PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

Jil.1 No.1 (Vol.1 No.1) Jan - Feb 1975

Untuk ahli-ahli sahaja
(For members only)

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PERSATUAN GEOLOGI MALAYSIA
(Geological Society of Malaysia)

Alamat Persatuan:
(Society's Address)

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MALAYSIA

A systematic programme for the X-ray fluorescence analysis of rocks and minerals

C.S. Hutchison, Jabatan Geologi, Universiti Malaya, Kuala Lumpur

A standard procedure, complete with FORTRAN IV computer programme, for the complete analysis of silicate rocks and minerals by the fusion technique of Norrish and Hutton (1969), is now in regular use in this department. Copies of the detailed procedure, computer programme immediately useful on an I.B.M. 1130 computer, and data sheets may be obtained from the author.

Specimen Preparation: A fused disc of the rock or mineral powder is made according to the procedure of Norrish and Hutton (1969) as detailed in Hutchison (1974, p. 290-293). The fused disc is used for analysis of all major elements from iron to magnesium. The weight of the specimen used should be close to 0.4200g, but allowance is made in the computer programme for the actual weight. A pressed pure rock or mineral powder disc, rimmed and backed by boric acid or chromatographic cellulose, is made according to the method in Hutchison (1974, p. 265-268) of each of the specimens and of one rock or mineral of similar composition, whose sodium content is already known from chemical analysis (called the standard). The pressed powder discs are used for sodium analysis.

Measurements: The loss on ignition of each specimen is determined by weighing an amount of specimen between 1 and 2g into a platinum crucible, heating it for 30 minutes at 1000°C, then re-weighing after cooling. The percentage loss in specimen weight is called the loss on ignition, which is necessary for the computer programme. At least two loss on ignition determinations are made and averaged.

All X-Ray fluorescence measurements are made under vacuum with a gas flow counter. The settings used are those of Hutchison (1974, p. 304-305). Specimen holders used by the author are of aluminium and all have been checked to give identical count rates for a standard specimen when placed in the different spectrometer chambers. For each element in turn the pulse height analyser is precisely set so that the energy peak is set symmetrically in the window. The window is of width equal to $2\frac{1}{2}$ times the peak width at the half peak height. A fused disc standard is kept permanently in spectrometer chamber 1.

Announcement

In future the newsletter of the Persatuan Geologi Malaysia (Geological Society of Malaysia) will be known as WARTA GEOLOGI which in Bahasa Malaysia (Malay) means 'geological news'. As our Society is the sole national association represeṅtating Malaysian earth scientists it is appropriate that the names of our publications should reflect the national identity and so have to be Malaysianized.

The previous practice of numbering our newsletters will be discontinued. Instead a more systematic method will be adopted for Warta Geologi. There will be six numbers of Warta Geology per year - Jan-Feb, March-April, and so on. The six numbers will form a volume. The first page of a particular number of Warta Geologi will be numbered immediately after the last page of the p preceding number of Warta Geologi of the same volume. Papers in the Warta Geologi should be quoted in the following manner:

Oh, K.W.P., Yeap, E.B. and Hosking, K.F.G. (1975) The behaviour of secondary lead species when subjected to the tinning test for cassiterite. Warta Geologi Vol. 1, pp. 4-8.

The masthead of this number of Warta Geologi is a temporary one. All members are invited to redesign the masthead and send the designs to the Editor as soon as possible. The designs should bear the Society's crest and only the words shown in the present number. The size of the letters of Persatuan Geologi Malaysia, Warta Geologi and newsletter of the Geological Society of Malaysia should be similar to those shown in the masthead of this issue.

The author uses a disc called FS-60, which was supplied by Dr K. Norrish. This standard disc is kept in a dessicator when not in use. For each element in turn, a check is made that 2θ of the goniometer is properly set for maximum reading, and that the high voltage of the gas flow counter is on an operating plateau (see Hutchison, 1974, p. 296-298). The pulse height analyser is set according to instructions in Hutchison (1974, p. 299-302; and 163-166). Failure to set the pulse height analyser properly by this procedure will undoubtedly result in highly inaccurate results. Each specimen is counted for each of the following elements in turn: Fe, Mn, Ti, Ca, K, S, P, Si, Al and Mg. Counting time is given in Hutchison (1974, p. 296-298), with the additional advice that the times may be extended for rocks that have low contents of any particular element. During analysis it may be noted that a fall in the counting rate of the standard is experienced with successive batches of specimens. When this occurs, the detector high voltage should be slightly adjusted for optimum count rate. In addition for P.E.T., K.A.P. and Rb.A.P. crystals it may be necessary to adjust the goniometer 2θ to regain the maximum count rate from time to time. In addition to counting each rock or mineral specimen, a disc made by the fusion procedure in which 0.4200g of pure powdered quartz (or pure SiO_2 glass) is added instead of the rock or mineral powder, is counted in the same way for each element. In addition a similar disc made with 0.4200g of powdered Al_2O_3 is counted for silicon. These counts give the background corrections for the computer programme.

The spectrometer is now carefully set for sodium analysis (see Hutchison, 1974, p. 302). The pressed powder standard should be an international or departmental standard, kept in spectrometer chamber 1. Each sample powder disc is compared with it, with 2θ set precisely on the Na peak, then background determined on each disc at $+1.20^\circ$ and -1.20° 2θ. A scan should be made on at least one of the discs to determine that $\pm 1.20^\circ$ from the peak position is a suitable interval at which to determine the true background. If another peak appears in that region, another more appropriate interval should be chosen.

Entering the Data: The data are now entered on four consecutive I.B.M. cards. The computer deck is then made of: Card 1 = //JOB T. Card 2 = // FOR . Card 3 = *IOCS (CARD,1403 PRINTER). These introductory cards are followed by the deck of 173 X-R-F programme cards. This is followed by a card // XEQ, followed immediately by all the data cards in their order of 1 to 4 each. Two blank cards must follow the last data card.

Print out: The following details are printed out: Specimen number, uncorrected oxide percent, corrected oxide percent, and the specimen weight used. The corrected oxide percent gives the specimen analysis completely corrected for specimen weight, counter dead time, background, and inter-element absorption effects. The corrections are iterated four times by the computer using the successively new values obtained. Stable values obtain usually after two iterations. The final row should give the correct analysis of the specimen, provided that proper procedure has been observed in all steps of the specimen preparation and X-ray counting.

