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CONTENTS

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GEOLOGIC NOTES

Late Pleistocene age indicated for volcanic ash in West Malaysia

P.H. Stauffer, Jabatan Geologi, Universiti Malaya

Scattered occurrences of a young, poorly consolidated rhyolitic volcanic ash have been known in West Malaysia for more than 40 years (Scrivenor, 1930). Only recently, however, was this ash found exposed as a layer in good stratigraphic context (Stauffer, 1971). In this occurrence, at Ampang, Kuala Lumpur, the ash layer is bracketted between an underlying peat deposit, 4-6 m thick and containing many large pieces of partly lignitised wood and even standing tree trunks, and an overlying bed of sandy clay alluvium, also containing some fragments of wood (see figure). Thus the exposure offered the possibility of dating the wood above and below the ash by the carbon-14 method and so deriving an approximate age for the ash itself.

This has now been done. Four samples of wood, one from above the ash, two from short distances below the ash, and one from the base of the peat layer, have been analysed for radio-carbon by Teledyne Isotopes, Westwood, New Jersey, U.S.A. All the samples were from massive cylindrical pieces of wood, 15 to 25 cm in diameter, lying horizontally within the deposits, and in each case the outer portion was carefully cleaned off to minimize the chance of contamination.

The derived ages form a coherent sequence (see table): The sample from above the ash provides a minimum age for the ash (1145 $\pm$ 90 B.P.) and, equally importantly, proves that the material overlying the ash is not merely tailings from early mining operations. The two samples from short distances below the ash give ages of 33,250 $\pm$ 1800 and 36,500 $\pm$ 2500 B.P. Even though these two ages appear in reverse order (that is, the "older" sample is higher in the section), if one includes the probable errors given, the two ranges overlap (from 34,000 to 35,050 B.P.) and are therefore considered consistent with the stratigraphy. Between them, these two ages imply a maximum age for the ash of about 35,000 years. The lowest sample, from the base of the peat, was beyond the range of the method, and its given minimum age is 39,900 B.P. From this one can conclude that the deposition of this peat layer took at least 5000 years, and that therefore the average rate of accumulation was not more than about 1 mm per year.

Diagrammatic Section
Kim Kee No. 6 Mine
Ampang

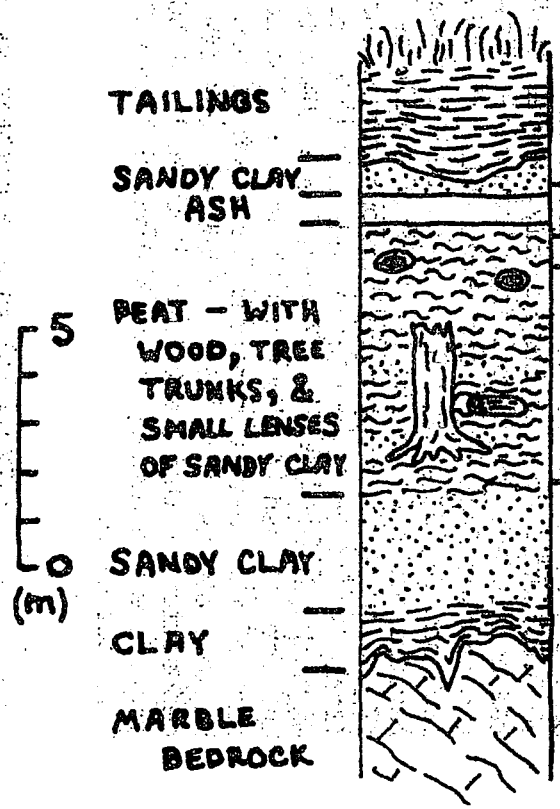

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Table Of Carbon-14 Results

SAMPLE No.	POSITION REL. TO ASH	C-14 AGE (B.P.)
UM7869	15 CM ABOVE TOP	1145 ± 90
UM7912	30 CM BELOW BASE	36,500 ± 2500
UM7870	90 CM BELOW BASE	33,250 ± 1800
UM7852	5 M ± BELOW BASE (20 CM ABOVE BASE OF PEAT)	> 39,900

