah dikenalpasti itu.

Tujuan

i. Memberikan pendedahan aspek-aspek penulisan dan penterjemahan buku teks, khususnya dalam bidang geosains.

ii. Menjelaskan pedoman-pedoman am (umum) dan tambahan peristilahan sains serta pedoman-pedoman khusus dalam bidang geosains.

iii. Menjelaskan beberapa kesalahan umum Bahasa Malaysia dalam bidang penulisan dan penterjemahan.

iv. Membantu mempergiatkan penglibatan bakal-bakal penulis dan penterjemah, khasnya ahli geosains.

Jawatankuasa Penganjur

Mohamad Ali Hassan (Pengerusi)

Hamzah Mohamad (Setiausaha)

Abd. Aziz Hussin

Abd. Hamid Mohamad

Azahar Hussin

Khalid Ngah

Aturcara

Jumaat, 27hb April, 1984

8.30 - 9.00 pagi	:	Pendaftaran
9.00 - 9.10 pagi	:	Ucapan Aluan Pengerusi Jawatankuasa Penganjur
9.20 - 10.10 pagi	:	Ucapan Dasar: Peranan Dewan Bahasa dan Pustaka Dalam Penerbitan Buku Pengajian Tinggi (En. Shaari Abdullah, Ketua Bahagian Buku Pelajaran, D.B.P.)

10.10 - 10.30 pagi	:	Minum Teh
10.30 - 12.15 tengahari	:	Peranan Tatabahasa serta Kesalahan-Kesalahan Umum Bahasa Malaysia Dalam Penulisan dan Penterjemahan. (En. Awang Sariyan, Bahagian Pembinaan dan Pengembangan Bahasa, Cawangan Penyelidikan Bahasa, D.B.P.)
12.15 - 2.30 petang	:	Makan Tengahari
2.30 - 3.30 petang	:	Panduan Asas Penulisan (En. Abd. Jalil Abd. Rahman, Bahagian Penerbitan Umum, D.B.P.)
3.30 - 3.45 petang	:	Minum Teh
3.45 - 4.45 petang	:	Pedoman Umum dan Pedoman Tambahan Istilah Sains (En. Abdul Ghafar Laili, Bahagian Pembinaan dan Pengembangan Bahasa, Cawangan Istilah, D.B.P.)
4.45 - 5.45 petang	:	Pedoman Khusus Istilah Geologi - Isu dan Masalah (Dr. Wan Fuad Wan Hassan, UKM, dan En. Mohamad Ali Hassan, UM)

Sabtu, 28hb April, 1984

9.00 - 10.00 pagi	:	Prinsip dan Teknik Asas Terjemahan - Rujukan Kepada Penterjemahan Sains (Puan Noresah Baharom, Unit Perubatan, Bahagian Buku Pelajaran, D.B.P.)
10.00 - 10.15 pagi	:	Minum Teh
10.15 - 11.15 pagi	:	Analisis Teks Penterjemahan (En. Mior Hamzah, Unit Teknologi, Bahagian Buku Pelajaran, D.B.P.)
11.15 - 12.30 tengahari	:	Rancangan Penulisan/Penterjemahan Buku Teks Geosains - Kemajuan & Perbincangan (Dr. Hamzah Mohamad, UKM dan Puan Rashidah Abdullah, Bahagian Buku Pelajaran, D.B.P.)
12.30 tengahari	:	Penutup

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BERITA PERSATUAN

(NEWS OF THE SOCIETY)

GEOSEA V POST-CONGRESS FIELDTRIP TO THE LUPAR LINE - BAU, SARAWAK - REPORT

The 14 participants of the Post-Congress Fieldtrip to the Lupar Line - Bau, Sarawak arrived in Kuching at 1020 hours on April 14, 1984 and were met on arrival at the Kuching International Airport by Denis Tan, Dorani Johari and K.S. Kueh from the Geological Survey of Malaysia, Sarawak. They were subsequently brought to the Geological Survey office

where a preview of the fieldtrip, illustrated with numerous slides, was given by D. Tan. The geological museum and the Department's library were visited; at the latter place, many of the participants took the opportunity to purchase various geological reports and maps. After lunch, the participants were taken on a sight-seeing tour of Kuching, including a visit to the famous Sarawak Museum.

The next day, the participants travelled by bus to Bandar Sri Aman (Simanggang), a distance of 195 km. Along the way, a total of 13 stops were made to study the geology. These stops gave a well-distributed representation of the geology of west Sarawak, covering outcrops of the pre-Upper Carboniferous Tuang Formation, Upper Triassic Sadong Formation, Upper Triassic Serian Volcanics, Upper Jurassic-Lower Cretaceous Bau Limestone, Upper Jurassic-Upper Cretaceous Pedawan Formation, Upper Eocene-? Oligocene Silantek Formation (inclusing a coal seam), and the Tertiary hypabyssal intrusive rocks.

On the third day, the parts drove from Bandar Sri Aman to the SESCO Batang Ai township. Along the way, stops were made at 9 outcrops to examine the Basal Sandstone Member of the Silantek Formation, the Upper Cretaceous Lupar Formation, Upper Cretaceous Layar Member, the pillow-lavas of the Pakong Mafic Complex, and the Lubok Antu Melange (5 stops).

After a briefing conducted by Mr. Mervyn Song (SESCO Materials Engineer) and a substantial lunch hosted by SESCO, the participants examined an extensive outcrop of overturned pillow-lavas, a gabbro quarry, and an exposure of folded Lupar Formation. After the last stop, it was the journey back to Kuching, a distance of 233 km, arriving in Kuching at about 2030 hours.

On the fourth day, the participants were taken to the Bau Mining District where 9 stops were made. The participants visited the Sb-Au mine at Paku Kong, examined the Sb-Au-As mineralisations at the Kusa Mine, went underground to observe gold mining at the Rumoh Mine, stopped for lunch at the beautiful Tasik Biru (the site of the old Tai Parit Mine), collected stibnite and sarabauite samples from the Luckyhill Mine, and examined massive sulphides at Gunung Tongga. In addition, the participants stopped to examine and sample hydro-thermally-altered breccia at Gunung Sirenggok, the microgranodiorite porphyry at Gunung Juala, and to observe the trences dug to exploit the tailings at the old airfield. A brief stop was made at the Sin Seng Ann Quarry to take photographs of the limestone quarry-face.

On the fifth and last day of the fieldtrip, the participants were taken on a visit to the Bidayuh longhouse at Kampung Benuk. For many of the participants this was a novel experience.

Grateful thanks are due to the Director and staff of the Geological Survey in Sarawak, especially Encik Dorani Johari and Encik K.S. Kueh, for their assistance before and during the fieldtrip.

