ON THE OCCURRENCE OF SPHERULITIC FELSITE ON THE WEST COAST OF TASMANIA.

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Examples of this rock from four different localities have come under our notice, namely, from Zeehan, the Castray River, Trial Harbour, and Strahan, and upon these occurrences we now offer a few observations.

Zeehan.—Specimens broken from a loose boulder in a swamp on the Montana Company's ground at Zeehan have been handed about rather widely in the colony, and have attracted attention from the exceptionally beautiful development of spherulites in the substance of the rock. Well preserved portions of these have been polished and used as pendants and other ornaments. Speculations have been made on the economic value of the iron-stained spherulites, and altogether no small amount of curiosity has existed respecting the nature of this handsome rock. The boulder in question has been laid under such constant contribution, especially recently, that only a few broken fragments now mark the spot where it lay, and notwithstanding numerous inquiries, we have been unable to hear of any similar rock mass in the neighbourhood from which it may have been derived.

Macroscopically, the rock from Zeehan presents a dull milk-white compact base, with numerous spherulites irregularly scattered throughout its substance. The spherulites average about five millimetres in diameter; they are of a grey colour with occasional splashes of a bright red, and have a glimmering glassy lustre. The specimens from the Castray River are solid and somewhat granular throughout, with the spherulites diffused with extreme irregularity. Occasionally they form protuberances on the exposed surfaces, and, more rarely, aggregates closely pressed together. The general colouration of the rock varies from a dark grey to a rich brown, the spherulites being equally varied in colouration. Sometimes they are almost white, and by varied gradations approach the darker shades of the general rock mass. Minute patches of a bright red colour can be sometimes detected in the vicinity of the marginal radiations, and a distinct nucleus is often observable in the form of a small perforation or solid core. That from near Trial Harbour is apparently of an intermediate character in its general colouration and arrangement of the spherulites, although it more closely approximates to the samples from the last mentioned locality.

The rock, as a whole, consists of siliceous spherules, somewhat smaller than peas, in a closely packed mass, occasionally separated by tracts of quartzose, or quartzo-felspathic (felsitic) ground mass. Viewed with the naked eye, these spherules are grey or pale green in colour, or sometimes stained red, which gives the stone an attractive appearance. A quantity of porcellanic alumina silicate (resembling porcellanite, but very siliceous) surrounds many of the spherulites, and is probably derived from the ingredients of the ground mass.

Microscopically, the spherulites show a radiation hardly recognisable in thin section by ordinary light, but plain enough under cross prisms, when the fixed black cross declares them to be true spherulites. Their central point is often indistinguishable, or it consists of one or two quartz grains, which have been the nuclei of the segregation. Where the spherulites are closely set together, they are united by sutural lines, interlocking and mutually interfering with one another. Their margins are always well defined, and usually somewhat crenulate. Wherever they are surrounded by the ground mass, they are adorned by a marginal fringe of felspar fibres. The lines of radiation are wavy, and the general surface appearance of the microscopic section is puckered or crumpled. The ground mass presents, under polarised light, the speckled field of a felsitic substance, and occasionally shows a tendency to develop minute spherulites.

From the preceding there appears to be little reason to doubt that this rock is an unusually fine example of spherulitic felsite. Figures of somewhat similar spherulites will be found in the Quarterly Journal of the Geological Society, vol. xxxix., 1883, pl. x., illustrating spherulitic quartz-porphyry from St. David's, discussed by Sir A. Geikie in his paper "On the supposed Pre-Cambrian Rocks of St. David's." The ground mass in that rock, however, is entirely microcrystalline, while in the Tasmanian one it is felsitic. Many of the British spherulitic felsites are devitrified rhyolites; whether the Tasmanian one is rhyolitic or not must remain an open question at present, though the absence of known rhyolites here favours the reference of the Zeehan boulder to a granitic source. Its parent rock was probably connected with some granite protrusion on the West Coast. Its specific gravity is 2·63.

Castray River.—A similar rock has been found as a boulder in the bed of the Castray River. The spherulites are of the same size as those in the Zeehan boulder, and are much the same in appearance. They interlock along their crenulated margins, and are often pressed into a more or less polygonal form. When elongated, the centre of the dark

. TWELVETREES, Photo-micro.