Discussion: The particular standard fused disc is FS-60 and the programme is written for it. The author can supply details of how to modify the programme for another standard. The programme corrects for a gas flow counter dead time of .000003 seconds. Should the dead time be different from this, the programme will have to be modified according to details available from the author. It is important that all entered data be counts per SECOND, and not for any other time, otherwise the programmed dead time corrections will be wrong. It is most important to correct for counter dead time. Failure to do so can result in grossly inaccurate analyses if the standard and specimen are not always closely similar. The inclusion of a dead time correction allows the use of a single standard for all rock and mineral variations.

Norrish and Hutton (1969) recommend that Mg be determined with an ADP crystal and with the detector voltage increased to put the energy peak off-centre in the pulse height analyser window. The author uses an Rb.A.P. crystal for both Mg and Na analysis and it has been found that the best peak to background ratio obtains when the energy peak is set exactly symmetrically in the window. For all elements the window is carefully set at 2½ times the width of the energy peak at its half height. Rb.A.P. gives considerably improved detection of both Mg and Na over K.A.P.. For both of these crystals care must be taken to set the detector voltage. A slight increase of voltage will cause the background count rate to increase dramatically. Therefore, it is recommended that after the energy peak has been centred in the window, readings on a blank be made to obtain the lowest background count rate by slight lowering of the detector voltage.

Accuracy: Several international and departmental rock standards have been analysed using this programme. High accuracy, with less than 1% relative error, has been obtained for Fe, Mn, Ti, Ca, P, S, Si and Al. The accuracy for K is not so good (usually less than 5% relative).

Accuracy for Mg and Na at present is poor (usually less than 10% relative), but this is thought to be due to deteriorating performance of the author's gas flow counter and not to be an inherent fault in the method. However high accuracy Na analysis by pressed rock disc methods may never be attainable because the effect of particle size cannot be eliminated and at present no inter-element correction is made.

References:

Hutchison, C.S. (1974): Laboratory Handbook of Petrographic Techniques. John Wiley-Interscience. New York. 527p.

Norrish, K. and Hutton, J.T. (1969): An accurate X-Ray spectrographic method for the analysis of a wide range of geological samples. Geochimica et cosmochimica acta, 33, p. 431-453.

The behaviour of secondary lead species when subjected to the tinning test for cassiterite

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Generally, but not invariably, it is possible to detect grains of cassiterite (SnO_2) in a composite sample by subjecting the latter to the 'tinning test'. This test, which has been discussed at some length by Hosking (1974), may be carried out in a variety of ways, but a convenient one is to place the sample, or a representative portion of it, in a zinc tray and then cover the grains with 1:1 HCl. After a short time, which depends on a number of factors, but which is normally less than 2 minutes, and may be much less, any cassiterite grains present are usually coated with a grey matt layer of elemental tin. The reaction involved is generally expressed as follows:

$$SnO_2 + 4H \rightarrow Sn + 2H_2O$$

Recently, when a concentrate of heavy-mineral grains, which had been collected by one of us (K.W.P.O.) from the Klian Intan area of North Perak, was subject to this test, not only were grains tinned that visual examination had suggested were cassiterite, but, in addition, certain bright yellow grains were also coated with a matt grey metallic layer. Initially it was thought that this latter coating might also be tin, but more careful scrutiny indicated that it was not tin-grey in colour, and as the yellow grains were quite unlike any cassiterite any of us had ever seen, it was decided to investigate the matter further.

A powder pattern of the grains in question indicated that they were pyromorphite, $Pb_4(PbCl)(PO_4)_3$, and this was confirmed by appropriate chemical tests. It was also confirmed that the coating was lead by subjecting it to Feigl's sodium rhodizonate test (Feigl, 1954, pp. 385-6).

It was also demonstrated that anglesite, cerussite, mimetite and vanadinite (the only other secondary lead species that were available for study) also reacted to the test in question in much the same way as did pyromorphite in that they all became coated with lead. In addition, after the termination of the test and removal of the grains from the zinc tray, the floor of the latter may be locally dark due to the deposition of elemental lead on it.

In the laboratory, at a room temperature of 24°C, the times, in seconds, taken for cassiterite and grains of the lead species, noted above, to become coated, when subject to the test under review, were as follows:

Cassiterite	-	15 seconds
Anglesite	-	25 "
Mimetite	-	45 "
Vanadinite	-	60 "
Pyromorphite	-	50 "
Cerussite	-	variable. Some grains only partially coated after 2 minutes

A further set of tests was carried out primarily with a view to discovering how the available secondary lead minerals behaved when certain other metals were substituted for zinc. Brief details of these tests and of their results are as follows:-

(i) The HCl/Al test

When grains of the lead species in question were placed in an aluminium dish and covered with 1:1 HCl they were coated with lead rather more rapidly than when a zinc dish was used. However, partial coating of grains was not uncommon and the degree of coating of grains of a given species during a test varied considerably.

When cassiterite grains are subject to the test they are rapidly coated with tin.

(ii) The HCl/Fe test

When grains of the lead minerals noted above were placed in an iron dish and covered with 1:1 HCl no metallic coating developed either in the cold or on warming.

Cassiterite also reacted negatively to this test.

(iii) The HCl/Mg test

When grains of the secondary lead species under review together with magnesium ribbon, were placed on a watch-glass, and 1:1 HCl was added, no coating of the grains was observed.

Cassiterite also reacted negatively to this test.

The problem of differentiating between coated cassiterite and coated secondary lead species

If a given person knows how secondary lead species behave towards the zinc/dilute HCl test, and if he has an average ability to differentiate between greys of different shades, then he will not find much difficulty in assessing the percentages of lead-coated and tin-coated grains in a composite sample that has been subjected to the test in question. The writers are of the opinion that differentiation between lead-coated and tin-coated grains is somewhat easier after the sample has been dried. Of course, the finer the grains the more difficult does this differentiation become. On the other hand, if the coated grains are coarse, then rubbing them with a piece of cloth burnishes the metal coats and this makes it easier to determine whether a given one is lead or tin.