List of Participants

Richard Barrett	D.G. Benham
C. Clements	Bhakti Harahap
Keiichiro Kanehira	Roger Majoribanks
Gunter H. Moh	Ian Neuss
Johan A.J. Smit	Sam Supriatna
David S. Trail	Peter R. Williams
Barry G. Wood	Phillip J. Uttley

DENIS TAN

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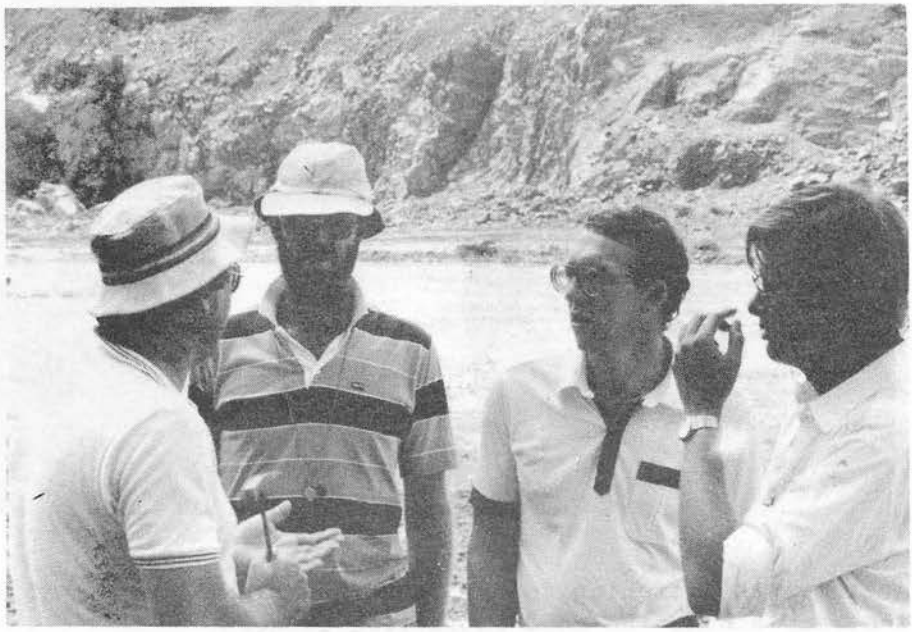
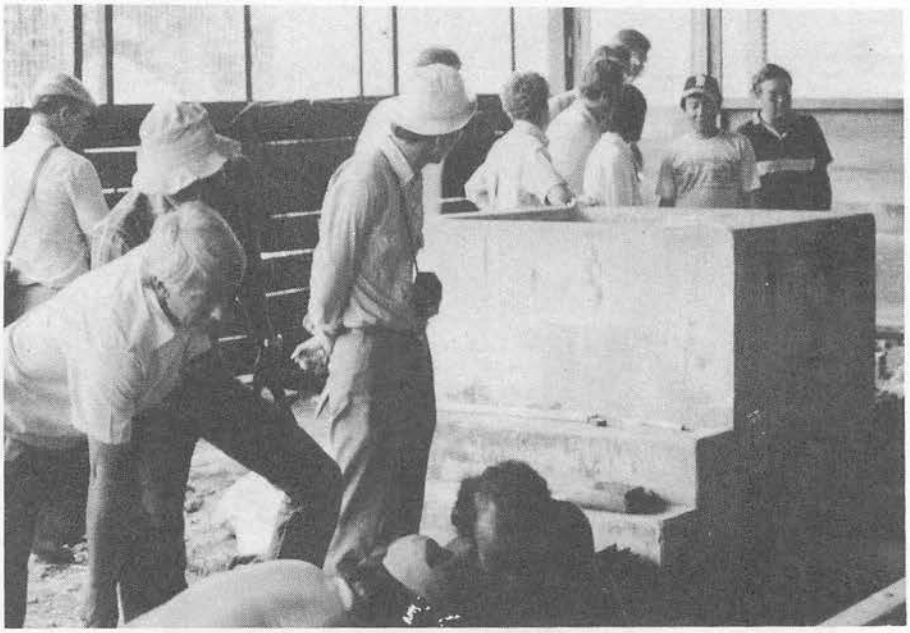


From left to right: D.G. Benham, I. Neuss, B. Wood and C. Clements in earnest discussion.

Participants studying the hydrothermally-altered breccia at Gunung Sirenggok.



Participants listening to Mr. Chua (2nd right), owner of Rumoh Mine, explaining the gold-extraction process.

Group photograph of participants and staff of the Geological Survey, taken at Tasik Biru.

Standing (L - R)

Denis Tan, Phillip Uttley, Sam Supriatna, David Trail, Peter Williams, C. Clements, Johan Smit, Roger Majoribanks, Richard Barrett, D. Benham, Günter Moh.

Squatting (L - R)

Barry Wood, Ian Neuss, Bhakto Harahap, K. Kanehira, K.S. Kueh, Dorani Johari, Ngang Gano.

GEOSEA V FIELDTRIP TO LANGKAWI ON 13TH APRIL TO 19TH APRIL, 1984 - A REPORT

The list of participants of the trip reads like mini UN with team leaders Lee Chai Peng and T.T. Khoo (plus wife) from Malaysia and group members R.G.C. Bathurst and M.P. Atherton from England, W. Altermann from Germany, Rachmat Heryanto from Indonesia, the Grant-Mackies from New Zealand and V. Nakashima from Japan.

After travelling through the night by express bus from Pudu Raya (Kuala Lumpur), the group arrived at Kuala Perlis to take the first ferry to Langkawi. After settling in at the hotel, field-work began with a look at the granites near the jetty and Country Club in the afternoon. The second day was spent looking at the Cambro-Ordovician clastic Machichang Formation with a most enjoyable lunch-break at Telok Datai.

The party was caught in a heavy downpour as they studied the Setul Formation on Pulau Langgun on the third day. The group also stopped by Pulau Timun to study the structures in the detrital band on the way back to Kuah.

The fourth day was spent studying the granites, skarns and detrital bands of Pulau Tuba and adjacent islands followed by a visit to Tasik Dayang Bunting.

The final day of field-work was concentrated on studying the pebbly mudstones of Pulau Ular, Pulau Singa Besar and Pulau Tepor.

In addition to geology, there was much good fellowship and fun in the sea-food dinners every evening as well as during the long journeys between stops in the boat. Everyone had a most enjoyable and profitable time and I am sure that the friendships built during this fieldtrip will last for a long time to come.

C.P. LEE

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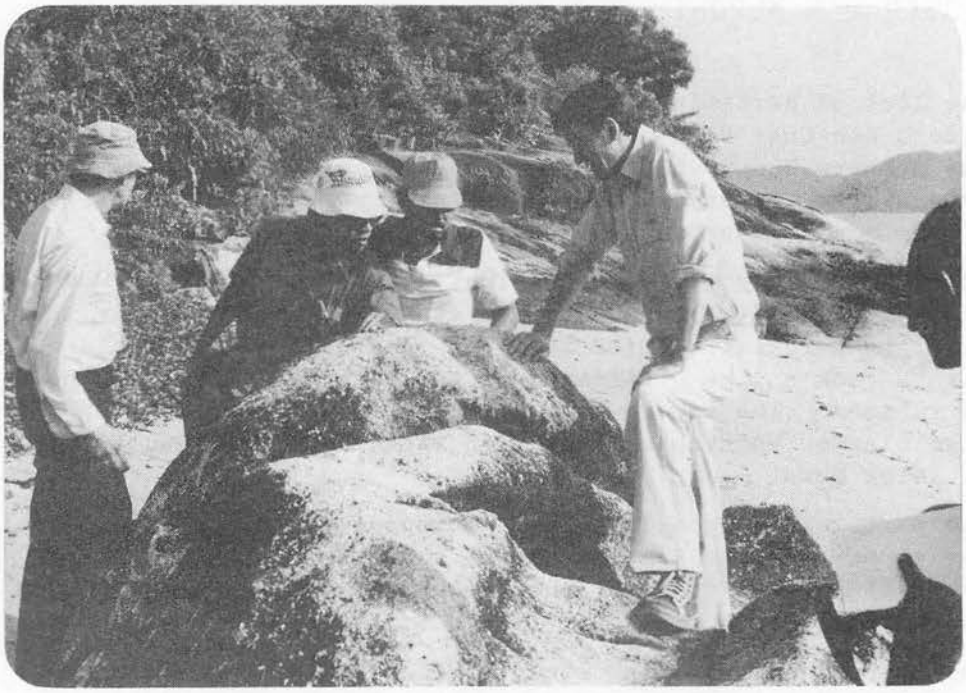
Mrs. Khoo serving "Langkawi Punch" on the boat between stops. Photos by V. Nakashima.



