

# EPIGENETIC COMMON OPAL FROM THE HAWKESBURY SANDSTONE FORMATION OF THE SYDNEY BASIN

By J. F. LOVERING, B.Sc.

Assistant Curator of Minerals and Rocks, The Australian Museum, Sydney.

(Plate IV.)

## *Abstract.*

An unusual occurrence of epigenetic common opal, apparently derived from the normal ground-waters of the Hawkesbury sandstone formation of the Sydney Basin, is described. The opal forms simple and botryoidal incrustations, simple and coralloidal stalactitic structures and also is deposited on stalactites of lamellar limonite. Refractive index values vary widely and haphazardly between 1.414 and 1.443.

In the Hawkesbury sandstone formation of the Sydney Basin small caves and ledges often show groups of stalactites and, more rarely, stalagmites up to 3 cm. in length. An immediate reaction was to class them as being calcereous and derived from the several calcereous members of this formation. Closer study, however, showed they were composed of common opal and as such were of considerably greater interest.

The common opal probably occurs wherever the Hawkesbury sandstones outcrop as, when looked for, they have always been found. The best occurrences yet seen, and the ones described here, were in small caves along the banks of Galna Creek which is west of the main northern railway line between Mount Colah and Mount Kuring-gai stations.

Typically the common opal structures are found on the roofs and floors of small caves but often they are found growing horizontally at 90 degrees to the walls of almost vertical cracks. Often, and particularly where the caves are formed by ledges in a creek bed, the stalactites are wet and apparently still growing. Elsewhere they are quite dry and "dead".

At least four different modes of occurrence can be differentiated :—

- I. Simple and botryoidal incrustations.
- II. Simple stalactitic structures.
- III. Coralloidal stalactitic structures.
- IV. Incrustation on lamellar limonitic stalactites.

## I. SIMPLE AND BOTRYOIDAL INCRUSTATIONS.

Simple (*i.e.*, smooth) incrustations are usually about 1 mm. thick. The botryoidal type incrustation is slightly thicker and represents a further stage in deposition as the botryoidal surface is formed by the accentuation of irregularities in the surface by further deposition of material. Both incrustations may grow immediately on the surface of the normal sandstone or else a second zone may develop between the normal sandstone and the common opal. This central zone shows residual quartz grains in white, opaque common opal which has replaced or rather infiltrated and included the clay cement. The process is rather one of infiltration as crushed fragments of the opal are almost opaque due to included clay material. In some cases this central zone is represented by infiltration of limonitic material.

The central zone rapidly gives way to the outer layer of the white, opaque common opal with a resinous lustre and normally hard and homogeneous. Inside any of the larger botryoidal protuberances the centre is composed of dark, earthy material which