The presence of secondary lead minerals in a sample of grains can be readily confirmed by applying the KI/dil. HNO_3 test (Hosking, 1957). To carry out this test immerse the sample in freshly-prepared, strong KI solution, then add 1:7 HNO_3 until the volume is increased by c. $\frac{1}{2}$. Most secondary lead species stain a brilliant yellow almost immediately. Little or no agitation is necessary, and the test can be carried out in the field on a saucer, pan, dulang or vanning shovel.

After a sample has been thus tested it may subjected to the Zn/HCl one after it has been washed to remove the excess of KI and HNO_3. Any yellow-coated lead-containing grains will then be rapidly coated with elemental lead.

In an endeavour to facilitate differentiation between lead-coated and tin-coated grains, attempts were made to so stain one or both types of metal coating that the two displayed marked differences in colour. The KI/HNO_3 test, noted above, and the sodium rhodizonate one (see Feigl, 1954) formed the bases of several experiments aimed at achieving this end. Alas, none of these yielded results which were satisfactory.

Further notes concerning the tinning test

It is of interest to note that when grains of the secondary copper minerals that were available to us (namely, malachite, azurite and cuprite) were subject to the Zn/HCl test they all become coated with a dull reddish-brown coating of elemental copper.

Although the silver haloid species (cerargyrite, embolite, etc.) were not available for study, the writers think that were they subjected to the test under consideration they might become coated with elemental silver. This is not entirely a matter of academic interest as such species may be associated, albeit rarely, with cassiterite. Thus, for example, cerargyrite (AgCl) locally occurred with cassiterite at the Perran Silver Mine, Cornwall (Jones, 1925, pp. 128-129).

It is also not irrelevant to remind the reader that grains of tungsten species, excepting those of members of the ferberite-wolframite-hubnerite series, become superficially reduced to a pale-blue compound when subjected to the Zn/HCl test. (Hosking, K.F.G. Unpublished studies.)

Conclusions

As far as the writers are aware the behaviour of secondary lead and copper species to the tinning test has not hitherto been recorded in the literature. From the points of view of the tin prospector, miner and mineral-dresser the reaction of the secondary lead species to the test in question is important because on superficial examination of a heavy-mineral concentrate it would not be difficult to overlook the presence of certain secondary lead minerals, for example, cerussite. Were this to happen, then, on application of the tinning test, such lead grains would be counted as cassiterite. It is also to be remembered that lead and tin species are by no means uncommon natural associates. In the southeast Asian Tin Belt, for example, such an association is well-known at Ulu Sokor (Kelantan, Malaya) and at Pinjok and neighbouring mines in South Thailand.

References:

Feigl, F., 1954: Spot tests. (Translated by R.E. Oesper) 1, 385-386. Elsevier Publishing Co., N. York. (518 pages.)

Hosking, K.F.G., 1957: The identification - essentially by staining techniques - of white and near-white grains in composite samples. Camborne School of Mines Mag., 57, 5-16

Hosking, K.F.G., 1974: Practical aspects of the identification of cassiterite (SnO_2) by the "Tinning Test". Geol. Soc. Malaysia, Bulletin 7, 17-26.

Jones, W.R., 1925: Tinfields of the World. Mining Publications, Ltd., London.

LETTER TO THE EDITOR

Dear Sir,

Stratigraphic Nomenclature, New Spelling of Geographic Names: Remarks

From among the many aspects to be considered by a Malaysian committee on stratigraphic nomenclature when this body begins (hopefully soon) to formalize various types of stratigraphic units in the country, I should like to single out the geographic component of lithostratigraphic names.

Article 8 of the Preliminary Report on Lithostratigraphic Units, International Subcommission on Stratigraphic Classification, Report no. 3 (p. 18, 1970) states that "The geographic component of an established lithostratigraphic name should not be changed". The article is then explained by four paragraphs as follows.

A. Difference in spelling of geographic names, according to the report, should be settled by adopting the form accepted by a majority, whatever the local spelling or the original spelling in geological literature might be.

I strongly object against accepting this ruling for stratigraphic nomenclature, especially so in Malaysia. There are three major parts in this objection. First, the majority of practicing geologists in the country are until now non-native speakers of Malaysian (including writer). Several geographic names have been, probably unconsciously, spelled according to the English usage. Johore instead of Johor is a recurrent example.

Second, geographic names of foreign origin are being replaced by local names. Apart from a natural urge to establish a national identity, this name-changing has practical reasons. Several 'unpronounceable' names have been Malaysianised in the past. Examples like Sungei Selim (Slim River) and batuan Kroker (Crocker rocks) sound farcical but are unfortunately true and have been used. The process of rechristening proceeds slowly but we may expect that almost all foreign-sounding localities will be renamed eventually. In order not to get caught with an obsolete name, I suggest that the committee assign Malay geographic names to the stratigraphic units. Fortunately the Kenny Hill formation has not been formally identified; Bukit Tunku or Damansara are good substitutes, I feel.

Third, about two years ago the Malaysian language has officially adopted the new spelling, as did the Indonesian. It is a disturbing fact that the majority of us keep spelling ayer (instead of air), gunong (gunung), tanjong (tanjung), tasek (tasik), and so on. In our nomenclature we should scrutinize names like Ayer Formation (eastern Sabah), Klang Gates quartz (Selangor), Chuping Formation (northwestern Peninsula), and the like. I should also like to know if the Lotong Sandstone of the Gagau Group does not mean l o t u n g, or l u t u n g (monkey species).

B. This paragraph in the report states that change in the name of a geographic feature does not bring about change of the corresponding name of the stratigraphic unit. The same objection applies to this paragraph as to the previous one. Aren't we lucky that many formation names have not been formalized yet!

C. Disappearance of a geographic feature does not entail the disappearance of the corresponding name of a stratigraphic unit. I believe we all can agree on this provided the stratigraphic name has been Malaysian.

D. Spelling of the geographic component of a lithostratigraphic name should conform to the usage recognized in the country that contains the type locality. Such a ruling should be fully supported!

One last remark. The stratigraphic code which we geologists in Malaysia would adhere to, should also insist that formal terms like group, formation, member, and bed should be translated when the language used is Malaysian. Translated terms could be grup, formasi, anggauta (?), lapisan.

