

A calcium-iron Garnet from China.

By J. B. SCRIVENOR, M.A., F.G.S.

Geologist to the Federated Malay States Government.

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DURING the earlier half of 1913 Mr. San Ah Wing, a Chinese gentleman residing in Kuala Lumpur, sent me three concentrates of sand for examination. It was thought at first that they came from some part of the Federated Malay States, but the locality proved to be the Yong Choon district of the province of Kwang Tung, China. No information concerning the geology of this district was obtainable, but the association of minerals in the concentrates suggests that they were washed out of detritus derived from calcareous rocks.

The concentrates may be briefly described as follows:—

1. A pale-green sand containing a pale-green, optically isotropic mineral as the chief constituent, a bright-green carbonate of copper, calcite, and a colourless, apparently biaxial mineral that was not determined.

2. A brownish sand containing an isotropic mineral like that in No. 1, but iron-stained and not quite the same colour, a little of the carbonate of copper, and a little quartz.

3. A pale-yellow sand, the chief mineral in which is optically isotropic and of a pale-yellow colour. Tremolite and an undetermined mineral are also present.

The isotropic mineral in No. 3 was found to be partially decomposed by hot hydrochloric acid; but the isotropic mineral in Nos. 1 and 2 was quickly and completely decomposed when reduced to powder and heated with hydrochloric acid, silica being liberated. Cold acid also attacked the mineral.

In No. 1 some grains were detected showing crystal faces, so this concentrate was selected for a thorough examination of the mineral. The copper carbonate and calcite were removed by weak hydrochloric acid. This had a slight effect on the isotropic mineral, liberating a little

silica on the surface, which was removed by rubbing and washing the grains under water.

Microscopical examination showed that a practically pure sample of the isotropic mineral had been thus obtained. The majority of the grains were pale olive-green, but some were brownish. One minute grain, which was preserved in Canada balsam as a microscope preparation, was found showing very clearly the form of the rhombic-dodecahedron {110}. Other grains were found showing crystal faces suggesting the same form, and one grain showed a face that might belong to {211} or {321}. The specific gravity of the cleaned sand was found to be 3.69, and analysis gave:—

Silica (SiO ₂)	...	...	...	...	40.26 per cent.
Total iron as Fe ₂ O ₃	...	...	...	...	28.62
Alumina (Al ₂ O ₃)	...	...	...	...	2.61
Lime (CaO)	...	...	...	...	28.29
Magnesia (MgO)	...	...	...	...	trace
Loss on ignition	...	...	...	...	0.94
					100.72

The composition of the isotropic mineral in No. 2 is much the same as the above. That in No. 3, examined for me by Mr. W. R. Jones, contains more alumina and less iron and silica.

The lack of double refraction, the crystalline form, chemical composition, specific gravity, and colour all point to this mineral being a calcium-iron garnet, or andradite. It differs from known garnets, however, in being completely and quickly decomposed by hydrochloric acid without previous ignition, and on that account it calls for this brief description.