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WARTA GEOLOGI

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c/o Jabatan Geologi, Universiti Malaya, Kuala Lumpur, Malaysia.



PERSATUAN GEOLOGI MALAYSIA
(Geological Society of Malaysia)

MAJLIS (COUNCIL) 1975/76

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Tujuan Persatuan Geologi Malaysia adalah untuk memajukan sains bumi, terutamanya di Malaysia dan tempat-tempat berhampiran. Sesiapa yang ingin menjadi ahli Persatuan sila dapat borang-borang daripada Setiausaha Kehormat.

The aim of the Geological Society of Malaysia is to promote the advancement of geological sciences particularly in Malaysia and nearby areas. Anyone interested in becoming a member of the Society should obtain the necessary forms from the Hon. Secretary.

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G E O L O G I C A L N O T E S

The nature and genesis of chalcopyrite with included pyrite
framboids from Bylco Azira Mine, Puchong, Selangor, Malaysia

K.F.G. Hosking & E.B. Yeap, Jabatan Geologi, Universiti Malaya

The Bylco Azira mine is a deep opencast one, approaching 100 ft. in depth, from which cassiterite is being recovered from those portions of the placers that largely occur between the pinnacles of the marble bedrock, and so were inaccessible to the dredges which had previously operated there. The mineral is also recovered from certain lodes and veins in the mine.

On the floor of the mine two major lodes are exposed that pinch and swell and vary in thickness from c. 1 to c. 4 ft. Associated with these is a swarm of veins with a markedly different strike from that of the former, but the age relationship between the lodes and veins is still in doubt.

The veins are characterised by the presence of cassiterite and pyrite, whilst the lodes contain, in addition to cassiterite and quartz, an impressive suite of sulphides, that probably includes stannite. In any event, a stannite-rich block was found near one of them and peripheral material from this, when examined in polished section, provided the data for this note.

The polished sections from the block consist of cassiterite and quartz associated with early pyrite and arsenopyrite, and somewhat later sphalerite, stannite, (tetrahedrite?) and chalcopyrite. In particular, the earlier sulphides are markedly veined and replaced by the later ones. The paragenesis and texture of this ore will be treated in detail in a later note. In this note the writers will confine themselves to the nature and genesis of a most interesting sulphide rim as revealed in the polished sections.