H.D. Tjia
Jabatan Kajibumi
Universiti Kebangsaan Malaysia

REPORT ON THE INTERNATIONAL MINERALOGICAL ASSOCIATION

The Ninth General Meeting of the International Mineralogical Association (IMA) was held in Berlin and Regensburg, Germany, in September 1974. Malaysia was not represented at this meeting.

It is hoped that closer future ties with the IMA will gain greater benefits for Society members in the form of up-to-date information in developments in mineralogy.

The following are the member countries of the IMA:

Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Czechoslovakia, Denmark, Egypt, Finland, France, Germany (FGR), Germany (DDR), Hungary, India, Italy, Japan, Malaysia, Netherlands, New Zealand, Norway, Poland, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States, and U.S.S.R.

Nominations for the Officers of the IMA for the period 1974 to 1978 were:

President: V.S. Sobolev (USSR)
Secretary: Marjorie Hooker (USA)
Treasurer: L.G. Berry (Canada)
Councillors: D.S. Coombs (New Zealand)
Manuel Font-Altaba (Spain)
R.W. Howie (U.K.)
Ichiro Sunagawa (Japan)
Josef Zemann (Austria)
First Vice-President: Claude Guillemin (France)
Second Vice-President: Mario Fornaseri (Italy)
Past President: Hugo Strunz (Germany FRG)

Progress of the IMA

A Thesaurus of mineral names is actively being compiled.

A World Directory of Mineral collections is being compiled.

The IMA sets the rules for and authenticates or rejects new mineral names. This is an important task which many mineralogists are not aware of. 340 new species were approved from 1962 to 1972. 324 of these were published by the end of 1972. Publication has to await approval. Unfortunately some new minerals have been proposed and published without approval. Since the Geological Society of Malaysia is a member of the IMA, it will first transmit to the IMA any manuscript in which a new mineral name or species is described before the manuscript can be considered.

As the new national representative for Malaysia, I intend to keep in close touch with the IMA activities and to report to members through this publication any activities of the IMA which should be of interest to the members.

If any member has any queries or suggestions on mineralogy, he is welcome to direct them to me c/o the Editor.

In April 1974 I attended a meeting in London on Reflected Light Microscopy. The following papers were given:

E.F. Stumpfl:	"Ore microscopy today"
N.F.M. Henry:	"Quantitative colour in ore microscopy"
P.R. Simpson:	"Necessary theory in reflected-light microscopy"
J.B. Nelson:	"Apparatus for the microscopic determination of ore minerals"
N.F. Henry & S.H.U. Bowie:	"Tables and charts in the microscopic determination of ore minerals"
J. Prins:	"A punched card system for the microscopic determination of ore minerals"
M. Tarkian:	"A new key-diagram for the microscopic determination of ore minerals"
J. Prins:	"A new method for polishing ore specimens"

Complete write-ups of these papers have been sent to me. If any member is interested, the Society will send him a copy of the write-up of any one of the above papers (when received). Requests should be addressed to me c/o The Editor of this journal.

C.S. Hutchison
Chairman
International Mineralogical Asso.
Sub-group

MEETING OF THE SOCIETY

Annual General Meeting

The Annual General Meeting was held as announced at 5 p.m. on 28 February 1975 at the Universiti Kebangsaan Malaysia, Kuala Lumpur. Before the meeting a discussion session was held in which 4 papers were read (see below for abstracts). About 25 members attended the meeting.

At the meeting the President gave a summary of the activities of the Society during the past year. He pointed out in his report that the Society is one of the largest professional bodies in Malaysia. The reports of the Secretary, Assistant Secretary and Editor, were later read and passed. The results of the election to the 1975/76 Council were also announced. For further details of the election and the reports mentioned members are advised to read the reports sent out together with this newsletter. The meeting was adjourned till 26 March 1975 to hear the Treasurer's report which was unfortunately not ready for presentation at the meeting. As the Treasurer's report was not ready, the Hon. Auditor also could not give his report at the meeting.

Abstracts of papers

Chairman: Encik C.H. Yeap
Associated Mines, Kuala Lumpur

Guustaaf Molengraaff: Pioneer geologist in Indonesia

N.S. Haile: Jabatan Geologi, Universiti Malaya, Kuala Lumpur

G.A.F. Molengraaff (1860-1942) was educated in his natal town, Nijmegen, and at the Universities of Leiden, Munich, and Amsterdam. For most of his life he was Professor and Head of Geology at the Technical High School in Delft, Holland. He was for some years (1897-1902) State Geologist of the Geological Survey of South Africa, and later (1902-1905) a consulting geologist there. He made three investigations in Indonesia (then the Netherlands East Indies): The Borneo Expedition in 1893-94;

an investigation of gold deposits in north Celebes in 1901; and he lead the Timor Expedition in 1910-1911.

His major work on Indonesia is his "Geological investigation in Central Borneo" published in Dutch in 1900, and in English in 1902, describing his survey of the Kapuas, the greatest of Borneo rivers, illustrated by an atlas of beautiful and detailed geological river traverses. Molengraaff described the Crystalline Schists of Semitau, recording glaucophane-bearing varieties; the tonalite of the Schwaner Mountains; the "Old Slate Formation" of the Embaluh valley; the association of radiolarian chert, diabase, and serpentinite of his oceanic "Danau Formation"; and Tertiary sandstones and subaerial andesitic lavas and tuffs of the Muller Mountains. All these formations are today important and controversial elements in the interpretation of geotectonics of the region, in terms of former subduction zones: the glaucophane schist has been cited as evidence of deep burial; the tonalite and volcanics may represent intrusions above a dipping former subduction zone, marked also by the chert/diabase/serpentinite (a chert/ophiolite assemblage) of the Danau Formation; whereas the "Old Slate Formation" and its continuation into Sarawak and Sabah as the Rajang Group is now recognized as forming a great thickness of marine sediments with typical flysch characters, which probably were deposited on the seaward side of a former subduction zone, and moved south towards West Borneo on spreading ocean crust. Although the area was resurveyed in the 1930's, Molengraaff's observations are still the only ones available from some parts.