Sample numbers refer to the University of Malaya Department of Geology Research Collection

The maximum age for the ash thus derived is much less than the 73,000 ± 12,000 years reported for the Toba ignimbrite deposits in Sumatra, which was derived by the potassium-argon method (Ninkovich, et al., 1971). There is no proof yet that the ash in West Malaysia is related to the Toba eruption, but as there is no evidence in Sumatra of any other eruption of comparable magnitude (D. Ninkovich, personal communication, 1972), a Toba origin may still be considered most likely. In that case I suggest that the carbon-14 dates reported here give a more reliable indication of the age of the Toba eruption, since the four ages form a consistent series, and the validity of the potassium-argon method for such very young ages has not been adequately demonstrated.

The ash itself is likely to be only slightly younger than the derived maximum age of approximately 35,000 B.P. This is based on the following reasoning: The remarkably flat and sharp base of the ash suggests, as noted by N.S. Haile (personal communication, 1971), that it fell into an open-water area, not a vegetated swamp. Open water of this type will, in this climate, rapidly be filled in, unless subsidence occurs, in which case increasing thicknesses of deposits will accumulate. We cannot, therefore, suppose the lake at Ampang to have stood for a long time with no deposition. That being so, if we allow about 500 years for deposition of the roughly 0.5 m of peat remaining between the ash and the two dated underlying wood fragments, and if we take 34,500 B.P. as the middle of their age overlap, one can estimate the actual age of the ash as approximately 34,000 B.P.

The fall of the ash appears to have ended peat formation at Ampang. This is not surprising, as such a blanket of ash could easily cause many minor drainage changes in relatively flat ground. What happened between 34,000 and 1145 B.P. is not clear. It is possible that the sandy clay above the ash is somewhat older than the 1145 date, as the sample from it is the only one of the four whose termination was not seen in the field and which therefore could have been a large root introduced later.

Dating of the ash itself by other means is currently in progress, and the results may resolve the remaining ambiguity. The carbon-14 age determinations reported here were paid for out of donations from ESSO Exploration Malaysia, Sdn. Bhd., to the Department of Geology, University of Malaya.

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Scrivenor, J.B., 1930. A recent rhyolite-ash with sponge-spicules and diatoms in Malaya. Geol. Mag., 67, 385-393

Stauffer, P.H., 1971. Quaternary volcanic ash at Ampang, Kuala Lumpur, West Malaysia. Geol. Soc. Malaysia Newsletter, 33, 5-8.

Rapid and simple chemical aids to the identification of Varlamoffite

K.F.G. Hosking, Department of Geology, University of Malaya, Kuala Lumpur, MALAYSIA

Varlamoffite a 'yellowish clay-like substance', was named after Monsieur N. Varlamoff who discovered it in what was then the Belgian Congo, and who described it in 1948. Subsequently it was found in Cornwall (Russell and Vincent, 1952), in Malaya (Bradford, 1960) and in a number of other tin-fields of the world.

In most of the known occurrences varlamoffite is the product of supergene alteration of stannite as, for example, in Cornwall and Bolivia, but some regard the varlamoffite at Chenderiang (Perak) as a 'hypogene replacement product of cassiterite' (Singh and Bean, 1968, p. 465) whilst the writer believes the Chenderiang material to be largely, perhaps entirely, the product of supergene alteration of malayaite.

The composition of varlamoffite has been the subject of considerable discussion and research, and the varied views expressed concerning this subject have been well summarised by Sharko (1971) - at least as far as varlamoffite derived from stannite is concerned. Sharko (op. cit., p. 603) states that "most investigators are inclined to regard it (i.e., varlamoffite) as compounds formed in the process of oxidation

of stannite such as hydrates of stannic oxide or as meta-stannic acid with subordinate amounts of other accessory constituents .... Some investigators consider these compounds to be finely dispersed secondary cassiterite, ... others, SnO_2 gel. ....