Something of interest on the granite outcrop at the coast at Pulau Tuba. Photos by V. Nakashima.

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KEAHLIAN (MEMBERSHIP)

The following applications for membership were approved by the Council:

Full Members

Kwok Kwee Pin, MMC Laboratory Services, P.O. Box 12, Batu Caves, Selangor.

Robert Toba Siahaan, Geological Survey Malaysia, Locked Bag Service, Jalan Penanpang, Kota Kinabalu, Sabah.

Noor Bakri Endut, Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak.

Peter Burri, Brunei Shell, (XGL), Seria, Brunei.

Mohd. Nazan Awang, Geological Survey Malaysia, P.O. Box 1015, Ipoh, Perak.

Jamain Bojei, Elf Aquitaine Malaysia, 14 Floor, Plaza Pekeliling, Jln. Tun Razak, Kuala Lumpur.

David Harrison, Gearhart Geodata Services, 46 Tagore Lane, Sindo Industrial Estate, Singapore 2678.

Zainudin Mohamad, MMC, P.O. Box 10936, Kuala Lumpur.

Associate Members

Ibrahim Samsudin, MMC, 1131-D, Simpang Tiga, Tok Ku, Kuala Terengganu, Terengganu.

Mohsen Abdul Hamid El Habachi, Schlumberger Overseas S.A., 3rd Fl., Wisma Bunga Raya, Jalan Ampang, Kuala Lumpur.

Student Members

Joseph Theodore a/l A. Thomas, 55 Eastern Garden, Teluk Intan, Perak.
Lau Pung Seng, 716/329, Desasiswa Permai, USM, Pulau Pinang.

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KEAHLIAN PROFESSIONAL (PROFESSIONAL MEMBERSHIP)

The following has been elected a Professional Member of the Society:

Lim Beng Kung, Geomex Surveys, 34, Jalan Pinggir, Off Jalan Ipoh, Kuala Lumpur.

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PERTUKARAN ALAMAT (CHANGE OF ADDRESS)

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

Thomas S. Mackey, P.E., 1201 Logan, Texas City, Texas, 77590, U.S.A.
R.P. Pitt, Home Energy Company Ltd., P.O. Box 6176, Hay Street, East Perth 6000, Western Australia.
James P.K. Lau, Exploration Logging Int'l Inc., Rm 1-101, NHWOC Foreign Guest House, P.O. Box 11, Potou, Zhanjiang City, Guangdong Province, People's Republic of China.

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PERTAMBAHAN BARU PERPUSTAKAAN (NEW LIBRARY ADDITIONS)

The following publications were added to the Library:

1. Regional Mineral Resources Div. Centre, NL no. 7, 1984.
2. IMM Bull. no. 926-930, 1984.
3. Agid News, no. 38, 1984.
4. AAPG Explorer, Jan-Mar 1984.
5. Groundboor ten hamer, nos. 5 & 6 (1983), nos. 1 & 2 (1984).
6. Geological Survey of N810, Quartery Notes 55, 1984.
7. Early Cretaceous marine & brachish-water gastropoda from Japan by Tomoki Kasi, 1984.
8. Southeast Asia Geosciences Newsletter, vol. 6, no. 2, 1983.
9. National Science Museum, Bull. v. 9, no. 4, 1983; vol. 10, no. 1, 1984.
10. Diesel & gas turbine worldwide, Jan-Feb, March-April 1984.
11. Staringia no. 7.
12. Inst. Mineral Engineering, Bull. 13, 1984.
13. Commonwealth Sc. Council, nos. 1 & 2, 1984.
14. Chronique de la recherche miniere, no. 473 & 474, 1983.
15. Bentonite & Fullers Earth in NSW, 1983.
16. Mineralogia Polonica, v. 13, no. 1, 1982.
17. National Lib. S'pore Nov & Dec '83, Jun & Feb 1984.
18. Journal of the Fac. Sc. Univ. Tokyo, vol. 20(5), 1983.
19. Oklahoma Geology Notes, vol. 43, 4-6, 1983.
20. Seatrad Library, Acquisition List, Oct-Dec '83 & Jan-Mar '84.

21. Science & Technology Malaysia, Bulletin, v. 2, no. 3 & 4, 1983.
22. IMM Transactions, v. 93, 1984.

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BERITA-BERITA LAIN

(OTHER NEWS)

UNPUBLISHED FINAL YEAR PROJECT REPORTS, UNIVERSITY OF MALAYA, 1983/84

Adzmi Yaacob: Petrology and Geochemistry of the Kulim Granite. 53 pp.

Ahmad Mohd Salleh: Geologi Kawasan Lebuh Raya Jabor-Jerangau Km 89.5-107 , Trengganu. 34 pp. (In Bahasa Malaysia)

Ahmad Kamal Mohd Sani: Petrology and Geochemistry of the Kuala Lumpur Granites. 156 pp.

Ahmad Zainuddin bin Yusoff: The Metasediments and Granite of Kemasik and Kijal. 38 pp.

Arifin Ahmad: Geologi dan Stratigrafi Kawasan Genting Jengka-Maran Pahang, Malaysia Barat. 59 pp (In Bahasa Malaysia).

Arshad Ali: Petrology and Geochemistry of the Granitic Rocks of the Gunung Bujang Melaka Area, Perak. 65 pp.

Azman Dawood: Geologi Kawasan Paloh Hinai dengan Penekanan Kepada 'Red Beds'. 105 pp. (In Bahasa Malaysia)

Elias Ismail: Stratigraphy and Sedimentology of the Semantan Formation in Temerloh-Mentakab Area, Pahang. 78 pp.

Harmizi Hj. Mohd Hashim: Geology of the Klias Peninsula, Sabah, East Malaysia. 78 pp.

Ishak bin Awang: Geologi Kawasan Kuala Lumpur dengan mengutamakan beberapa aspek Geologi Kejuruteraan. 62 pp. (In Bahasa Malaysia)

Izuddin bin Murshid: The Geology, Primary Mineralization and Geochemical Study of the Tronoh Area, Perak. 38 pp.

Lili Sulastri Zainal Abidin: General Geology of the Alor Gajah Area, Melaka. 55 pp.

Mohammad Azmi Zain: Geologi Kawasan Wang Tangga, Kaki Bukit, Perlis. 104 pp. (In Bahasa Malaysia)

Mohd Hanifah bin Ab. Latif: Geologi Kota Bahagia, Lebuhraya Segamat-Kuantan (26-63 Km), Pahang Tenggara, Pahang. 66 pp. (In Bahasa Malaysia).

Mohd Nizam b. Mohd Zain: Geologi, Bandar Muaadzam Shah, Rompin, Pahang Tenggara. 93 pp. (In Bahasa Malaysia)

Mohd Pauzi bin Ismail: Geology of Kuala Dungun Area, Dungun, Trengganu with emphasis on Structure. 63 pp.

Mohd Suhaili Ismail: Petrographic Studies of Bukit Batu - Batu Menggapur Limestone hills, Kampung New Zealand, Maran, Pahang. 55 pp.

Mustaffa Kamal Shuib: Structural Geology of Pulau Singa Besar Area, Pulau Langkawi, Kedah. 61 pp.

Nor Saawaludin b. Mohd Nor: Geologi kawasan Pelepah Kanan dan Pemineralan di lombong Pelepah Kanan, Kota Tinggi, Johor. 48 pp. (In Bahasa Malaysia)

Ramly Manja: Geology of the Kota Perdana Area, South Pahang. 85 pp.

Sazali Sulaiman: Geology of the Mentakab Area, Pahang. 63 pp.

