On some New South Wales Minerals.

By A. Liversidge, F.R.S., Professor of Chemistry and Mineralogy in the University of Sydney.

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The specimens forming the subject of the following notes were exhibited and described at the July meeting of the Society, 1884.

Native Gold

Is found in association with antimonite at Sandgate, county of Sandon, New England. In some cases the antimonite serves as the matrix of the gold, but in most of the specimens which have come under my notice the gold is held by quartz, intimately mixed with the antimonite. This association of gold and antimonite is extremely rare, not only in New South Wales but elsewhere. At the new Reform Gold Mining Company, Lucknow, native gold occurs with native arsenic in calcite.

Crystallized Gold.

A beautiful group of gold crystals is to be seen in the Museum of Science and Art at Edinburgh—perhaps one of the finest in existence. The model of this rare and very valuable nugget, now on the table, has been kindly made for me by Professor Archer, the Director of the Museum.

As will be seen from the photographs (plates 1 and 2), the crystals are for the most part imperfect octohedra and elongated cubes; some have imperfectly developed faces of the rhombic dodecahedron, joined end to end in an arborescent form.

Professor Archer was under the impression that the specimen came from New South Wales, but the exact locality is no longer known. This notice may, perhaps, draw attention to the specimen, and be the means of eliciting some information as to its history.

It is much to be regretted that more of such specimens have not been preserved. At the present day they are extremely scarce, and even in the early days of the gold discoveries they were never

FIG. 1.

Group of Gold Crystals in Edinburgh Museum.

abundant. Unfortunately most of them very quickly find their way into the melting-pot, and of the few which have been preserved, probably even fewer are to be found in Australia than elsewhere.

TOURMALINE.

Amongst the specimens placed before you are some very fine examples of tourmaline crystals, collected by Mr. Cleghorne of Uralla, which I obtained from him in June, 1883. In form, size, and appearance they closely resemble the large and well-developed black rhombohedral crystals, for which the locality of Bovey Tracy, in Devonshire, used to be so famous.

Great credit is due to Mr. Cleghorne for the good service he has done to the knowledge of the mineralogy of New South Wales, by collecting and preserving these and many other minerals hitherto unknown in the Colony.

SCHEELITE.

Scheelite or tungstate of lime occurs in massive lumps in association with molybdenite and molybdenum ochre at Hillgrove, county Sandon.

Axinite.

This mineral has been found near Nundle, by Mr. D. A. Porter of Tamworth, a diligent and painstaking collector of minerals, to whom we are also indebted for bringing to light several minerals new to the Colony.

The crystals are large, fairly well formed, and of a clove brown colour.

Idocrase.

Mr. Porter has also found idocrase in the same district, of a green colour, associated with small colourless garnets, crystallized in rhombic dodecahedra, apparently of the variety known as grossularite, consisting of silicate of lime and alumina.

Ironstone Concretions.

The hollow nodules of ironstone were found by Mr. Murdoch, of the Railway Department, in the bed of the Macquarie River, near Dubbo, where they apparently are not uncommon.

The outer shell consists for the most part of brown hydrated oxide of iron, and when first found they are quite soft and can be cut with a knife. I am informed that the interior is usually filled with sand, which can be shaken out, leaving a hollow cavity. Although hard and compact, they are evidently of quite recent origin.

Lithomarge.

A variety of lithomarge, a hydrated silicate of alumina, of a pale bluish colour, more or less translucent, occurs as the matrix of native copper at the Great Blayney Mine, near Blayney. The metallic copper is scattered through it in small granular crystalline masses.

Breaks in places with a somewhat conchoidal fracture, but earthy in others. Soft and greasy feel.

Chrome Iron Ore.

A very rich chrome iron ore deposit occurs near Nundle. The outcrop which I saw was about 700 feet above Bowling Alley Point, and the apparent thickness of the vein is in one part some 40 odd feet; one huge block of the mineral lying loose on the surface, measures about 12 feet long by 6 feet high and 5 feet wide.

The chrome iron vein is in association with serpentine, diallage rock, and black slates. This deposit ought to be easily and cheaply worked.

Chrome iron of good quality also occurs with serpentine beyond Young in the Bland district.

Iron Pyrites Concretions.

Some very interesting concretions of iron pyrites occur at the Sunny Corner Silver and Gold Mine, which is situated on Mitchell's Creek, some 16 miles from Rydal, on the Western line.

The rocks in which the Sunny Corner deposits occur are altered Devonian or Silurian shales and sandstones, penetrated by a porphyry dyke. The portion of the lode worked for silver, which bears nearly north and south with westerly dip, is mainly composed of a loose earthy ferruginous material, and is rather cavernous in places. The vuggs or cavities vary much in size, but are usually small, and are lined with stalactites of brown hæmatite, externally of a deep brown or black colour.