Opinions are also expressed as to the occurrence of stannates of the type $Cu[Sn(OH)_6]$, $Fe[Sn(OH)_6]$, and others, in the oxidation products of stannite ...." Sharko (who has carried out the most comprehensive study known to the writer of the composition of the material under review, concludes (op. cit., p. 612) that "the investigation of the chemical nature and properties of varlamoffite indicates that the latter is not a distinct mineral but is a mixture of three phases of amorphous and semiamorphous hydrated compounds of tin, metastannic acid, a polycondensed phase, and a hydrocassiterite phase". Sharko further notes that the metastannic acid is soluble in diluted acids (e.g., 0.5 - N HCl), but the polycondensed phase, whilst not dissolving in 0.5 N HCl will dissolve in ~1:3 H_2SO_4, and the hydrocassiterite is "completely decomposed by concentrated H_2SO_4 and even by 1:3 H_2SO_4 during the repeated treatments, with the formation of a colloidal solution". Cassiterite in marked contrast to the above tin-bearing compounds, is but slightly soluble in HCl and virtually insoluble in H_2SO_4.

Years ago Herzenberg (1946) had recorded that 'souxite', which is now known to be varlamoffite, from Potasi, Bolivia, contained 25.8 per cent Sn of which 17.2 per cent was soluble in HCl. This suggested to the writer, about fifteen years ago, that it should be easy to locate and/or develop tests for the establishment of tin in varlamoffite that involved an HCl attack rather than, say, a fusion. He also thought that the difference in the solubilities of cassiterite and varlamoffite in concentrated HCl might serve as a basis for differentiating between these two substances particularly when they were in a a finely divided state, and between varlamoffite and other, at least superficially similar ones. He was anxious to develop such tests as at that time he was searching, in Cornwall, for further occurrences of varlamoffite to add to the three Sir Arthur Russell had already located. The tests in question, which he has not previously published, follow, but, most unfortunately, both varlamoffite and cassiterite react positively to them, although, without doubt, the former species does so in a much more definite manner. (It must, of course, also be appreciated that these tests, with but slight modification, also permit the presence of tin to be established in other species, such as stannite, and cylindrite.)

1. The Flame-test

Place c. 0.5 g of the very finely commuted substance under test in an evaporating dish, then add c. 7 ml of concentrated HCl and digest for c. 5 minutes. This treatment will result in partial solution of both minerals in question. Allow to cool, then stir with a clean test-tube half-filled with cold water. Place the closed end of the test-tube into a non-luminous Bunsen flame and immediately above the blue cone. The presence of tin in the test solution, derived either from cassiterite or varlamoffite, is indicated by the appearance of a transient blue flame-mantle around the test-tube, but the varlamoffite mantle is the more spectacular.

The whole test may be carried out on a much smaller scale by placing a drop of the test solution on a magnesia stick and evaporating it to dryness by holding it near a flame. The area occupied by the test substance is then damped with a drop of concentrated HCl and placed in the reducing zone of the flame from a micro-burner. Again, the development of a blue flame mantle indicates tin, and this, in turn, confirms that the test substance is probably either cassiterite or varlamoffite. The above tests, which are adaptations of tin tests devised by Feigl (1947), p. 88), only fail when arsenic is present, in the solution, in amount equal to, or greater than, that of the tin.

ii) The rubidium chloride test

The microchemical rubidium chloride test for tin in solution, in the stannic state, has been both investigated and described in considerable detail by Short (1940, p. 219). As described below the test will establish the presence of tin in varlamoffite and in cassiterite.

A small portion of the powdered test material on a microscope slide is partly decomposed by heating it, by means of the flame of a microburner, with two successive drops of concentrated HCl. Before the addition of the second drop the first should be taken just to dryness. After the second drop has been taken to dryness add 1 drop of aqua regia and again take to dryness. Take up the residue in a drop of 1:5 HCl. Collect a portion of the solid-free solution by means of a drawn-out capillary tube. Transfer this aliquot to another part of the slide then blow out the drop and merge a small fragment of RbCl with it. The presence of stannic tin is indicated by the development of colourless isometric crystals, almost invariably octahedra, of rubidium chlorostannate.