His surveys in Timor and Celebes led to important papers on neotectonic movements, attested by raised coral reefs, and to his synthesis on the coral reefs and marine geology of the whole archipelago. He was the first to describe the Sunda Shelf systematically and to attribute the valley systems found on it to lowering of sea level during the Pleistocene Ice Age.

His recognition of the Danau Formation of Borneo and red clay with manganese nodules in Timor as uplifted abyssal deposits resulted in a classic paper on this topic.

Molengraaff's energetic field work, and his careful and detailed field observations, coupled with his sound judgement and cautious but imaginative interpretation, give a present relevance to his work beyond that of many of his contemporaries and successors who worked in Indonesia, yet Molengraaff, perhaps because his major work was in a still remote part of the least developed major island of Sundaland, Borneo, is hardly remembered today. If ever, the history of scientific exploration of Southeast Asia is studied systematically, his name will, perhaps, be more widely known and honoured.

On the Malayan Carboniferous

S.S. Sarkar, Jabatan Geologi, Universiti Malaya, Kuala Lumpur

In the Malayan Carboniferous, the well-known Visean age determination has not been confirmed by Igo and Koike (1968) as their attribution is younger, that is Namurian. Malayan Lower Carboniferous has been correlated to that of Great Britain and the Malayan marine sediments of Lower Carboniferous have been closely compared to the European Dinantian (Gobbett, 1972) but the present author has found a faunal affinity between Malaya and the Lower Carboniferous Po Series and Lipak Limestones of Himalaya and Salt Range.

In the Malayan Carboniferous marine fauna is mostly associated with plant fossils which are known as drifted plant remains and the marine fauna occurs in siltstone, sandstone, mudstone or impure limestones. It is interesting to note that the marine fauna tolerated this shallow coastal pollution. Occasionally brachiopods are found in the Carboniferous strata showing marine incursions in coal-swamp sedimentation.

The Malayan plant fossils do not show an affinity to India like the marine fossils but they show resemblance to the fossils of China.

Relations between the norm and its variations, and the mode

C.S. Hutchison, Jabatan Geologi, Universiti Malaya, Kuala Lumpur

The C.I.P.W. norm is an expression of the chemical analysis of a rock in terms of the weight % of the normative minerals. It is more commonly used by North American petrologists. The Niggli catanorm is an expression in terms of cation proportions of the same minerals. Both norms of the same rock will contain identical minerals, but in varying amounts because of the differences in allocation procedures.

The oxide % is converted to a molecular proportion by dividing by the oxide formula weight (C.I.P.W.) or by the oxide equivalent molecular weight (Catanorm). The divisors are identical for single cation oxides (eg SiO_2), but different for others (e.g. C.I.P.W. Fe_2O_3, K_2O = Catanorm $FeO_{1\frac{1}{2}}$, $KO_{\frac{1}{2}}$). Allocations in C.I.P.W. are oxide based, e.g. 1 orthoclase = either $1(K_2O)$, or $1(Al_2O_3)$ or $6(SiO_2)$, whereas in the catanorm 1 orthoclase = either $5(KO_{\frac{1}{2}})$, or $5(AlO_{1\frac{1}{2}})$ or $5/3$ (SiO_2), because 1 orthoclase contains 5 cations. The C.I.P.W. norm procedure ends by multiplying each mineral amount by its oxide-based molecular weight (e.g. quartz 60.08, orthoclase 556.64).

Based on these procedural differences, a table of factors have been calculated for conversion from C.I.P.W. to Catanorm: CATANORM amount = C.I.P.W. amount divided by $\frac{\text{catanorm molecular weight}}{\text{number of cations}}$

All conversion factors have been multiplied by a constant ($= \frac{5}{278.32}$) because it has been found that orthoclase calculated by either the C.I.P.W. or the Catanorm are always closely similar in amounts. This makes all conversion factors close to unity. An example of a conversion factor for albite = $NaO_{\frac{1}{2}}.AlO_{1\frac{1}{2}}.3SiO_2$ =

$$\frac{30.99 + 50.98 + 3(60.08)}{5} \times \frac{5}{278.32} = .942$$

The Volume Norm (= mode). To convert from C.I.P.W. to Volume Norm, divide the C.I.P.W. mineral amount by $\frac{\text{the mineral specific gravity}}{\text{the specific gravity of orthoclase}}$. After all conversions, the norm has to be pro-rated to 100%

The Mesonorm of Barth is like the Catanorm, but incorporates BIOTITE and HORNBLENDE. It is more useful for acid to intermediate igneous rocks and for meta-igneous rocks where biotite and hornblende are more appropriate than hypersthene and diopside.

The C.I.P.W. and Catanorms are really only ideal for basic igneous rocks.

FORTRAN IV computer programmes for C.I.P.W., Catanorm, and Mesonorm calculations and complete lists of the conversion factors between the three norms are available from the author.

Notes on recent developments in tin mining, Nakhon Si Thammarat province, South Thailand

R.F. Goninon, Faber Merlin Ltd., Thailand

The search for new tin deposits in peninsular Thailand has intensified, with considerable activity in Nakhon Si Thammarat province. Brief descriptions of past and present activity are given. The effect of this exploration effort on the search for other minerals is discussed.

NEWS OF THE SOCIETY

Council 1975/76

The full Council for 1975/76 will be as follows:-

Officers

President: D. Santokh Singh

Deputy Director-General Geological Survey of Malaysia. Educated at University of Western Australia, B.Sc. (Hons.) 1957 and Imperial College, London, D.I.C. (1964), M.Sc. (1965). Publications -

several in Geological Survey of Malaysia publications and 3 in the 4 Technical Conferences on Tin held to date.

Vice-President: W.K. Lee

Senior geologist, Associated Mines, Educated at Camborne School of Mines and Imperial College, London. Interest - exploration, evaluation, and appraisal of mineral deposits; mine planning.

Secretary: S.S. Almashoor

Assistant Lecturer, Jabatan Kajibumi, Universiti Kebangsaan Malaysia. Educated at University of Malaya and Universiti Kebangsaan Malaysia, B.Sc. (Hons.), M.Sc. Research interest - petrology.

Assistant Secretary - T.H. Tan

Assistant Lecturer, Jabatan Kajibumi, Universiti Kebangsaan Malaysia. Educated at University of Malaya, B.Sc. (Hons.) M.Sc. Research interest - geochemistry of Malaysian granites, gemmology.