Shamsuddin bin Shuib: Geology of the Ulu Kratong Area, Southeast Pahang. 56 pp.
Sivagnanam Sivalingam: Sedimentology of the Crocker Formation, Tenom Pangi Area, Sabah, East Malaysia. 60 pp.
Tham Kum Choong: The General Geology and Basinal Studies of the Deposits in the Bukit Garam District, Sabah, East Malaysia. 104 pp.
Thi Lip Kah: Geological and Geophysical Survey of South-Eastern Portion of Malacca. 43 pp.
Toh Kang Sai: General Geology of Lahat-Menglembu Area with Special Emphasis on Mineralization of New Lahat Mine. 74 pp.
Visvalingam Dorairaju: A Gravimetric Study of Machang-Tanah Merah District, Kelantan. 54 pp.
W. Hasiah Abdullah: Geology and Mineralization of the Puchong Area, Selangor. 96 pp.
Wan Rosli Hj. Wan Abdullah: General Geology of Kuala Kerai Area, Kelantan. 107 pp.
Wang Hui Kuen: Mineralization, General Geology and Geochemical Studies of the Brusih Area, Bidor, Perak. 63 pp.
Wong Thiam Cheong: Geology of the Tataru-Arip River Area, Central Sarawak. 39 pp.
Yap Kian Fah: Geology of Bukit Kerisek Area, Pahang. 56 pp.
Yong Chee Hong: Geology of the Kampung Pasir Pandak-Pasir Panjang Area, West Sarawak. 37 pp.
Zaili Ismail: Geology of Jasin-Kemendor Area, Melaka with emphasis on Granite Petrology. 57 pp.
Zainal bin Ismail: Petrology and Geochemistry of Santi Area, Pengerang, South-East Johore. 53 pp.
Zulkapli Hashim: Geology of Bahau-Bukit Kerisek Highway (12.5 - 49.5 km). 55 pp.
Zulkefli Abdullah: General Geology of the Semanggol Area, Perak. 58 pp.

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SHORT COURSE ON QUATERNARY GEOLOGY OF MALAYSIA - UPDATE

Place	Department of Geology, Universiti Kebangsaan Malaysia, Bangi, Selangor.
Date	26 November - 5 December 1984 4 & 5 December - Field Trip to Taiping
Organized by	The Department of Geology, Universiti Kebangsaan Malaysia, United Nations ESCAP-CCOP and Geological Survey of Malaysia.

COURSE CONTENT

The Quaternary (6 hours)

- Global climate, atmosphere
- Glaciations
- Sea-level changes: short-, long-, and very long term
- Local climates
- Stratigraphy (bio- and magnetostratigraphy)
- Impact of Quaternary on life in SE Asia

Geomorphology (3 hours)

- Special landform processes of the Quaternary
- Landforms in the humid tropics: destructional, constructional

Sedimentology (4 hours)

- Processes
- Sequences
- Environments (change from cold-warm-cold; wet-dry-wet)

Soil Formation (2 hours)

- Weathering and soil formation in the humid tropics

Methods and techniques (8 hours)

- Palaeontology
- Palynology
- Age dating techniques
- Drilling techniques
- Geophysical techniques
- Soil mechanics
- Sedimentological techniques
- Aerial photographs and remote sensing

Case Studies in Malaysia (8 hours)

- Stratigraphy and sedimentology, Perak and Pahang coastal areas
- Coastal geomorphology
- Hydrogeology and hydrology
- Foundations on soils
- Detrital minerals

Two one-day field excursions or one two-day excursion
Practicals and demonstrations in some methods and techniques

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THE ROYAL SOCIETY FELLOWSHIPS FOR SCIENTISTS FROM DEVELOPING COUNTRIES

Applications are invited for awards under a new scheme which operate from 1 April 1984.

The purpose of the scheme is to enable scientists of proven ability working in developing countries to pursue research, learn new techniques or undertake other forms of study in the natural and applied sciences by working with colleagues in the United Kingdom or, in the case of applicants in category (a) below, a developing Commonwealth country other than the applicant's own.

Applications will be considered in two categories:

a) Royal Society Nuffield Foundation Developing Commonwealth Fellowships for scientists resident in developing Commonwealth countries other than India wishing to visit the United Kingdom or to visit a developing Commonwealth country other than their own.

b) Royal Society Developing Country Fellowships for scientists resident in non-Commonwealth developing countries with which the Society has no bilateral exchange agreement.

Fellowships will normally be tenable for between six and 12 months. Awards will cover subsistence in the country visited but not international fares which candidates will be expected to find from their home countries. Study towards higher degrees or diplomas is specifically excluded. No provision is made for dependents, for research costs, bench fees, etc.

Application forms and copies of the detailed regulations governing the scheme may be obtained from the Executive Secretary (Ref: JJPD/FGM), The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, to whom completed forms should be returned to arrive before 15 March each year for proposed visits commencing in July of the same year and later, and before 15 September for proposed visits beginning in January of the following year and later. These closing dates cannot be varied and applicants are strongly advised to make their arrangements as early as possible.

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Symposium on Cenozoic Basins of Thailand: Geology and Resources

October 24, 1984.
Organized by Dept. of Geological Sciences, Chiang Mai University and Geological Society of Thailand.

Place and Date : Chiang Mai University; October 24, 1984.

Registration Fee : ฿ 100

Call for Papers

Original papers on the following topics are invited:

* Stratigraphy
* Sedimentology
* Paleontology
* Structural Geology/Tectonics
* Energy and Mineral Resources

For further information write to:

Symposium Secretary
Department of Geological Sciences,
Faculty of Science,
Chiang Mai University,
Chiang Mai 50002.

Proceedings

The papers accepted for presentation will be published in the Proceedings and will be distributed before the Sysposium.

Related Activities

25-27 October 1984 - 10th Annual Technical Meeting of Science Society of Thailand.

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DECENNIAL CONVENTION AND INTERNATIONAL SEMINAR ON EXPLORATION GEOPHYSICS

26-28 October, 1984.

Introduction

The Association of Exploration Geophysicists (AEG) dedicated to promoting academic, research and professional activities in the field of Exploration Geophysics, will complete its Tenth Anniversary in 1984. A Decennial Convention and an International Seminar on "Exploration Geophysics" is being organised by the Centre of Exploration Geophysics, Osmania University in co-operation with the National Geophysical Research Institute, Hyderabad, to mark this occasion.

Geoscientists the world over, are cordially invited to participate in the Convention and contribute scientific papers to be presented at the Seminar.

Venue and Date

The Seminar will be held at the Centre of Exploration Geophysics, Osmania University, Hyderabad-500 007, India, from 26th to 28th October, 1984.

Themes

* Geophysical Technology
* Instrumentation, integration and optimization of Geophysical strategies
* Geophysical Data Processing, inversion, modelling of earth systems
* Global tectonics, lithophere studies
* Regional Studies and geological mapping
* Exploration of Energy resources
* Exploration of ore deposits
* Exploration of Groundwater
* Engineering geophysics and related studies

Special Theme

** Geophysics in Developing Countries (including teaching, research and developmental aspects)

For further information write to:

Prof. V.L.S. Bhimasankaram
Secretary,
Association of Exploration Geophysicists,
CEG Building,
Osmania University,
Hyderabad-500 007,
India.

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APPLICATIONS OF GEOLOGY AND THE NATIONAL DEVELOPMENT

Bangkok, 19-22 November, 1984.

In commemoration of the twenty-fifth anniversary of the foundation of the Department of Geology, Chulalongkorn University

will organize jointly with the Department of Mineral Resources and the Geological Society of Thailand a technical conference, entitled "Applications of Geology and the National Development". The objective of the conference is to review the geological data as applied to national development projects in conjunction with the National Economic and Social Development Plants, as well as to various investment and development projects of private sectors.

