

2. The activity has an inverse relationship with the silica content.

3. The ratio between uranium and potassium is not constant.

The beta-activity shown by the shales varies from 3 to 8 times the background count. Considering the fact that the uranium in the shales is very low and the possibility of the presence of thorium being largely precluded by virtue of its geochemical behaviour, the high activity shown by the shales might be principally due to potassium. The absence of regular relationship between uranium and potassium may be ascribed to the absence of sustained reducing environment.

The author is grateful to Dr. U. Aswathanarayana for his kind suggestions. Mr. R. V. Chalapathi Rao has been of great help in the course of field-work. The financial assistance of the Council of Scientific and Industrial Research (India) is thankfully acknowledged.

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IDAITE, A NEW COPPER SULPHIDE FROM GARIMANIPENTA, NELLORE DIST., ANDHRA PRADESH

GARIMANIPENTA (Topo sheet 57 N/9, longitude 79° 34', latitude 14° 61') was visited by the author in September 1957 and a small collection of copper ores was made from the old workings. The actual specimens described here are from a small pit situated one mile south-east of the Garimanipenta village. The report concerns a new copper sulphide not described earlier from any copper deposit of India.

The following mineralogical and textural features are presented by the ores: (1) Chalcopyrite-bornite-pyrite representing primary mineralization. (2) Malachite-chalcocite hydrated oxides of iron representing the alteration of primary minerals.

The chalcocite is a relict found as irregular grains of varying sizes. The chalcocite and the bornite do not exhibit any interrelationship between themselves but both the minerals are enclosed in chalcopyrite which is younger. Pyrite is the last formed ore mineral, idiomorphic and some of it is recrystallized.

Idaite appears as thin films around the bornite grains, sometimes as fine flakes (micaceous habit) in cracks of the bornite. The colour is reddish-orange and could be distinguished from the red colour of the bornite. It has higher reflectivity compared to bornite but less than the chalcopyrite. The mineral is strongly pleochroic in greens. The anisotropism can be described as enormous. The pleochroism and anisotropism are enhanced when observed under oil immersion.

Covellite has similar intense pleochroism and anisotropism but idaite can be distinguished from its not being blue but green.

Idaite was first discovered and described from Ida mine, South-West Africa by Frenzel (1959). The composition is ascertained as Cu_3FeS_6 and it is considered as a secondary mineral formed from bornite at a temperature of 400° C. The present microscopic study suggests that the primary copper deposit (Sen Gupta, 1924) is subjected to metamorphism and a part of the original bornite at 400° C. is transformed to idaite. Subsequent alteration in the zone of oxidation is responsible for the existing large quantities of malachite.

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OCCURRENCE OF RHENIUM IN AN INDIAN COPPER ORE

A SAMPLE of copper ore obtained from the Mosabani Mine, Bihar, had the association chalcopyrite, molybdenite, bornite and quartz. It was subjected to a preliminary chemical examination.¹

The finely powdered ore was heated with concentrated nitric acid, the solution diluted and filtered. The insoluble residue consisted of quartz. The filtrate was treated with sulphuric acid and evaporated to fumes. The residue was dissolved completely in hydrochloric acid. The solution was warmed and hydrogensulphide was passed for several minutes. The solution turned blue and gave finally reddish-brown precipitate. This precipitate was systematically examined for the metals of group II of the qualitative analysis. Molybdenum was identified

in this precipitate by the thiocyanate test.² The presence of molybdenum was confirmed directly by dissolving the ore in hydrochloric acid and reducing the ferric iron with zinc and then testing with potassium thiocyanate. A red colour soluble in ether was obtained.³

The presence of rhenium was also suspected. This was confirmed by the distillation method in which rhenium was separated and isolated as its volatile chloride.⁴ The distillate was tested as follows.⁵

(1) 3 ml. of the distillate were taken into a test-tube and treated with 2 ml. of concentrated hydrochloric acid, 2 ml. of potassium thiocyanate (20%) and 2 ml. of stannous chloride (20%). First a pale pink colour developed which faded away yielding an yellow colouration which is characteristic of rhenium.

(2) To 3 ml. of the distillate, 4 ml. of concentrated sulphuric acid, 2 mg. of α -benzildioxime, 0.5 ml. of isoamylalcohol and 2 ml. of 15% stannous chloride in 1 : 5 sulphuric acid were added, heated nearly to boiling for 3 minutes and 1 ml. of water was added. Red colour was developed.

Rhenium sulphide is isomorphous with molybdenum sulphide. Noddack and Noddack,⁶ and Aminoff⁷ have reported on the occurrence of rhenium in molybdenite. It is, therefore, concluded that the rhenium present in the copper ore is directly associated with the molybdenite part of the ore.

The authors express their grateful thanks to Prof. K. Neelakantam and to Prof. M. G. Chakrapani Naidu for their kind interest in the work.

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GLOSSOPTERIS FRUCTIFICATIONS FROM CHINTALPUDI SANDSTONE, SOUTH INDIA*

SINCE the first announcement of fructifications attached to *Glossopteris* leaves from Transvaal, South Africa in Middle Ecca (L. Permian) beds, in 1952 by Plumstead¹ and her subsequent contributions,²⁻⁴ much careful search is being made for these organs by the palaeobotanists working on the Gondwana flora. A careful search in this direction by Pant⁵ and Thomas⁶ has already resulted in some new types of fructifications from Africa ascribed to *Glossopteris*. Probable male organs and fructifications of *Glossopteris* have also been reported from India by Sen⁷⁻¹⁰ and from Australia (personal communications from Plumstead and Sen) by Rigby.¹¹

The present discovery of the two genera of fructifications from the Chintalpudi Sandstone formation is not the result of a systematic search for such organs but an accidental find by a field party of the Commission** working in the West Godavari District during 1960-61. Earlier from India, Sen⁷⁻⁹ described some male fructifications referable to *Glossopteris* and also described a *Glossopteris* bearing sori-like structures which are different from those described by Feistmantel.¹²⁻¹³ Sen¹⁰ also described two fructifications which resemble very much Plumstead's genus *Lanceolatus* from Murulidih Collieries of the Raniganj stage (Upper Permian). Apart from this Plumstead's other genera *Scutum* and *Hirsutum* were not known from India. The present note illustrates and describes two fructifications resembling those of *S. leslium* and *H. dutoitides*, recovered from India for the first time. The various species of *Glossopteris* leaves recognised in the present collection are *G. browniana*, *G. retifera*, *G. indica*, *G. decipiens* and *G. communis*.

Fructification Type-1.—The detached fruit is preserved on the sandstone as an impression having no organic matter, the two counterparts are illustrated (Figs. 1 and 2). The cupule is rounded, about 1.7 cm. in diameter, with fluted margins about 2.5 mm. long (partially preserved) all round the main head and about 2 mm. wide. A small pedicel is preserved which is 4 mm. wide at the point of attachment with the cupule

* Read at the 14th Annual Scientific Meeting of the Palaeobotanical Society of India, Lucknow, with the permission of the Director of Geology. The views expressed here are entirely those of the author.

** Dr. S. Ramanathan, Mr. V. L. Narsimham and Mr. P. V. L. Babu.