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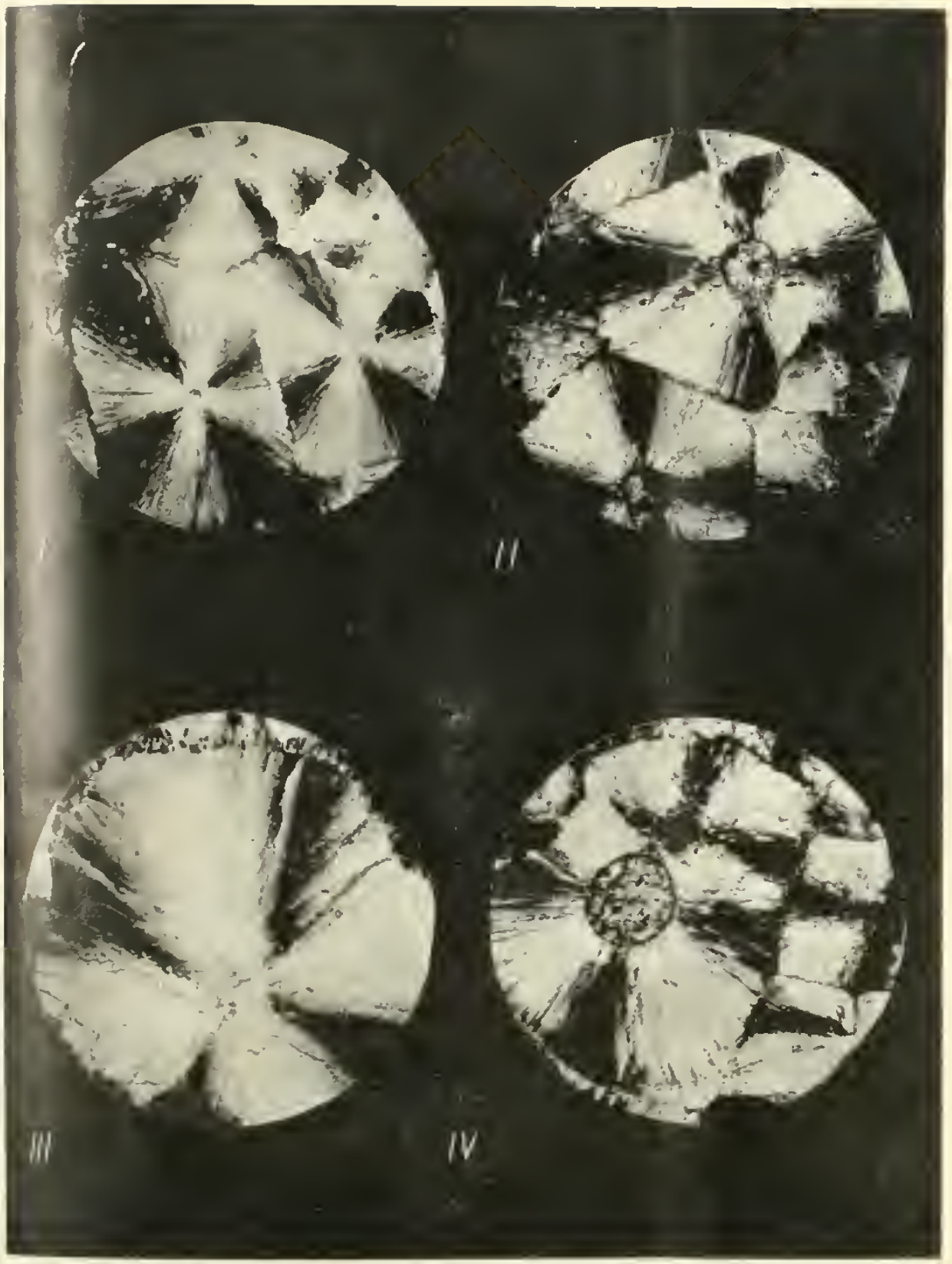

W. H. TWELVETREES, Photo-Litho.

SPHERULITIC FELSITE.

cross occupies a position analogous to one of the foci of an ellipse. The margins of the spherulites are without the remarkable fringes of the Zeehan variety. An aggregation of minute colourless to brown granules (quartz-orthoclase) frequently forms a kind of central nucleus. This centre decomposes, and finally disappears, leaving a foramen. The sectional surface is broken up by radial lines and a reticulate venation marked by iron dust, and the interspaces are ornamented with a feathery crystallisation of some alumina silicate. The general colour in thin section is grey, stained warm brown by iron. There are some fine examples of double centres and a triple change of crystallisation from centre to circumference. A little quartzo-felspathic ground mass occurs between some of the spherulites containing specks of iron oxide. The specific gravity ranges from 2·62 to 2 64, and in the more ferruginous variety is 2·66.

Trial Harbour.—A piece of loose rock which we have examined from this locality is spherulitic, but has a very different appearance from the preceding ones. Composite spherulites are abundant, and their boundaries are ill-defined. The structure may for the most part be described as of the nature of spherulitic aggregations rather than that of true spherulites. There is a want of symmetry in the arrangement of the component crystals, consequently their axes of elasticity are in different azimuths, and the arms of the cross are disturbed and difficult to locate. We seem here to have an approach to a pseudo-spherulitic structure, although as the crystalline constituent is only quartz, it may be more strictly correct to describe it as imperfectly spherulitic. Here and there a little felsitic ground mass is discernible.

We have an additional sample of a spherulitic rock picked up two miles from Strahan. A noteworthy feature of all these occurrences is that none of them are in situ. The nearest granite appears to be that of Mt. Heemskirk, but whether these several boulders and stones were derived from that particular exposure is, for the present, purely a matter of speculation.

EXPLANATION OF PLATE.

Fig. 1. Spherulitic Felsite from Zeehan.

Figs. 2, 3, 4. Spherulitic Felsite from Castray River.

The figures are photo-micrographs under polarised light and a magnification of 13 diameters. The dark cross is caused by the axes of elasticity in the individual fibres of each spherulite being coincident with their axis of figure. In other words, the arms of the cross represent the directions of the vibration planes of the polarising and analysing prisms.