Papers

Original papers related to the applications of Geology to the National Development on the following topics are cordially invited: mining industry, petroleum and coal industry, development of alternative energy resources, ground water resources, raw materials for industries and construction, engineering geology, environmental geology and environmental monitering, agricultural development, urban development, land use classification and mineral resources planning and management.

Proceedings

Accepted papers will be published in the Proceedings and distributed before the Conference.

Language

Thai and English.

For further information write to:

The Conference's Secretary
Department of Geology,
Chulalongkorn University,
Bangkok 10500,
Thailand.

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PERSATUAN GEOLOGI MALAYSIA

Geological Society of Malaysia

PETROLEUM GEOLOGY SEMINAR '84

Hotel Merlin, Kuala Lumpur

3-4th December 1984

KURSUS-KURSUS LATIHAN DAN BENGKEL-BENGKEL (TRAINING COURSES AND WORKSHOPS)

July 31 - August 1984

FISSON TRACK DATING (Workshop), Troy, New York, U.S.A. (Donald S. Miller, Department of Geology, Rensselar Polytechnic Institute, Troy, NY 12181).

August 1984 - June 1986

SOIL SCIENCE AND WATER MANAGEMENT (Wageningen, The Netherlands). Two-year M.Sc. course designed for B.Sc. graduates from developing countries. English. For information: Director of Studies of the M.Sc. course in Soil Science and Water Management, P.O. Box 37, 6700 AA Wageningen, The Netherlands.

August - October 1984

GEOLOGY AND GEOTECHNICS OF THE QUATERNARY SEDIMENTS. Co-sponsored by AGID (Bangkok, Thailand). Training program organized by the Asian Institute of Technology, Bangkok. For information: Dr. Prinya Nutalaya, AGID, Asian Institute of Technology, G.P.O. Box 2754, Bangkok 10501, Thailand.

September 1984 - November 1984

GEOTHERMAL ENERGY (Kyushu, Japan). Annual short course organized by the Government of Japan and sponsored by Unesco. English. For Information: Japan International Cooperation Agency (2nd Training Division, Training Affairs Department), P.O. Box 216, Shinjuku Mitsui Building, 2 - 1, Nishi-shinjuku, Shinkuku-ku, Tokyo 160, Japan.

September 1984 - November 1985

MINING EXPLORATION AND EXPLORATION GEOPHYSICS (Delft, The Netherlands). Annual diploma courses organized by the International Institute for Aerial Survey and Earth Sciences and sponsored by Unesco. English. For information: ITC (ME), 3, Kanaalweg, 2628 Delft, The Netherlands.

September 3-7, 1984

CLASTIC TIDAL DEPOSITS, short course, Utrecht, the Netherlands. (Comparative Sedimentology Division, Institute of Earth Science, Budapestlaan 4, 3584 CD Utrecht)

October 1984 - November 1984

TECTONICS, SEISMOLOGY AND SEISMIC RISK ASSESSMENTS (Potsdam, G.D.R.). One-month training course organized annually by East German Academy of Sciences 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, G.D.R.

October 1 - November 2, 1984

REMOTE SENSING: GEOLOGIC APPLICATIONS (Flagstaff, Arizona, U.S.A.). Advanced training program for foreign scientists organized by U.S. Geological Survey. English. For information: U.S. Geological Survey Training Center, 917 National Center, Reston, Virginia 22092, U.S.A.

October 1984 - September 1985
FUNDAMENTAL AND APPLIED QUATERNARY GEOLOGY (Brussels, Belgium). Annually organized training course leading to a Master's degree in Quaternary Geology by the Vrije Universiteit Brussel (IFAQ) and sponsored by Unesco. English and French. For information: Prof. Dr. R. Paepe, Director of IFAQ, Kwartairgeologie, Vrije Universiteit Brussel, Pleinlaan 2, B-1050, Brussels, Belgium.

October 1984 - September 1985
HYDRAULIC ENGINEERING AND HYDROLOGY (Delft, The Netherlands). Diploma courses organized annually by the International Institute for Hydraulic and Environmental Engineering and sponsored by Unesco for professionals from developing countries. English. For information: International Institute for hydraulic and Environmental Engineering (IHE), Oude Delft 95, P.O. Box 3015, 2601 DA Delft, The Netherlands.

October 8 - 12, 1984
BIOGEOCHEMICAL CYCLING OF S AND N IN REMOTE AREAS (NATO Workshop), St. Georges, Bermuda (J.N. Galloway, Environmental Studies Dept., University of Virginia, Charlottesville, VA 220903, U.S.A.).

November 1984 - December 1984
METHODS AND TECHNIQUES IN EXPLORATION GEOPHYSICS (Hyderabad, India). Diploma course organized annually by the National Geophysical Research Institute of the Council of Scientific and Industrial Research, Hyderabad, India, and sponsored by Unesco. English. For information: The Director, International Training Course on methods and techniques in geophysical exploration, National Geophysical Research Institute, Hyderabad, 500 007 (A.P.) India.

November 1984 - December 1984
SMALL MINE POTENTIAL AND TECHNOLOGY (Leoben, Austria). Annual training course sponsored by the Republic of Austria and Unesco. English. For information: Prof. Wolfbauer, Forschungsgesellschaft Joanneum, Roseggerstrasse 15, A-8700 Leoben, Austria.

November 12 - 30, 1984
RURAL HYDROGEOLOGY AND HYDRAULICS IN FISSURED BASEMENT ZONES (Workshop), Roorkee, India. (Prof. B.B.S. Shinghal, Department of Earth Sciences, University of Roorkee, Roorkee 247667, India)

November 15 - 17, 1984
MINERAL POLICY FOR SMALL-SCALE MINING (Workshop), New Delhi, India. Cosponsored by AGID in conjunction with World Mining Congress. (Co-ordinator, Regional Mineral Resources Development Centre, P.O. Box 19, Bandung, Indonesia)

January 1985 - March 1985
REMOTE SENSING APPLICATION AND DIGITAL IMAGE PROCESSING (Enschede, The Netherlands). Certificate courses on techniques for national resources surveys, organized annually 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.

February 1985
METALLOGENY (Quito, Ecuador). Annual training course for Latin Americans organized by Central University of Quito, the Autonomous University of Madrid (Spain), and Unesco. Spanish. For information:

Ing. Antonio Salgado, Director, Curso Internacional de Metaloginia, Escuela de Ingenieria en Geologia, Minas y Petroleos, Division de Post-grado, Universidad Central, Quito, Ecuador.

February 1985 - March 1985

GEOCHEMICAL PROSPECTING TECHNIQUES (Tervuren, Belgium). Annual course sponsored by the Royal Museum of Central Africa and UNDP. French. For information: Musee royal de l'Afrique centrale, Steenveg op Leuven, 13, B-1980 Tervuren, Belgium.

February 1985 - June 1985

MINERAL EXPLORATION (Leoben, Austria). Diploma course organized annually by the University of Mining and Metallurgy in Leoben and sponsored by Unesco. English. For information: University for Mining and Metallurgy, Postgraduate course on mineral exploration, Montanuniversitat, Leoben, A-8700, Austria.

February 1985 - November 1985

PHOTOINTERPRETATION APPLIED TO GEOLOGY AND GEOTECHNICS (Bogota, Colombia). 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 2, Colombia.

February 1985 - December 1985

GEOTHERMICS (Pisa, Italy). Certificate course organized annually by the Istituto Internazionale per le Ricerche Geotermiche and sponsored by Unesco, UNDP and Italy. English. For information: Dr. Mario Fanelli, Istituto Internazionale per le Ricerche Geotermiche, Via Buongusto 1, 56100 Pisa, Italy.