When varlamoffite is so tested octahedra of sufficient size usually develop as to be easily recognised at 50 magnifications but under the same conditions cassiterite-derived solutions yield small crystals that are only adequately viewed at 80 or greater magnifications, and which may be so small that some float on the surface the test drop.

In spite of the appreciable compositional range displayed by varlamoffites, all samples of this substance which have been subjected to the two above tests have yielded positive results. To date, varlamoffite from a number of localities in Britain, Southeast Asia, and from the Sardine Tin Mine, Australia, have been examined.

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LETTER TO THE EDITOR

Dear Sir,

Malayaite from Kramat Pulai, Perak, West Malaysia

The first recorded presence of malayaite was noted by the writer recently in the Kramat Pulai area.

The geology of the area was described by Willbourn and Ingham (1933). The area lies on the contact between the Main Range granite and the limestone - schist rocks of the valley. This area was once well known for its cassiterite, scheelite, corundum and fluorite. Apart from these minerals the area yielded diaspore, galena yttrotungstite, ferbertite, wolframite, stolzite, tungstite, stibnite, sphalerite, arsenopyrite, pyrite, pyrrhotite, tremolite asbestos, beryl, garnet, idocrase, axinite, tourmaline, wollastonite, bustamite and quartz crystals. Malayaite occurs as disseminations in association with fluorite and also in the skarn rocks. This mineral fluoresces bright yellowish-green under short wave ultra violet light, and was confirmed by X-ray fidentification.

REFERENCE

INGHAM, F.T. and BRADFORD, E.F., 1960. The geology and mineral resources of the Kinta Valley, Perak. Dist. Mem. no. 9, Federation of Malaya, Geol. Surv.

K.N. Murthy
Geological Survey
West Malaysia

CONFERENCES

GSM Discussion Meeting

Discussion meeting to be held in the Department of Geology, University of Malaya, Kuala Lumpur on February 16 and 17th 1973

The final programme has not yet been drawn up, but it will include the following papers:

1. "The value of studying the metal content of the heavy fractions of soils during geochemical follow-up work"

   by Aw Peck Chin of the Geological Survey of West Malaysia (subject to approval by the Director)

2. "Structural features in the Western Kuala Lumpur area"

   by Choy Kam Wai, Conzinc Riotinto, Kuala Lumpur, Malaysia.

3. "Stanniferous Axinite and garnet from a skarn rock in Pelepah Kanan Mines, Kota Tinggi"

   by P. Ganesan Kanapathipillai, Pernas

4. "Redbeds and radiolarian chert; uneasy bedfellows of the Bentong Group"

   by N.S. Haile, P.H. Stauffer, Nik Mohamed, University of Malaya, Kuala Lumpur, Malaysia

5. "Grain size and mineral content of grab samples from West Malaysian waters"

   by David R. Muerdter, U.S. Peace Corps: (Geological Survey, West Malaysia)

6. "Recent oil exploration activities in Southeast Asia"

   by Richard W. Murphy, Esso Exploration Inc., Singapore

7. "Palaeozoic Structures in West Malaysia"

   by B.K. Tan, University of Malaya, Kuala Lumpur, Malaysia

8. "Sungei Siput unconformity, Pahang"

   by Wee Heng Tian and Dennis Taylor, Conzinc Riotinto, Kuala Lumpur, Malaysia

9. "The exploratory activities of CONOCO in Malaysia"

   by John White, Continental Oil Company, Oklahoma (subject to CONOCO approval)

10. "Upper Paleozoic Stratigraphy of the Cheroh area, West Pahang"

    by Thomas Yancey, University of Malaya, Kuala Lumpur, Malaysia

11. "Comparative study of Triassic and Cretaceous granites of Gunong Pulai, Johore"

    by Voon Choon Chan

Additional short communications and exhibits will be added to the programme. The schedule is as previously announced;

Friday 16th February 1973

9 a.m. - 12.30 Discussion meeting

2 p.m. - 4.30 Discussion meeting

8 p.m. Presidential Address
"Malaya and Southeast Asia in the pattern of continental drift"

Saturday 17th February 1973

9 a.m. - 11.30 Discussion meeting

11.30 - 1 p.m. Annual General Business meeting

Venue: Geology Department, University of Malaya, Kuala Lumpur, Malaysia.