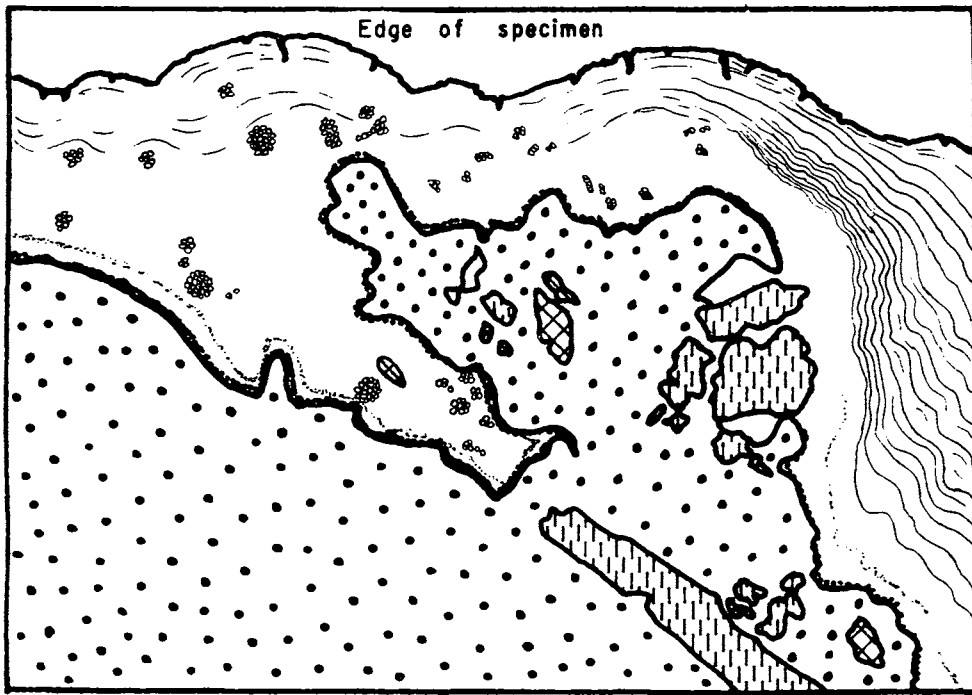


Fig. I

600 μ

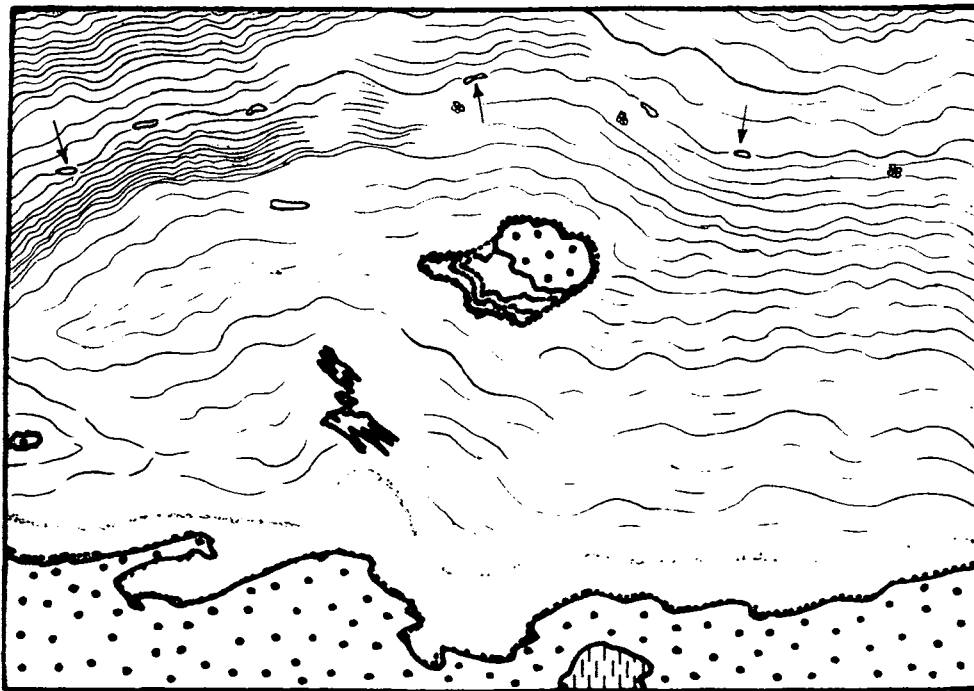
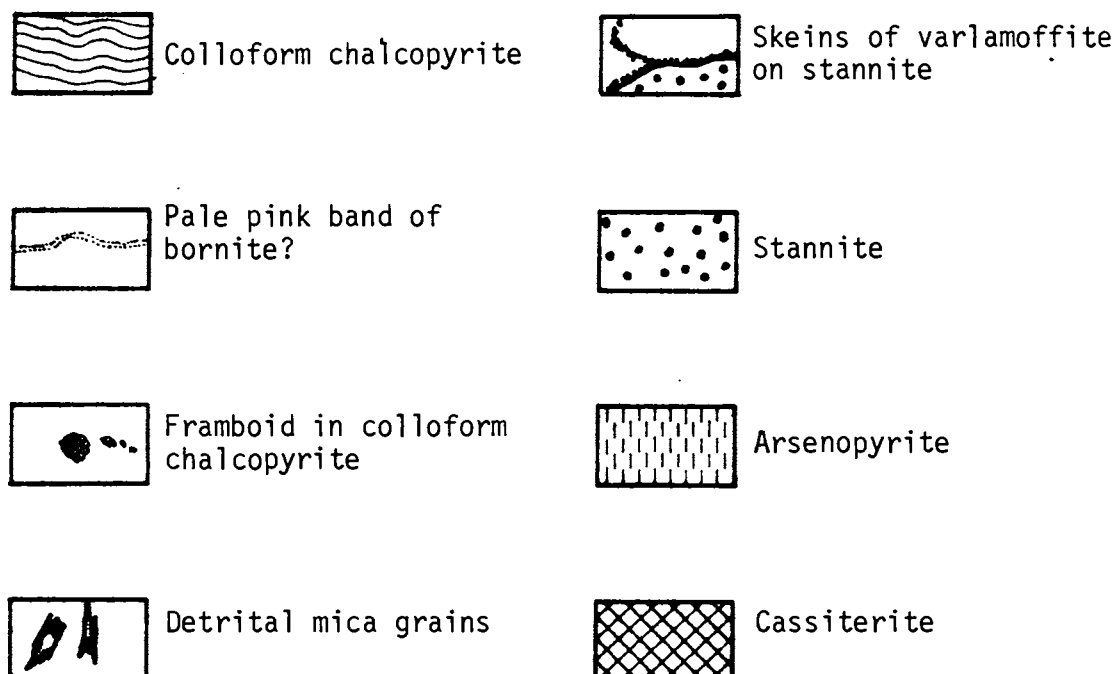