Treasurer - G.H. Teh

Tutor, Jabatan Geologi, Universiti Malaya. Educated at Universiti Malaya, B.Sc. (Hons.). Research interest - instrumental and analytical geochemistry, fluoride analysis, ore textures. Previous experience - geologist, Gopeng Consolidated; seismologist, Geophysical Service International.

Editor: T.T. Khoo

Lecturer, Jabatan Geologi, Universiti Malaya. Educated at Universiti Malaya and University of Liverpool, M.Sc., Ph.D. Interest - general geology.

Councillors

(To serve 2 years)

M. Ayob

Lecturer, Jabatan Geografi, Universiti Malaya. Educated at Universiti Malaya and New York University, M.Sc. Ph.D. Interest - sedimentology, stratigrapphy, geomorphology, etc..

<u>S.H. Chan</u>

Associate Professor, Jabatan Geologi, Universiti Malaya. Educated at Camborne School of Mines and University of Missouri (Rolla), ACSM, M.Sc., Ph.D. Research interest - Theoretical geophysics.

<u>S. Paramanathan</u>

Agricultural Officer, Dept. of Agriculture, Malaysia. Educated at Universities of Malaya and Queensland, B.Sc. (Hons.), Dip. Trop. Agron. Currently in charge of National Soil Mapping Programme.

<u>L.C. Wong</u>

Planning engineer, Sungei Besi Mines Ltd., Kuala Lumpur. Educated at Universiti Malaya, B.Sc. (Hons.). Interest - economic geology, mine planning and evaluation.

<u>To serve 1 year</u>

<u>N.H. Chong</u>

Geologist, Associated Mines, Kuala Lumpur. Educated at Universiti Malaya, B.Sc. (Hons.). Research interest - evaluation of economic mineral deposits, tungsten mineralisation in the Thai-Malay Peninsular.

<u>A.S. Gan</u>

Geologist, Geological Survey Malaysia. Educated at Universiti Malaya, B.Sc. (Hons.). Currently mapping the Tanjung Malim Area, Perak, Peninsular Malaysia.

<u>B.K. Tan</u>

Lecturer, Jabatan Geologi, Universiti Malaya. Educated at Universiti Malaya, I.T.C. Delft and Imperial College, London, B.Sc.(Hons.), Dip. Photogeology, Ph.D., D.I.C. Research interest - structural geology, etc.

<u>H.D. Tjia</u>

Chairman, Jabatan Kajibumi, Universiti Kebangsaan Malaysia. Educated at Universitas Indonesia; Institut Teknologi Bandung, Indonesia, and Columbia University. Drs, Dr. Research interest - structural and Quaternary geology.

Donation

A gift of 3600 Ringgit (Malaysian dollars) was received from Esso Exploration Malaysia Inc. on 14 December 1974. The Society thanks Esso Exploration Malaysia for the generous offer.

International Mineralogical Association Sub-group

The Council has appointed Dr C.S. Hutchison to be the Chairman of the Sub-group and national representative in place of Mr J.H. Leow on 24 February 1975.

A Review on Bulletin 6

The following comments on Bulletin 6 appeared in the AAPG Bulletin Vol. 59, No. 1 (Jan. 1975):

"The quality of this volume is a tribute to the Geological Society of Malaysia, the organizing staff of the conference, and the editor. The scope of interest in the region is evidenced by the diversity of the 260 participants listed in the back of the volume. Most of the articles are supported by extensive bibliographies. The book is attractively bound, and the materials and printing are all of such quality that occasional typographic errors can be ignored. At its members price of US$5 it is a bargain, and even at its nonmembers price of US$10 it is a very useful addition to the library of anyone interested in the geology of southeast Asia."

Reviewed by A.E.L. Morris
Los Angeles, California 90064

Exchange of Publications

The Council has agreed to exchange publications with the following:

1. Suomalainen Tiedeakatemia
   Academia Scientiarum Fennica
   Snellmanikatu 9-11
   00170 Helsinki 17
   Finland

2. Jabatan Kajibumi
   Universiti Kebangsaan Malaysia
   Kuala Lumpur

Membership

The following applicants have been elected to the Society:

Full member

J.H. Armitage
EXXON Prod. Malaysia Inc.
Box 857
Kuala Lumpur

H. Doust
Sarawak Shell Bhd.
Lutong, Sarawak

S.K.F. Ho
Sarawak Shell Bhd.
Lutong, Sarawak

Mohd. Zahari Abu Bakar
Jabatan Kajibumi
Universiti Kebangsaan Malaysia
Kuala Lumpur

R.L. Pile
BP Petroleum Dev. Ltd.
Tanglin P.O. Box 288
Singapore 9

W.R. Brown
Buttes Gas & Oil Co.
P.O. Box 2067, Houston
Texas, USA 77001

W.O. Gigon
Sarawak Shell Bhd.
Lutong, Sarawak

T.H. Lim
122A Jalan Choo Cheeng Khay
Kuala Lumpur

A.R. Lloyd
Core Laboratories Ltd.
24-A Lim Teck Boo Road
Singapore 19

W. W-S Yim
Dept. of Geography & Geology
University of Hong Kong
Pokfulam Road, Hong Kong

Student member

H.K. Lim
25A Sussex Mansions
Old Brompton Road
London, S.W. 7

Y.L. Low
Jabatan Kajibumi
Universiti Kebangsaan Malaysia
Kuala Lumpur

M.K. Tang
Jabatan Geologi
Universiti Malaya
Kuala Lumpur

N E W S O F M E M B E R S

Honours

Dr C.S. Hutchison, Jabatan Geologi, Universiti Malaya has recently been elected a Fellow of the Mineralogical Society of America.

Appointment

Encik W.H. Mah formerly a geologist with the Geological Survey of Malaysia has joined Exploration Logging International Inc. as a petroleum engineer.