The vein stuff is very variously coloured, yellow, brown, green, red, black, &c., and contains but little mineral matter of a definite and readily recognizable character except galena and pyrites; occasionally small crystals of barytes are found and some black oxide of copper. In places it is as much as 50 feet across, but usually much less.

Formerly this mine, when owned by Messrs. Winter & Morgan, the first of whom used to bring me specimens from it for identification, was worked for gold only, and yielded some very rich returns.

In some respects these concretions of pyrites resemble the calcareous concretions of the London clay, known as septaria, and used for the preparation of hydraulic cement; *i.e.*, as far as general form and structure, both are more or less rounded and both are fissured, but the fissures or cracks in those from Sunny Corner are filled in either with pyrites or with quartz. I am indebted to Mr. J. M. Smith, of Sydney, the superintendent of the mine, for the various specimens placed before you, as well as for the many others which he has been good enough to obtain for me from time to time.

The concretions occur in a pale-coloured shale of a greyish tint, abutting against the vein, full of cavities, which can be seen to have formerly contained crystals of iron pyrites. This gradually passes into a slaty shale of a dark bluish-grey colour, studded with cubical crystals of pyrites, most of which are twinned.

As will be seen from the figure No. 2, the concretions of pyrites have a somewhat concentric structure, and are fissured in a more or less regular radiate manner.

FIG. 2.

Concretion of Iron Pyrites, showing the radial lines.

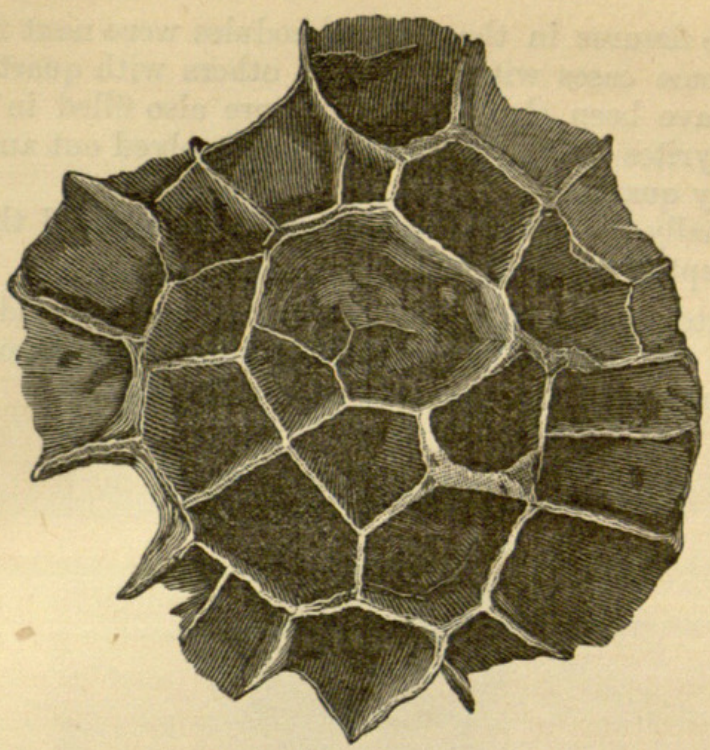

FIG. 3.

Siliceous septa set free from concretions of Iron Pyrites.

They vary in size; some are an inch or less in diameter, and others are several inches through.

Some of the concretions (fig. 2) consist wholly of iron pyrites, with the fissures or cracks also filled in with the same material, but of a more compact character. Others consist of soft friable pyrites with the fissures filled in with hard white quartz, thus forming septa. As the rock weathers and exposes the concretions, the granular pyrites falls out and the septa are left in the form of irregular, exaggerated honey-comb structures (fig. 3).

The changes which appear to have gone on are as follows :—

1. The iron pyrites, crystallized in more or less well-developed cubes, were formed in the slaty shale, probably while it was in a soft and clay-like condition.
2. The pyrites crystals gradually passed into solution.
3. The pyrites was gradually re-deposited from solution, not in the form of cubical crystals, but in the form of nodules of marcassite, *i.e.*, the rhombic and less durable form of iron pyrites.
4. The pyrites nodules (marcassite) cracked or fissured, probably from unequal contraction. Probably due to the outer portions of such nodules having become hardened first, then as the inner portions hardened and contracted, fissures would necessarily form within, since the hard outer portions would not give way so readily as the softer and weaker inner portions.

5. The fissures in the pyrites nodules were next filled in, in some cases with pyrites in others with quartz; it may have been that the latter were also filled in first with pyrites which was afterwards dissolved out and replaced by quartz.
6. Finally the marcassite has been removed and the silicious septa set free (fig. 3).

The pyrites of the nodules oxidizes with great rapidity: specimens kept for only a few months rapidly fall to powder, and become incrusted with crystals of iron sulphate.

[Two photo-lithographs.]

PLATE I.

CRYSTALLIZED GOLD.
(Slightly reduced.)

PLATE II.

CRYSTALLIZED GOLD.
(Slightly reduced.)