Fig. II

600 μ

Figures I and II: Legend and caption



Figures I and II, drawn from polished sections, show the relationships of the colloform chalcopyrite rim to the minerals that it is investing. Figure I shows portion of the rim that contains captured framboids while figure II shows islets of stannite. The smaller islets (arrows) are oriented parallel to the local chalcopyrite bands and this orientation may be due to forces acting during the development of the chalcopyrite rim. Note that detrital mica grains are caught in the band also.

The nature of the rim (Figs. I and II)

The rim in question is composed of chalcopyrite which displays a delicate colloform texture whose character was much more obvious after the specimen had been etched for 30 secs. with 1:1 HCl and $KClO_3$.

Enclosed within this rim are randomly distributed pyrite framboids whose diameters differ widely and range from c. 10 to c. 100 microns. These framboids consists of an aggregate of pyrite cubes which may or may not be well-ordered. Locally, in addition, swarms of small pyrite crystals, of the same sizes as those composing the framboids, are in evidence. These, in the writers' view, were derived from framboids that were disintegrated as a result of the force of crystallisation to which they were subject when the gel, that was the parent of the chalcopyrite host, crystallised. Rarely, also, small aggregates of randomly oriented pyrite crystals occur that are appreciably larger than those of the framboids and a few, scattered, irregularly-shaped islets of stannite are to be seen.

Whilst this colloform chalcopyrite may fringe a variety of different minerals, it is generally found closely associated with chalcopyrite that lacks a colloform texture and is devoid of framboids, and these two 'varieties' of chalcopyrite are separated by a very thin pale pink band which has been provisionally identified as bornite. This inner, framboid-free chalcopyrite has clearly rim-replaced and embayed a number of other sulphides, but, in particular, pyrite and stannite. During the replacement of the stannite the tin of the latter was converted to skeins of minute bodies, that are almost certainly varlamoffite, and that now ornament the chalcopyrite. Examination of the polished sections does not enable one to decide whether the agents responsible for this replacing chalcopyrite and its bornite (?) edge were supergene or hypogene ones.

Genesis of the rim

The marginal disposition of the colloform chalcopyrite and the presence of pyrite framboids within it give strong reason for believing that the copper/iron sulphide is of supergene origin and that it was probably deposited initially as a gel. There is nothing to support the view that it originated by replacement of any of the components of the ore.

It is held that rapid downcutting by elements of the local drainage system during the Quaternary phase of low sea-level allowed exposed sulphides of the lodes and veins to be

stranded in the zone of oxidation. Subsequently a general rise in sea-level, with accompanying rapid accumulation of sediments in a then sluggish drainage system, in which swamps developed, created a reducing environment which prevented the sediment-covered parts of the sulphide lodes from suffering any further decomposition. The organic-rich reducing horizons in the sediments also provided an environment in which, during the early stages of diagenesis, pyrite framboids and individual pyrite crystals developed by reaction between biogenic sulphide ions and elemental sulphur and the ever-present soluble ferrous iron.

It is supposed that during this time the sulphides, in those parts of the lodes that were in the zone of oxidation above the water-table, were decomposed, yielding oxysalts, and providing copper, sulphate, etc., ions, that in part descended, approximately along the line of the lodes, into the reducing environment of the sediments, (Probably a portion of the liberated ions also descended with the lodes and were fixed as internal secondary sulphides by those supergene processes that are fairly well understood and that are discussed at length in most modern text-books of ore-deposits. We are not concerned with these lode-internal events in this paper). Then externally moving copper and iron ions reacted with biogenic sulphide ones (and elemental sulphur?) producing a copper/iron sulphide gel that locally invested the lode. It is thought that the development of this gel was by displacement of the fine components of a carbonaceous, pyrite-bearing (framboids, etc.) mud, and that the nature of the deposition was such that although the fine components of the mud could be, and were, rejected by the developing rim, the pyritic bodies, being much larger, were simply by-passed and engulfed by the gel. Subsequently this gel crystallised to chalcopyrite, and at this stage, as noted earlier, some of the framboids were completely disorganised by the forces of crystallisation to which they were subjected.