March 1985 - April 1985

MINERAL EXPLORATION (Paris, France). Short course based on a simulation method organized annually by the Ecole Nationale Superieure des Mines and sponsored by Unesco. French. For information: Prof. H. Pelissonnier, Ecole des Mines, 60 Bd Saint Michel, 75272 Paris, Cedex 06, France.

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KALENDAR (CALENDAR)

A bracketed date (Mar-Apr 1984) denotes entry in that issue carried additional information.

1984

September	:	INTERGLACIAL MARINE DEPOSITS, PAST AND PRESENT (Symposium), Schleswig-Holstein, F.R.G. Sponsored by INQUA. (Dr. H. Streiff, Niedersächs, Landesamt für Bodenforschung, Postfach 51 01 52, D-3000 Hannover 51, F.R.G.)
Sept 2 - 7	:	SNOW AND ICE PROCESSES AT THE EARTH's SURFACE (Symposium), Sapporo, Japan. (Mrs. H. Richardson, Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, U.K.)
Sept 3 - 5	:	DYNAMIC SOIL STRUCTURE INTERACTION (International Symposium), Minneapolis, U.S.A. (International Symposium on Dynamic Soil-Structure Interaction, Department of Civil and Mineral Engineering, 500 Pillsbury Drive SE, University of Minnesota, Minneapolis, MN 55455, U.S.A.).
Sept 3 - 6	:	JURASSIC STRATIGRAPHY (IUGS Subcommission International Symposium), Erlangen, F.R.G. (Prof. Dr. A. Zeiss, Paläontol. Inst. Univ. Loewenichstrasse 28, D-8520 Erlangen, F.R.G.)
Sept 3 - 6	:	DESIGN AND PERFORMANCE OF UNDERGROUND EXCAVATIONS (International Symposium), London, U.K. (Miss Y. Brooks, ISRM 1984 Symposium Conference Office, Institution of Civil Engineers, Great George Street, Westminster, London SW1 JAA, U.K.)
Sept 3 - 8	:	EVOLUTION OF THE CALEDONIAN-APPALACHIAN OROGEN (Final Symposium of IGCP Project 27), Glasgow, Scotland. (A.L. Harris, The University of Liverpool, Jane Herdman Laboratories of Geology, Brownlow Street, P.O. Box 147, Liverpool L69 3BX, U.K.)
Sept 6 - 9	:	MEDITERRANEAN NEOGENE,MARINE MEGAFAUNAL PALAEO-ENVIRONMENTS, AND BIOSTRATIGRAPHY (Interim Colloquium, RCMN), Athens, Greece. (Prof. E. Georgiades-Dikeoulia, Laboratory of Stratigraphy and Palaeontology, Athens University, Panepistimiopolis, Post Office Zografou, Athens 15701, Greece)
Sept 6 - 11	:	MESOZOIC TERRESTRIAL ECOSYSTEMS (Symposium), Stuttgart - Tübingen, F.R.G. Language: English. (Dr. Frank Westphal, Institut und Museum fur Geologie und Paläontologie, Sigwartstrasse 10, D-7400 Tübingen 1, F.R.G.)
Sept 10 - 12	:	OCEANS 84 (Conference), Washington, D.C. (Oceans 84 Technical Program Committee, 1730 M St. NW, Suite 412, Washington, D.C. 20036, U.S.A.)
Sept 10 - 14	:	TITANIUM (5th International Conference), Munich, F.R.G. (Deutsche Gesellschaft fur Metallkunde EV, Adenaueralle 21, D-6370 Oberursel 1, F.R.G.)

Sept 11 - 12 : HABITAT OF PALAEOZOIC GAS IN NW EUROPE (Meeting), London, U.K. Geological Society-Petroleum Group (Geological Society, Burlington House, Piccadilly, London W1V OJU, U.K.)

Sept 11 - 15 : GEOLOGY OF BOLIVIA (2nd Congress), Cochabamba, Bolivia. Language: Spanish. (Secretary General, II Geological Congress of Bolivia, Casilla 183, Cochabamba, Bolivia)

Sept 12 - 14 : DEGRADATION, RETENTION, AND DISPERSION OF POLLUTANTS IN GROUNDWATER (Seminar), Copenhagen, Denmark. (Erik Arvin, Department of Environmental Engineering, Building 115C, Technical University of Denmark, DK-2800 Lyngby, Denmark)

Sept 12 - 14 : ALKALINE IGNEOUS ROCKS (Geological Society of London Symposium), Edinburgh, Scotland. (J.G. Fitton, Grant Institute of Geology, West Mains Road, Edinburgh EH9 33W, Scotland, U.K.)

Sept 13 - 19 : DYNAMICAL AND CHRONOLOGICAL RELATIONS BETWEEN GLACIAL AND PERIGLACIAL DEPOSITS (Annual Meeting INQUA Subcommission on European Quaternary Stratigraphy), Besancon, France. (Dr. Michel Campy, Labo de Géologie Historique, Institut des Sciences Naturelles, Place Leclerc, F-25030 Besancon, France)

Sept 14 - 16 : GEOLOGY AND GENESIS OF MINERAL DEPOSITS IN IRELAND (International Conference), Dublin, Ireland. (J. Ashton, Tara Mines Geology Dept., Knockumber, Co. Meath, Ireland)

Sept 16 - 22 : LANDSLIDES (4th International Symposium), Toronto, Canada. Sponsored in part by IAEG. (Mr. J.L. Seychuk, Chairman, Organizing Committee, ISL/84, P.O. Box 370, Station A, Rexdale, Ont., Canada M9W 5L3)

Sept 17 - 20 : AQUATECH '84. (12th International Congress), Amsterdam, The Netherlands. Sponsored by the International Association for Water Pollution Research. (IAWPR, Alliance House, 29/30 High Holborn, London WC1V 6BA, U.K.)

Sept 20 - 25 : RECENT ADVANCES IN PETROLEUM EXPLORATION AND DEVELOPMENT (Meeting), Beijing, P.R. China. Co-sponsored by CPEMRC and Chinese Petroleum Geology Society, (R.J. Foster, BHP Petroleum, G.P.O. Box 1911R, Melbourne, 3001 Australia)

Sept 23 - 28 : TRANSPORT PROCESSES IN FRACTURE ROCK (Penrose Conference), Park City, Utah. (L.J. Smith, Dept. of Geological Sciences, Univ. of British Colombia, Vancouver, B.C., Canada V6T 2B4)

Sept 24 - 28 : ASSESSMENT OF SOIL SURFACE SEALING AND CRUSTING (International Symposium), Ghent, Belgium. Language: English. (Organizing Committee, International Conference, Department of Soil Physics, State University of Ghent, Coupure Links 653, 9000 Ghent, Belgium)

Sept 24 - 28 : ICSU (20th General Assembly), Ottawa, Canada. (K. Charbonneau, Conference Office, National Research Council, Ottawa, Canada K1A 0R6)

Sept 25 : GLOBAL CHANGE (ICSU Symposium), Ottawa, Canada. (K. Charbonneau, Conference Office, National Research Council, Ottawa, Canada K1A 0R6)

Sept 25 - 27 : FOSSIL ARTHROPODS AS LIVING ORGANISMS (International Symposium), Edinburgh, U.K. (Royal Society of Edinburgh, 22-24, George St., Edinburgh EH2 2PQ, U.K.)

Sept 26 - 28 : SEDIMENTATION IN THE AFRICAN RIFT SYSTEM (Geological Society Meeting), London, U.K. (L.E. Frostick, Dept. of Geology, Birkbeck College, 7/15 Gresse Street, London W1P 1PA. U.K.)