New Address

C.K. Burton
P.O. Box 987 M.C.C.
Makati, Rizal
Philippines

E.A. Gribi
P.O. Box 99
Singapore 10

Lee Mun Kit
Placer Expl. Ltd.
GPO Box 4315
Sydney, NSW 2001
Australia

R.D. Stewart
Resident Manager
Union Oil Co.
House 661, Road 33
Gulshan, Dacca 7, Bangladesh

T.R. Sweatman
Superintending Co. of Indonesia Ltd.
Jalan Let. Jen S. Parman 102
Grogol, Jakarta
Indonesia

R.E. Sweet
Mobil Oil
Box 900
Dallas, Texas 75221
U.S.A.

J.S. Wonfor
Gulf Oil Co. (Japan)
c/o Pacific Gulf Oil Ltd.
P.O. Box 43
Akasaka, Tokyo 107
Japan

Resignation

W. Ahmad
P.T. International Nickel
Ujung Pandang
P.O. Box 143
Indonesia

Members who wi › inform other members of the Society about changes in jobs, po: is, addresses, etc. can send the information to the Editor for p le inclusion in the newsletter.

NOTICE

Regional Conference on the Geology and Mineral Resources of South-east Asia, Jakarta, 4-7 August 1975

According to the first circular received in late February 1975, the scientific programme will consist entirely of invited papers. Also it appears that offers of contributions will be considered and such offers must reach the Secretary General not later than 15 May 1975. Excursions to larger islands of the Archipelago will be held. For further information, registration forms and information circulars members are advised to write to:-

G.A.S. Nayoan
The Secretary General
Regional Conference on the Geology
and Mineral Resources of Southeast Asia
Jalan Sinabung 111/4
Jakarta Selatan
Indonesia

NEW PUBLICATIONS

Lapuran tahunan kajibumi (Annual report of the Geological Survey of Malaysia) 1972. 281 pages. Price $15.00 (Malaysian).

Rishworth, D.E.H. (1974). The Upper Mesozoic terrigenous Gagau Group of Peninsular Malaysia. Geol. Survey Malaysia Sp. Pap. No. 1, 78 pages. Price $10.00 (Malaysian).

Sains Malaysiana, Vol. 3 (182) 1974, 175 pages. (This journal contains 6 papers on geology of Southeast Asia by C.K. Burton, H.D. Tjia, T. Zakaria and P. Heseldonckx. 5 of the geological papers are in English).

BOOK REVIEW

Rishworth, D.E.H. (1974): The Upper Mesozoic terrigenous Gagau Group of Peninsular Malaysia. Geol. Survey Malaysia Sp. Pap. No. 1, 78 pp.

This hard-cover bound publication is a very welcome addition to the publications on the geology of the Malay Peninsula. It contains a large number of photographs and figures, and also 4 fold-out figures not given page numbers.

This is an important work for several reasons. First, it covers the deposits of the upper Jurassic-lower Cretaceous, which is the youngest geological interval that is of widespread importance on the Malay Peninsula. These are continental deposits that were deposited after the main period of lower Mesozoic orogeny on the peninsula. They are flat-lying to low dipping, and are separated from underlying rocks by a profound unconformity. These slightly deformed strata may be marginal deposits of the newly forming Malay Basin in the South China Sea area, which is a significant source of petroleum. An interesting aspect of the deposits of the Gagau Group is that they are entirely continental, similar to deposits of the same age in Thailand and the south end of the Malay Peninsula, whereas deposits of the same age in southwestern Sarawak and western central Sumatra are marine carbonates.

The Gagau Group is described formally in this report, and contains two formally described formations. These are the lower Badong Conglomerate and the upper Lotong Sandstone formations. The Badong is quite variable in thickness and may be hundreds of metres thick or only a thin basal conglomerate, but is restricted to the western and southern parts of the Gagau area. It contains a great variety of coarse grained strata, and some interbedded siltstones. The probable source area was to the west. The Lotong is at least 1000 metres thick in places, and consists of both orthoquartzitic and subarkosic sandstones and siltstones and minor conglomerate as well was variable amounts of volcanics. This formation is widely exposed. There are variable, but quite common, exposures of volcanic rocks within the Gagau group. These occur as tuffs, lava flows and agglomerates present in both the Badong and Lotong formations.

This report by Rishworth is a detailed study of the Gagau Group in its type area, in the upland areas at the borders of Pahang, Kelantan and Trengganu, and within the large Taman Negara, the national park of Malaysia. Continental strata of the same lithology and age occur extensively in the high areas along the Pahang-Johore border. These are placed in the Gagau Group, and are discussed in the report, but are not covered in detail because relatively little was known about these strata at the time the report was written (1963-1964). In the 10 years between writing and publication further work on the Gagau strata in Johore has been done by S.S. Rajah.

This report is one of the best stratigraphic studies published by the Geological Survey, and is the best stratigraphic study on rocks of the Malay Peninsula. This is due to the favourable exposures of the rocks, although in difficult terrain, and to the careful work of the author, who made every effort to determine the stratigraphic succession and properly describe the units. Older rocks are invariably deformed and folded, and usually also slightly to moderately metamorphosed, and consequently have generally received inadequate stratigraphic study.

Of great significance for the study of stratigraphy on the Malay Peninsula is Rishworth's unhappiness with informal and inadequate stratigraphic nomenclature that still plagues Malaysian stratigraphy. Consequently he decided to follow the principles and procedures of the 1961 Code of the American Commission on Stratigraphic Nomenclature as rigidly as possible in his own work to help end this confusion. He succeeds in this intention admirably, and the Gagau now emerges as the best defined formational unit in Malaysia. It will be difficult to equal this feat in pre-Gagau strata, but the effort must always be made. Inadequate stratigraphic nomenclature and descriptions, aggravated by the practice of proposing formations in the legends of geological maps (often only sketch maps at best), is currently a major detriment in studying strata on the Malay Peninsula.