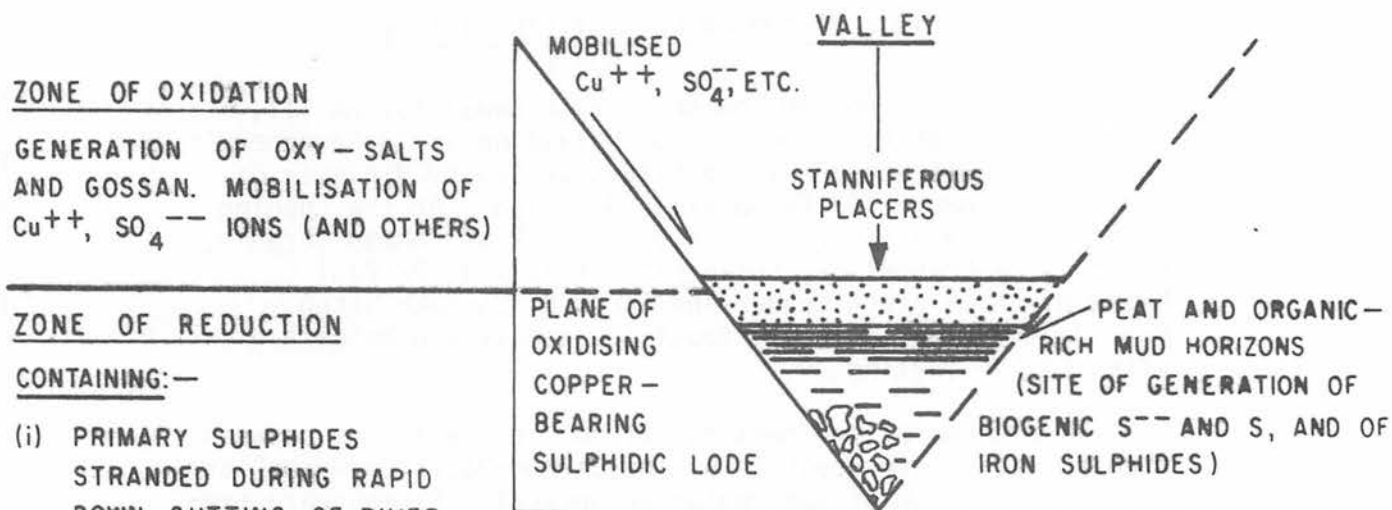
The large stannite islets that occur in the rim may be the high points of the irregular surface of the parent ore-body, but it is more probable that they are simply mechanically detached fragments of ore that were sitting on the parent at the time of ore development and were of such a size that they could only be by-passed by the advancing chalcopyrite. On the other hand it is believed that the small stannite islets that are orientated parallel to the chalcopyrite bands are detached fragments of the parent orebody that were so small that they were moved by the developing sulphide gel (Fig. 2).

As there is no good reason for believing that during the phase of rim-sulphide development the water associated with the sediments was brackish, one is forced to the conclusion that the parents of the biogenic sulphide ions were sulphate ones that were derived from the oxidising parts of the lode and/or from sulphur-bearing plant proteins.

Figure 3 is a diagrammatic representation of the writers' views of the genesis of the chalcopyrite under review.

FIG.3

DIAGRAM INDICATING THE POSTULATED GENESIS OF SUPERGENE CHALCOPYRITE IN THE PLACER MATERIAL AT BYLCO AZIRA MINE, PUCHONG, SELANGOR. (K.F.G. HOSKING, OCT., 1975)