Sept 30 - Oct 6 : LATE QUATERNARY SEA-LEVEL CHANGES AND COASTAL EVOLUTION (International Symposium and Field Meeting), Argentina and Chile. IGCP-200 and INQUA Commission on Quaternary Shorelines. (Dr. Enrique Schnack, International Sea-level Symposium, Casila 722, Correo Central, 7600 Mar del Plata, Argentina)

Oct 1 - 5 : SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH (18th Meeting), Bremerhaven, F.R.G. (G. Hemmen, Scott Polar Research Institute, Lensfield Road, Cambridge, U.K. CB2 1ER)

Oct 1 - 5 : REMOTE SENSING OF ENVIRONMENT (18th International Symposium), Paris, France. (Environmental Research Institute of Michigan, P.O. Box 8618, Ann Arbor, M1 48107, U.S.A.)

Oct 1 - 6 : CENTRAL ANDEAN TECTONICS (Symposium), La Paz, Bolivia. (Secretaria, Commission National de Estudios Geofisicos, Casilla 5939, La Paz, Bolivia)

Oct 5 : WATER RESOURCES PLANNING AND MANAGEMENT (International Conference), Athens, Greece. (Prof. A. Aureli, Via Cimarosa 10, 95124 Catania, Italy)

Oct 7 - 12 : BUENOS AIRES COASTAL PLAIN - NORTH PATAGONIA COAST (Field Meeting), Mar del Plata, Argentina. INQUA Shorelines Commission. (Dr. Enrique Schnack, Casilla 722, Correo Central, RA - 7600 Mar del Plata, Argentina)

Oct 8 - 11 : MINING TECHNIQUES FOR ALLUVIAL TIN DEPOSITS (International Seminar), Ipoh, Malaysia. (The Director, SEATRAD Centre, Tiger Lane, Ipoh, Malaysia)

Oct 8 - 10 : ASSOCIATION OF EARTH SCIENCE EDITORS (Annual Meeting), Portland, Oregon, U.S.A. (Beverly Vogt, Oregon Department of Geology, 1005 State Office Building, Portland, OR 97201, U.S.A.)

Oct 9 - 14 : IN SITU SOIL AND ROCK REINFORCEMENT (International Conference), Paris, France. (Conference Director, ENPC/DFCAI, 52, rue Madame, 75006 Paris, France)

Oct 13 - 16 : ORIGIN OF THE MOON (Topical Conference). Kona, Hawaii. (P. Jones, LPI, 3303 NASA Road One, Houston, TX 77058, U.S.A.)

Oct 14 - 20 : MINERAL PROCESSING AND EXTRACTIVE METALLURGY. (International Conference), Kunming, P.R. China. (The Secretary, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, U.K.)

Oct 15 - 17 : SINKHOLES (1st Multidisciplinary Conference), Orlando, Florida, U.S.A. (College of Extended Studies, University of Central Florida, Orlando, Fl 32816)

Oct 15 - 18 : LATIN AMERICAN CONGRESS OF PALAEONTOLOGY (3rd Congress), Oaxtepec, Morelos, Mexico. (Dr. Jose C. Guerrero, Universidad Nacional Autonoma de Mexico, Mexico D.F., Mexico)

Oct 17 - 20 : AMERICAN ASSOCIATION OF STRATIGRAPHIC PALYNOLOGISTS (Annual Meeting and Field Trip), Arlington, Virginia, U.S.A. (N.O. Frederiksen, U.S. Geological Survey, M.S. 970, Reston, VA 22092, U.S.A.)

Oct 21 - 25 : SOCIETY OF EXPLORATION GEOPHYSICISTS (54th Annual Meeting), Denver, Colorado, U.S.A. (H. Breck, Society of Exploration Geophysicists, P.O. Box 3098, Tulsa, OK 74101, U.S.A.)

Oct 24 - 26 : NATURE OF THE LOWER CONTINENTAL CRUST (Joint Meeting Geological Society of London with 3rd Alfred Wegener Conference), London. Co-sponsored by ILP. (Prof. J.B. Dawson, Department of Geology, The University, Sheffield, S1 3JD, England, U.K.)

Oct 25 - Nov 5 : GEOLOGY OF TIN DEPOSITS (International Symposium), Nanning City, Guangxi Zhuang Autonomous Region, P.R. China. (Mr. Zhang Sihui, Chinese Academy of Geological Sciences, Baiwanzhuang Road 26, Fuchengmenwai, Beijing, People's Republic of China)

Oct 29 - Nov 2 : INTERNATIONAL WATER SUPPLY ASSOCIATION (15th International Congress), Tunis, Tunisia. (R. Clark, International Water Supply Association, 1 Queen Anne's Gate, London SW1H 9BT, U.K.)

Oct 31 - Nov 7 : SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR (Regional Assembly of the International Association), Hyderabad, India. Plus short course for developing countries on inversion of geoscience data. Co-sponsored in part by ILP. (Organising Committee, IASPEI Regional Assembly, National Geophysical Research Institute, Hyderabad 500 007, India)

November/ December : LAND EVALUATION FOR SOIL EROSION HAZARD ASSESSMENT (Meeting), Enschede, Netherlands. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)

Nov 5 - 8 : GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Reno, Nevada, U.S.A. (S.S. Beggs, Geological Society of America, P.O. Box 9140, 3300 Penrose Place, Boulder, CO 80301, U.S.A.)

Nov 5 - 9 : ARGENTINE GEOLOGICAL CONGRESS (9th), Bariloche, Argentina. Field trips. Languages: Spanish, English, and French. (IX Congreso Geologico Argentino, Maipu 645 Piso 1, 1006 Buenos Aires, Argentina)

Nov 13 - 15 : OPHIOLITES THROUGH TIME (Conference), Nancy, France. (J. Desmons, University de Nancy I, Lab. de Petrologie, B.P. 239, F-54506 Vandoeuvre-les-Nancy Cedex, France)

Nov 19 - 23 : 12th WORLD MINING CONGRESS, New Delhi, India. (Organizing Committee, Institute of Engineers, 8 Gokhale Road, Calcutta 700 020, India)

Dec 2 - 5 : FUTURE PETROLEUM PROVINCES OF THE WORLD (AAPG W.E. Pratt Memorial Conference), Phoenix, Ariz., U.S.A. (AAPG, P.O. Box 979, Tulsa, OK 74101, U.S.A.)

Dec 2 - 6 : SOCIETY OF EXPLORATION GEOPHYSICISTS (54th Annual Meeting), Atlanta, Georgia, U.S.A. (J. Hyden, SEG, Box 3098, Tulsa, OK 74101, U.S.A.)

1985

January : ACID-SULPHATE SOILS (Meeting), Dakar, Senagal. (Dr. W.G. Sombroek, ISSS, International Soil Museum, 9 Duivendaal, POB 353, 6700 A.J. Wageningen, The Netherlands)

Jan 7 - 10 : HYDROGEOLOGY OF ROCKS OF LOW PERMEABILITY (17th International Congress of IAH), Tucson, Arizona, U.S.A. (Eugene S. Simpson, Department of Hydrology and Water Resources, College of Earth Sciences, The University of Arizona, Tucson, AZ 85721, U.A.A.)

February : INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION ASSEMBLY (13th Session), Paris, France. (Unesco, 7, place de Fontenoy, 75700 Paris, France)

Feb 11 - 14 : GEOMECHANICS IN TROPICAL LATERITE AND SAPROLITIC SOILS (1st International Conference), Sao Paulo, Brazil. (Dr. W.C. Hachich, Secretary ISTS-BMS, C.P. 7141, 01000 Sao Paulo, SP, Brazil)

Feb 11 - 14 : ASIAN MINING '85 (2nd Conference), Manila Philippines. (Meeting Secretary, The Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, U.K.)