Refreshments will be served at appropriate times.

C.S. Hutchison

International Symposium on the Boreal Lower Cretaceous

Under the auspices of the University of London, Queen Mary College and the Institute of Geological Sciences, London an International Symposium on the Boreal Lower Cretaceous was held from 17-30th September 1972. The Chairman was Dr R. Casey, FRS, of the Institute of Geological Sciences. I was invited to attend and read a paper in the Symposium on the Tethyan ammonite migrants into the English Boreal as well as on the general palaeogeography of the Boreal and Tethyan Lower Cretaceous, as a delegate of the University of Malaya.

It was not known before that the Boreal and Tethyan Lower Cretaceous seas had often interconnections permitting a part of the population to migrate. In 1924, Dr L.F. Spath, FRS, questioned whether the Speeton Clay (England) ammonites had any identical representative from the South East France. It is now known that not mere representatives, but some identical genera and species from South East France, occurred frequently in the English Lower Cretaceous, for example: Crioceras duvali Leveille, 1835-37, Emericiceras Sarkar, 1954, Emericiceras thiollieri Astier; Acrioceras tabarelli Astier 1851; Acrioceras puzosianum d'Orbigny 1840, Crioceras binelli Astier; Crioceras cristatum d'Orbigny. Prof. P. Donze has reported that the following genera of Ostracods which occur in the Lower Berriasian in South-East France, migrated into Poland and North Germany during the Valanginian and into eastern England during the Hauterivian: Euryitycythere Oertli 1959, Quasihermanites Grundel 1964, Kentrodictyocythere Donze 1968, Parexophthalmocythere Oertli 1959, and Cythereis Jones 1849.

About sixty delegates attended the Symposium from Canada, Denmark, France, West Germany, Netherlands, Poland, U.K., and U.S.A., including myself from Malaysia. A number of interesting papers were read covering Stratigraphy, Biochronology, Palaeontology (Ostracods, Foraminifera, Ammonites, Brachiopods, Belemnites) and Palaeopalynology. Excursions were conducted to different geological formations (mainly Cretaceous) in Eastern and Southern England. Besides there were opportunities to see the collections of Cretaceous fossils in the British Museum (Natural History) London and in the Sedgwick Museum, Cambridge. The Symposium was well organised. Receptions were given to the delegates by the Director of the Geological Institute and by the Principal of the Queen Mary College, London University.

S.S. Sarkar

NEWS OF THE SOCIETY

Forthcoming Publications

The 1971 Presidential Address of K.F.G. Hosking entitled "The search for Tungsten" is expected to be out by the middle of February 1973. This paper is the extended version of the address delivered to the Society in February 1971 and, because of its length and content, is published by itself as a single Bulletin. This Bulletin would be Bulletin 5 in our Bulletin Series and consists of 70 pages. All members of the Society shall receive one free copy, extra copies may be purchased at M$5.00 by members. Price for non-members is M$10.00.

Bulletin 6, comprising 20 papers presented at the GSM Regional Conference on the Geology of Southeast Asia is also expected to be printed in the next few months.

There is a possibility that Bulletin 7 may be out this year. At the moment a total of 7 papers are being considered for publication in this Bulletin. More papers on any aspect on the Geology of Southeast Asia or on related or relevant topics are still welcomed. It is hoped that at least some of the papers to be presented at the forthcoming AGM Discussion Meeting would be submitted for this or future Bulletin.