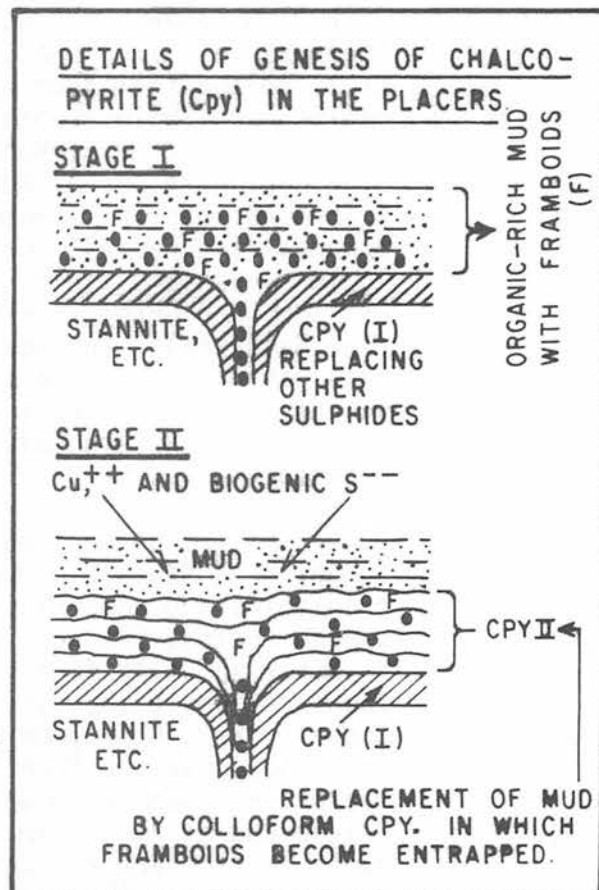
ZONE OF OXIDATION

GENERATION OF OXY-SALTS AND GOSSAN. MOBILISATION OF Cu^{++} , SO_4^{--} IONS (AND OTHERS)

ZONE OF REDUCTION

CONTAINING:—

- (i) PRIMARY SULPHIDES STRANDED DURING RAPID DOWN-CUTTING OF RIVER, THEN PROTECTED BY RAPID ACCUMULATION OF SEDIMENTS AND ESTABLISHMENT OF A REDUCING ENVIRONMENT.
- (ii) POSSIBLY SUPERGENE SULPHIDES FORMED BY REPLACEMENT OF PRIMARY ONES.
- (iii) POSSIBLY EARLY PRODUCTS OF OXIDATION OF LODE (NOW STRANDED IN A REDUCING ENVIRONMENT)
- (iv) ACCUMULATIONS OF IRON SULPHIDES (FRAMBOIDS, SULPHIDISED PLANT MATERIAL) GENERATED IN THE ORGANIC-RICH HORIZONS. (BIOGENIC S^{--} AND S^{--} INVOLVED)
- (v) SUPERGENE CHALCOPYRITE DEPOSITED BY REPLACEMENT OF ORGANIC-RICH, FRAMBOID-CONTAINING MUD, ADJACENT TO LODE SULPHIDES PROPER [BIOGENIC S^{--} (AND S^{--}) INVOLVED]
- (vi) DETACHED LODE FRAGMENTS, PERHAPS, IN PART, EMBEDDED IN CHALCOPYRITE RIM.



MEETINGS OF THE SOCIETY

IGCP Circum-Pacific Plutonism Project 5th Meeting

The Society hosted the meeting in Dewan Kuliah III, Faculty of Science, University of Malaya on 12-13 November. The meeting was opened by the Malaysian Deputy Minister of Lands and Mines, Y.B. Dr Sulaiman Hj. Daud. At the opening ceremony's addresses were also given by Prof. Ahmad Ibrahim, Deputy Vice-Chancellor, University of Malaya, Dr Paul C. Bateman, the Project Leader and Encik D. Santokh Singh, President of the Society. About 100 guests and members attended the meeting.

The theme of the meeting was on "The relations between granitoids and ore deposits of the Circum-Pacific region" and also on plutonism of the region in general. Papers were presented by Dr G.J. Woodsworth and Dr J.A. Roddick (Canada), Dr P.C. Bateman, Dr S.G. Creasey, Dr F.C.W. Dodge and Dr T.G. Theodore (all from USA), Prof. N. Oba, Prof. N. Murakami and Dr T. Nozawa (all from Japan), Prof. D.S. Lee (Korea), Academician N.A. Shilo (USSR), Dr A.H.G. Mitchell (Burma), Mr S. Pongsapith and Mr C. Mahawat (read by Mr A. Meesook) and Dr S. Suensilpong, Mr A. Meesook, Mr S. Nakapadungrat and Mr P. Putthapiban (all from Thailand), Dr R. Sukanto and Dr T. Suhanda (Indonesia), Encik S.S. Rajah, Encik F. Chand and Encik D. Santokh Singh, Encik K.W. Choy, Encik C.H. Yeap and Dr S.H. Chan, Prof. K.F.G. Hosking and Dr C.S. Hutchison (all from Malaysia). In addition a paper by Dr F. Hehuwat (Indonesia) was distributed but not read. Distinguished Asean earth scientists such as Prof. J.A. Katili (Hon. Member of our Society), Dr P. Aranyakanon and Encik S.K. Chung also participated.