Feb 27 - Mar 2 : GEOLOGY OF THE OCEANS (75th Annual Meeting of the Geologische Vereinigung), Kiel, West Germany. Languages: English and German. (M. Sarnthein, Geologisch-Palaeontologisches Institut, Universitaet, Olshausenstrasse, D-2300 Kiel, F.R.G.)

Mar 11 - 15 : SE ASIAN GEOTECHNICAL CONFERENCE (8th), Kuala Lumpur, Malaysia. Language: English. (The Hon. Secretary, 8th SEAGC, The Institution of Engineers, Malaysia, P.O. Box 223, Petaling Jaya, Selangor, Malaysia).

Mar 11 - 15 : TUNNELLING 85 (4th International Symposium), Brighton, England. (Tunnelling 85, The Secretary, Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, U.K.)

Apr 1 - 4 : EUROPEAN UNION OF GEOSCIENCES (Biennial Conference), Strasbourg, France. (Organizing Committee, Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ, U.K.)

Apr 1 - 5 : NUMERICAL METHODS IN GEOMECHANICS (5th International Conference), Nagoya, Japan. (Prof. T. Kawamoto, Department of Civil & Geotechnical Engineering, Nagoya University, Chikusa, Nagoya 464, Japan)

Apr 9 - 12 : EVOLUTION OF THE EUROPEAN LITHOSPHERE (MEGS 4: Meeting of European Geological Societies), Edinburgh, U.K. (Dr. S.K. Monro, Institute of Geological Sciences, Murchison House, West Mains Road, Edinburgh EH9 3LA, Scotland, U.K.)

Apr 14 - 17 : PROSPECTING IN AREAS OF DESERT TERRAIN (Conference), Rabat, Morocco. (Conference Office, IMM, 44 Portland Place, London W1N 4BR, U.K.)

Apr 28 - May 1 : GEOCHEMICAL EXPLORATION (11th International AEG Symposium), Toronto, Canada. (Dr. W.B. Coker, Kidd Creek Mines Ltd., 357 Bay St., Ste. 300, Toronto, Ontario, Canada M5H 1T7)

May 6 - 17 : NEOGENE PHOSPHORITES OF THE SE UNITED STATES (International field workshop and seminar, IGCP 156), Greenville, N.C., to Tallahassee, Florida. (W.C. Burnett, Dept. of Oceanography, Florida State University, Tallahassee, FL 32306, U.S.A.)

May 13 - 17 : TUNGSTEN (3rd International Symposium), Madrid. (Mr. M.R.P. Maby, Secretary, Primary Tungsten Association, 280 Earls Court Road, London SW5 9AS, U.K.)

May 15 - 17 : TURBIDITE-HOSTED GOLD DEPOSITS (International Symposium), Fredericton, New Brunswick, Canada. Symposium held with Geological Association of Canada Annual Meeting. (Simon J. Haynes, NOVA Scotia Department of Mines and Energy, P.O. Box 1087, 1690 Hollis Street, Halifax, Nova Scotia, Canada B3J 2X1)

May 27 - 31 : AMERICAN GEOPHYSICAL UNION (Spring Meeting), Baltimore, Md. (Meetings, AGU, 2000 Florida Avenue, NW, Washington, DC 20009, U.S.A.)

May 27 - June 1 : CORAL REEF CONGRESS: Reef and Man (5th International), Papeete, Tahiti. (Antenne Museum Ephe, Congres Recifs Coral Liens 1985, B.P. 562, Papeete, Tahiti, French Polynesia)

June 2 - 9 : INTERNATIONAL MINERAL PROCESSING CONGRESS (15th), Cannes, France. Languages French and English. (International Mineral Processing Congress Secretary, BRGM SGN/Mineralurgie, B.P. 6009-45060 Orieans Cedex, France)

June 9 - 15 : WATER RESOURCES (5th World Congress), Brussels, Belgium. (Dr. L.W. Debacker, c/o Brussels International Conference Centre, Parc des Expositions, Place de Belgique, B-1020 Brussels, Belgium)

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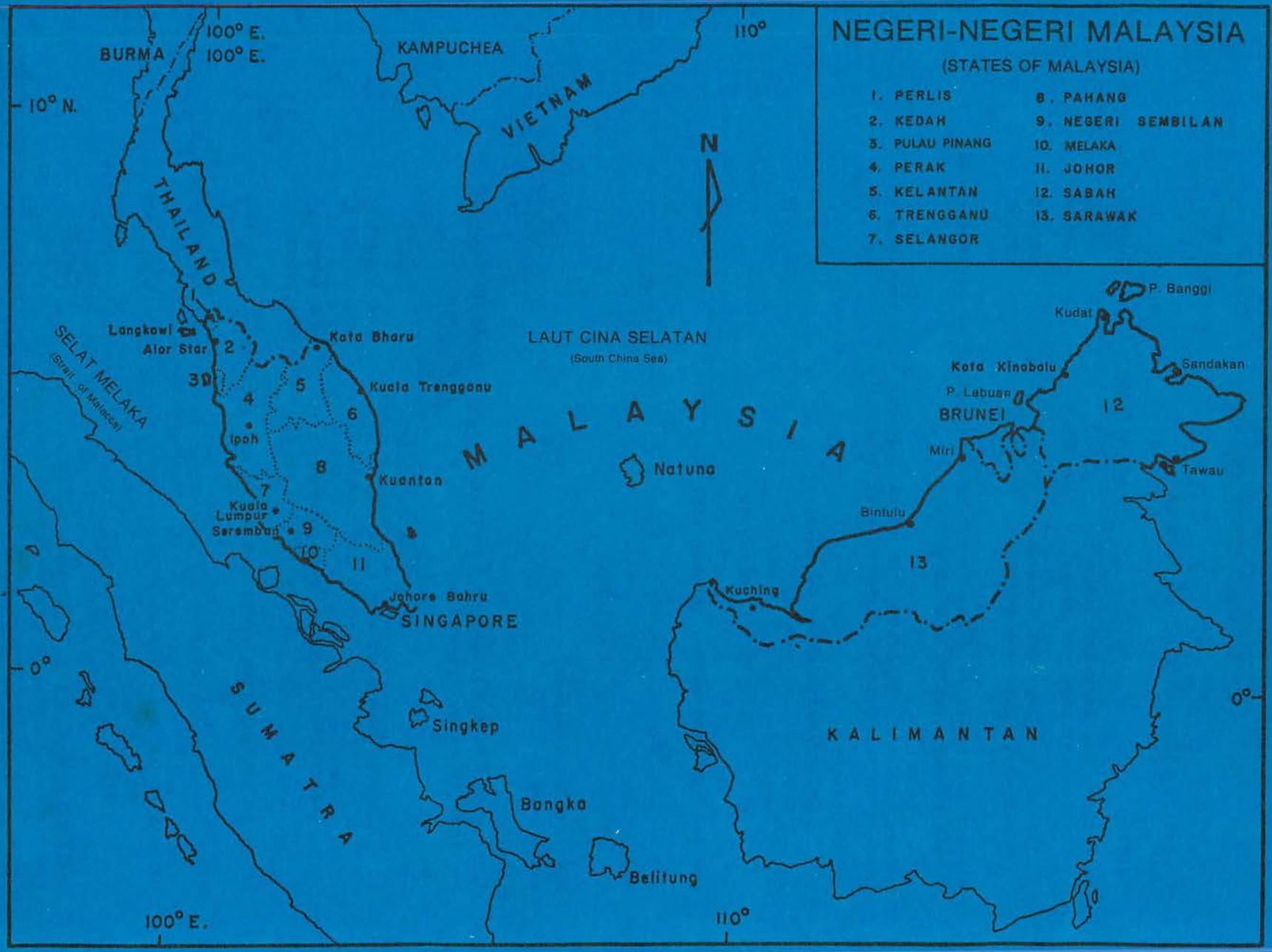
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