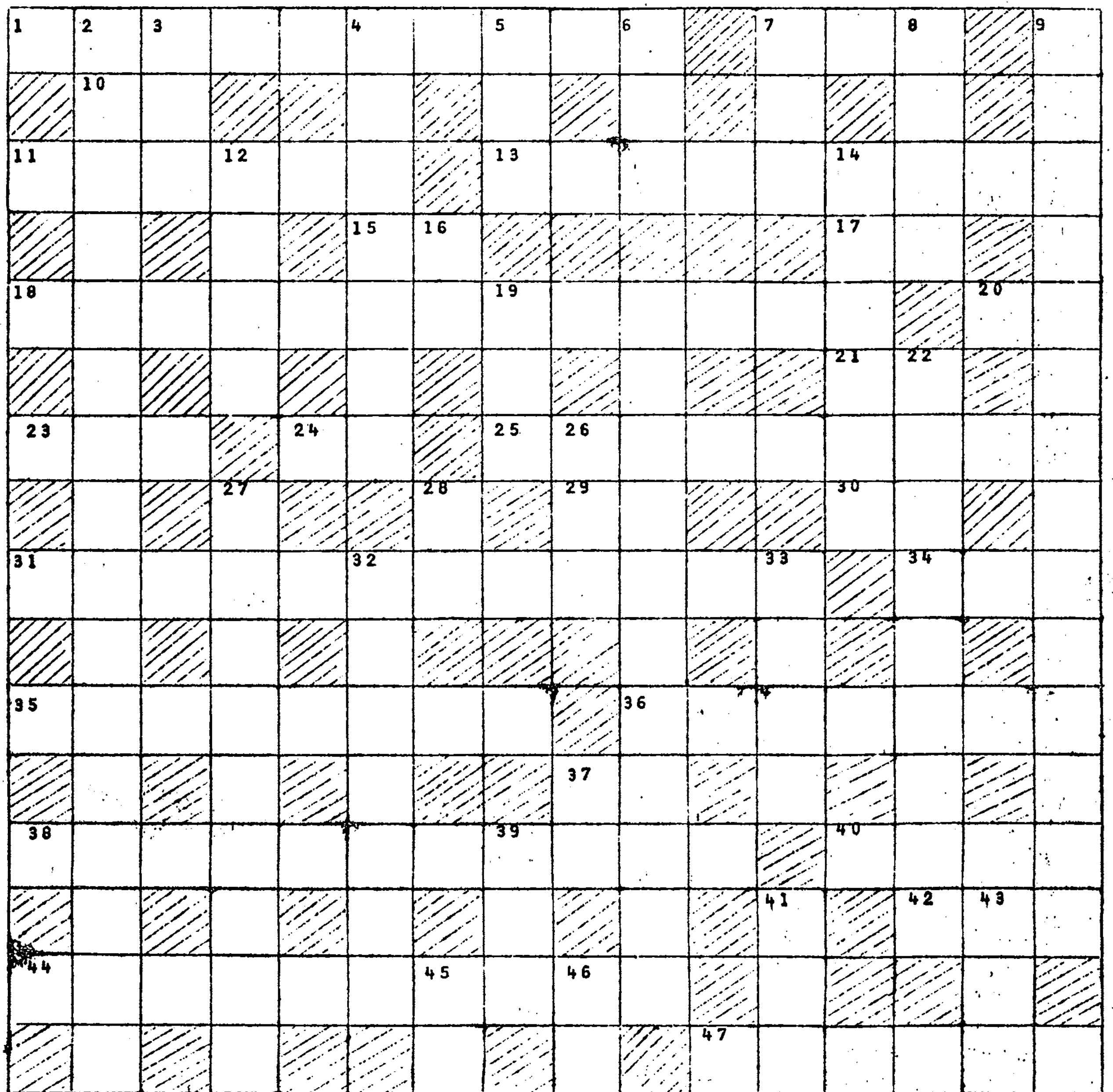
T.E. Yancey
Jabatan Geologi
Universiti Malaya

GEO - FUN

The GSM picture puzzle introduced in Newsletter No. 51 appears to be quite popular especially to our student members. Many of them have sent in solutions. The winner is Encik Yogeswaran Mailvaganam of Jabatan Geologi, Universiti Malaya. Members who sent in all correct entries are Encik Hoh Swee Chee, Encik Johnny A. Kading, Encik Foong Yin Kwan, Encik Seet Chin Peng and Encik Ahmad Said. The answers to the puzzle are:-

2. overturned (inverted) bed
3. tie-line
4. Triassic
5. Love wave and
6. Pele's tears.

Dr C.S. Hutchison has made another geo-crossword (GSM geo-crossword No. 4) for our members. However, no prize will be given this time and so do not send your solutions to the Editor. The solutions will be published in the next Newsletter.



CSH

GEO-CROSSWORD NO. 4

ACROSS

1. Trans-Atlantic quartz monzonite (10)
7. Spoonerism (3)
10. Normative Mg SiO_3 (2)
11. requisition from knoop or Vickers (6)
13. F = C-P + 2 (5, 4)
15. acid for etching quartz (2)
17. ultrabasic (2)
18. separation from a mixture or a magma (13)
20. measure of permeability or medical qualification (2)
21. identity card (2)
23. metamorphism in a triangle (3)
24. measure of geochronology (2)
25. The gem of Wilkie Collins (9)
29. 10^{-9} metres (2)
30. The magnesium orthopyroxene (2)
31. Clayey (12)
34. Jewelry from fuel (3)
35. Crystal projection like a sundial (8)
36. nektonic plus planktonic (7)
37. thunderous element (2)
38. density separation by water (11)
40. from heel to toe (2)
42. And so on (3)
44. mixtures of mechanically separable solid materials (10)
47. Geological Sir Leonard (6)

DOWN

2. Ringing out the old year, after year, after year .... (16)
3. a garnet conjunction (3)
4. Transform Lot's wife and Stone the crows (7)
5. majestic 4.546 litres (3)
6. Alice and Alice-through-the-looking-glass (15)
7. kind of line for the neck (3)
8. Plinth for attaching electron microscope specimens (4)
9. falsely interpreted as a mixture of components which are proportioned so as to give the lowest possible melting point, for example intergrowths of some sulphide minerals (6, 8)
12. a figure produced by acid (4)
14. graphic granite (6)
16. normative Mg_2SiO_4 (2)
19. no one (3)
22. connected - by a special type of joint system (9)
26. emphatic numeral (3)
27. widths of manganese nodules (9)
28. clinkery-surfaced lava (2)
32. stopping-place for a cage in a shaft (7)
33. lower surface (4)
37. major cation of rutile (2)
39. explosive substance (3)
41. energy unit from the U.K.
43. number of components in the plagioclase system (3)
45. normative $NaAlSi_3O_8$ (2)
46. other end from FS (2)

---oooOOooo---