After the meeting about 80 participants visited the Sungei Besi Mines and Ayer Hitam Mine on 14 November and granitoids and volcanics localities of the Main Range (Genting Sempah-Bentong-Fraser's Hill area) on 15 November. On 16 November about 40 local and foreign participants were in the Ipoh area where they visited the Eu Tong Seng Mine, Gopeng Consolidated, Bujang Melaka granite and the Geological Survey. On 17 November the foreign participants were brought to Penang where they examined granitoids along the north coast of the island and at Ayer Itam. On 18 November the foreign participants left Penang for Chiangmai where they continued their field excursions.

The foreign guests attended the Society's Annual Dinner (see News of the Society). All participants were also invited to a Beer & Satay Party sponsored by Conzinc Riotinto (Malaysia), Pacific Tin and Selangor Dredging at the Kolej Pertama, University of Malaya. Sungai Besi Mines gave the participants a sumptuous lunch near Sungai Besi and Ayer Hitam mine provided refreshments for all participants who visited the mine. Participants of the Main Range excursion were generously provided with beer and soft drinks in the buses by Valdun Mining Consultants. In Ipoh, the participants were entertained by Osborne and Chapel Ltd and Mineral Consultants who provided a lunch and an afternoon tea respectively at the Ipoh Club.

The IGCP gave the Society \$3787.83 to organize and hold the meeting including field trips. In spite of the relatively small amount of money given the Society managed to hold the meeting, run the field excursions and keep the participants well entertained. This could not be possible without the generous cooperation of the mining companies and consultant firms mentioned above, the Geological Survey of Malaysia, the University of Malaya (especially the Department of Geology), National University of Malaysia, Staff of the National Commission for UNESCO (Malaysia), Institut Pertanian (Serdang and Bumbong Lima), etc. The Society is indeed fortunate to have such generous supporters and should be grateful to their kindness and cooperation.

TTK

J.N. Bubb: Seismic Interpretation in Petroleum Exploration

On 12 December 1975, Dr J.N. Bubb, Geophysical Manager in the Exploration Dept. of Exxon Production Malaysia Inc gave the talk to the Society at 5 p.m. in the Department of Geology, University of Malaya. In spite of stormy weather and also the day being declared a holiday at very short notice, about 40 keen and attentive members turned up for the talk.

Dr Bubb began his talk by showing a seismic profile of an area off Kuala Trengganu. The profile showed occurrences of fault zones, marker horizons and an unconformity. From there he proceeded to show the audience how such informative profiles could be obtained. He showed and explained how shooting boats operate and how data were obtained, stored and refined. Finally he showed how the information obtained can be interpreted.

The talk was well illustrated and was well appreciated by the audience who came to be better informed.

NEWS OF THE SOCIETY

Resignation of the Asst. Secretary

The Asst. Secretary, Mr T.H. Tan resigned from the post on 8 November 1975. He has gone to La Trobe University, Australia to work for a Ph.D. degree on tin mineralization in Tasmania. The Council thanked him on behalf of the Society for his yeoman duties for the Society and wished him success in his studies.

Cooption of new Asst. Secretary

Mr A.S. Gan of the Geological Survey Malaysia and also a Councillor was coopted to be the new Asst. Secretary on 5 December 1975.

Resignation of a Councillor

Mr L.C. Wong, a Councillor who was elected to a 2 year term last year resigned as a Councillor on 8 November 1975. He has gone to the Royal School of Mines, London to pursue a mining engineering course. Mr Wong is noted for his cool and analytical observation of Council discussions and his timely and helpful comments which guided several major decisions. The Council thanked him for his services to the Society and wished him every success.

Cooption of a new Councillor

Mr T. Suntharalingam of the Geological Survey Malaysia was coopted to fill the post vacated by Mr L.C. Wong mentioned above on 8 November 1975.