GSM Loan Fund

The Council has decided to establish a loan fund for student members of the Society. Council felt that in view of its healthy financial situation it is now in a position to help needy students in their final year of study or undertaking post-graduate studies in geology, at an institution of Tertiary education in Malaysia. The total loan granted to any student member would not normally exceed M$300. This would be interest free and should be repayable within three years. It was noted that approximately $10,000 would be needed to start the loan fund for the first few years. In later years, the repayment from the earlier loans would keep the fund going. The Council is also hopeful that mining and exploration companies would look favourably on this idea of helping to promote geological investigations by student members of the Society and make some

contribution to this fund. Since other members of the Society may have some views on this matter, this item has been included for discussion at the forthcoming AGM.

Student Membership in the GSM

The Council has noted with regret that only five student members enrolled into the Society during the past year. It is felt that it is important that something should be done to encourage more students to join the Society and to participate in its activities. The Council would therefore propose at the forthcoming AGM that the By-Laws should be amended so as to create two types of student membership:

a) M$8.00 p.a. and receive all Newsletters and publications issued to Full Members (as at present)

b) M$2.00 p.a. and receive Newsletters and notices only.

Membership

New Members:

Full members

1. Mr J.C. Champion
   P.O. Box 291
   Kuala Lumpur
   MALAYSIA

2. Mr F.P. Sonneberg
   Union Texas Asia Corp.
   No. 7, Arcade, Hyatt Hotel
   Scoots Road, SINGAPORE 9

3. Mr L. Albertelli
   Djalan, Tibini Raya 44
   Jakarta, INDONESIA

Student members

4. Lim Yew Kuen
   Dept. Geology
   University of Malaya
   Kuala Lumpur, MALAYSIA

5. Tan Jee Theng
   923A Jalan 17/13B
   Petaling Jaya
   SELANGOR, MALAYSIA

Resignations

1. Dr H.J.C. Kirk
34 Boyford FGreen
Nr. Hertford
England

2. Mr H.T.L. van Eijk
Billiton N.V.
2nd Floor, Wisma Damansara
Jalan Semantan
Kuala Lumpur

3. Dr K.C. Dunham
Inst. Geological Sciences
South Kensington
London S.W. 7, England

4. Mr A.P. Ng
c/o Malayan Tin Dredging Co.
Batu Gajah
Perak

5. Mr Seetheram

NEW BULLETIN - INTERNATIONAL MINERALOGICAL ASSOCIATION

The Commission on Ore Microscopy of the International Mineralogical Association is now publishing a "Mineralogy & Materials News Bulletin for Quantitative Ore Microscopy". This comes in four issues each year and from 1973 will appear at definite intervals, that is, in March, June, October and December. The yearly subscription for the four issues is at £1 (post free) for 1973.

It has been found that most individual subscribers prefer to pay this small sum of subscription in a more personal way to an "Agent". Mr J.H. Leow, c/o 51 Kallang Place, Singapore-12, has been appointed "Agent" for this region. Any official body can, if it prefers, be invoiced directly so that its subscriptions can be sent to Dr N.F.M. Henry of the Department of Mineralogy and Petrology, University of Cambridge, Downing Place, Cambridge CB2, 3EW, U.K.

Each new subscriber for 1973 is being supplied free, on demand, with ten previous issues: 1970 Nos: 1 & 2; 1971 Nos: 1, 2, 3 & 4, 1972 Nos: 1, 2, 3 & 4.

J.H.L.

APPEAL FOR BACK ISSUES OF SCIENCE

Two recent volumes of the journal SCIENCE in the library of the Department of Geology, University of Malaya, are incomplete and therefore remain unbound because of a single issue in each being missing. The publisher reports that these issues are already out of print and unobtainable.

The volumes and the issues missing are:

SCIENCE Vol. 168, No. 3936 (5 June 1970)
SCIENCE Vol. 173, No. 3991 (2 July 1971)

If any subscriber to this journal still retains these issues and is willing to donate or sell them to the Department of Geology, we would be very grateful. Please contact:

Department of Geology
University of Malaya
Kuala Lumpur, MALAYSIA

PHS