Annual Dinner 1975

The Society's Annual Dinner was held in Equatorial Hotel on 13 November 1975 at 7.30 p.m. About 80-90 guests and members attended the dinner. The guest of honour was Y.B. Dr Sulaiman Hj. Daud, the Deputy Minister of Lands and Mines Malaysia. Among the guests were distinguish participants of the IGCP Plutonism Meeting and representatives of companies and institutions which have supported our Society's activities since the birth of our Society.

Y.B. Dr Sulaiman thrilled dinner guests and members with his after-dinner speech which was spiced with interesting observations. The President's speech was just as interesting. Mr Umar Yahya from Indonesia sang two songs which left the people present asking for more. Not to be outdone, Prof. N. Oba of Japan sang a patriotic Japanese song and Academician N.A. Shilo from USSR obliged with a poem in Russian which Mr R.W. Murphy tried to interpret. Dr M. Ayob the master-of-ceremony sang a Malaysian song to accompany the guests who entertained us. It was a pleasant and enjoyable evening.

Donation from Exxon Production Malaysia Inc.

Dr J.N. Bubb presented a cheque for \$1500 (Malaysian) on 12 December 1975 from Exxon Production Malaysia Inc to the Hon. Secretary who received it on behalf of the Society. The Hon. Secretary thanked Exxon Production Malaysia for the kind donation on behalf of the Society.

Membership

The following applicants have been elected:

Full member

W. Jauncey
Champlin Philippines Inc.
P.O. Box 1802 MCC
Makati, Rizal
Philippines

J.A. Roddick
Geological Survey of Canada
100 W Pender St.
Vancouver B.C.
Canada

Student member

Abu Samad b. Nordin
15 Lorong Enggang 17
Taman Keramat
Kuala Lumpur

Dana D. Atwood
9 Lorong Damansara Endak
Kuala Lumpur

S. Chandramohan
76 Jalan SS3/68
Taman Universiti
Sungai Way-Subang
Selangor

Koh Tuck Wai
2298/2 Jalan Berserah
Kuala Lumpur

Lim Tow Ho
115 Jalan 12/14
Petaling Jaya
Selangor

D. Selvaraj
39 Jalan Chenderai Dua
Lucky Garden
Bungsar Baru
Kuala Lumpur

Tan Say Biow
Kolej Kedua
Universiti Malaya
Kuala Lumpur

K. Thiruchelvam
173 Jalan Limau Purut
Off Jalan Maarof
Bungsar
Kuala Lumpur

Yip Foo Weng
Sungai Way Dredging Bhd.
Petaling, Selangor

NEWS OF MEMBERS

New addresses

S.S. Almashoor
425 Wanpelari Drive
201 Imperial Towers Dept.
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USA

Robert E. Besley
c/o Philippine Goethermal Inc.
P.O. Box 7336
Airport, Philippines

G.A. Nelson
Australia Exploration
Box 3972 GPO
Sydney, NSW 2001
Australia

T.H. Tan
Dept of Geology
University of La Trobe
Melbourne
Australia

Addresses unknown

1. Mohd Yusop b. Abd. Mutalib
2. J.E. Monical
3. Nik Azman b. Mohd Zain
4. R.W. Seymour
5. Shaharin b. Ibrahim
6. R.D. Stewart and
7. Wong Nam Chong.

It will be appreciated if members who know the addresses of these members can inform the Hon. Secretary of their knowledge.

O T H E R N E W S

A user school on "Quantitative Colour in the Microscopic Study of Minerals" will be held in the department of Geology, Imperial College, London SW 7 from Thursday, 1st to Saturday, 3rd April 1976. It will be concerned mainly with the use of quantitative colour in ore-microscopy but there will also be some study in transmitted light.

For further details, please write to Dr N.F.M. Henry, Dept of Mineralogy and Petrology, Downing Place, Cambridge CB 2 2EW, England.

The 10th General Meeting of the International Mineralogical Association will be held during the 25th International Geological Congress, Sydney, N.S.W., Australia from the 16th to the 25th August 1976. Information may be obtained from The Secretary General, 25th International Geological Congress, P.O. Box 1892, Canberra City, A.C.T., Australia.

C.S. Hutchison
Chairman
IMA Subcommittee

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