On Sphærostilbite.

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SPHÆROSTILBITE was one of a number of sub-species which Beudant, in his *Mineralogy*, published in 1832, separated from ordinary stilbite owing to slight differences in chemical composition. In a typical specimen from the Faroe Islands he describes the sphærostilbite as implanted upon ordinary stilbite, in the form of small globules, presenting a fibrous radiated structure and brilliant pearly lustre on the fractured surface. Unlike stilbite, it gelatinised with acids, and it also had a specific gravity (2·31) slightly higher than that of stilbite. According to the analyses given by Beudant, however, it differed in chemical composition so little from ordinary stilbite that in later text-books (Glocker, 1839; Breithaupt, 1847, &c.) it has always been referred to that species.

In Greg and Lettsom's *Mineralogy* (1858, p. 163), sphærostilbite is described under stilbite, and there occurs the statement, referred to by Dana (*System of Mineralogy*, 6th edition, p. 584), that according to Dr. Heddle sphærostilbite is "merely stilbite in the form of minute primary crystals disposed upon delicate radiating tufts of mesolite, the presence of which determines the spherical form, causes the gelatinisation in acids, and accounts for the slight variation in composition." In the above statement, instead of *mesolite* it is almost certain from the description that Heddle really meant *mesole*, for it was in 1857 that he published in the *Philosophical Magazine* the analytical work by which he showed that the delicate needles of mesolite and the radiated spheres with pearly lustre of mesole (or, as he preferred to call it, faroelite) must be considered as distinct species. Long before this, mesole had been referred by Haidinger (*Best. Min.* 1845, 529) to thomsonite, and this was confirmed by the examination of the optical characters made by Des Cloizeaux. As the result probably of his observations on mesole, Des Cloizeaux (*Min.* 1862, 419) was led to express the opinion with regard to sphærostilbite

that "it appears to result, from Beudant's description, that the name sphærostilbite and that of mesole have been applied to the same mineral," and that originally there had probably been confusion between the specimen described and that which was analysed.

Some years ago I had occasion to examine a number of doubtful specimens of zeolites belonging to a collection made by Miss Caroline Birley in the Faroe Islands. Amongst these specimens were some which were provisionally named sphærostilbite, owing to their resemblance to specimens so labelled in the British Museum. In appearance these specimens answered closely to Heddle's description, quoted above, if mesole be substituted for mesolite. Thus they consist of a sort of open network of confusedly-grouped and imperfect crystals, presenting pearly cleavage surfaces and resembling stilbite, disposed upon ordinary compact mesole (faroelite), the presence of which determines the spherical form. In most cases, between the crystal network and the compact radiated spheres of mesole is interposed a material more compact and less definitely crystallised than the network, but less compact and more crystalline than the mesole.

In the determination of doubtful specimens in Miss Birley's collection, reliance was chiefly placed upon examination of the optical characters. Small fragments crushed in oil on a slide were examined under the microscope with a $\frac{1}{12}$-inch immersion objective. In the case of the so-called sphærostilbites it was found that material taken from the base (mesole), from the intermediate portion, or from the upper and more definitely crystallised network, all behaved in the same way, and presented the optical characters, not of stilbite, but of thomsonite. Thus almost all the cleavage flakes obtained by crushing a fragment compensated with the quartz wedge across the length of the flake, and in convergent light showed the emergence of a positive bisectrix with the plane of the optic axes at right angles to the length of the flake and an optic axial angle of about 80°, as measured with an eyepiece micrometer. Intermixed with such flakes were only very few of apparently a somewhat more strongly doubly refractive mineral which showed no definite optic figure, and compensated with the quartz wedge along the length of the flake. The latter flakes doubtless consist of stilbite, the presence of which would account for the slightly higher silica percentage of faroelite over that of normal thomsonite. On close examination the material forming the crystal network was seen to consist of sheaf-like bundles, which are very similar to those of stilbite, and present a similar pearly cleavage surface; but, unlike that mineral, they have

square terminations, and thus resemble the sheaf-like aggregates—of comptonite (thomsonite) from Vesuvius. On many of the specimens of faroelite in the British Museum the square terminations can be seen as markings on the surface of the spheres. All the specimens of so-called sphærostilbite in the British Museum were found to have, like the specimens collected by Miss Birley, the optical characters of thomsonite, and not those of stilbite.

To confirm this determination, a quantitative analysis was made on 0·5299 gram of the crystal network carefully separated from the more compact spheres of mesole.

The result of this analysis is given under I., and under II. are the numbers obtained in a partial analysis made on 0·3733 gram of material from another specimen; while, for the sake of comparison, under III. is given the result of an analysis by Lemberg of a faroelite from the Faroe Islands, and under IV. the result of an analysis by the same analyst of a stilbite from the Faroe Islands.

		I.	II.	III.	IV.
SiO_2	...	40·69	41·47	39·98	55·26
Al_2O_3	...	28·63	28·69	29·62	17·36
CaO	...	12·98		11·77	7·55
Na_2O	...	5·66		4·87	1·93
H_2O	...	12·42	12·63	13·76	18·62
		100·38		100·00	100·72

The result of the analysis showed that the specimens of so-called sphærostilbite, which had been proved to have the optical characters of thomsonite, had also the chemical composition of that mineral.

Of the museum specimens three belonged to the Allan-Greg collection acquired in 1859, another was presented in 1858 by P. Dudgeon, Esq., a great personal friend of the late Prof. Heddle, while the third was purchased in 1858 from Mr. Alex. Rose, of Edinburgh. It was, therefore, shown that material from different sources which had been regarded as sphærostilbite must be referred to thomsonite, and not to stilbite.

The result of the above examination, made some years ago, was not deemed of sufficient importance to publish. Since that time, however, the museum has from time to time acquired specimens, labelled sphærostilbite, from American and Australian localities (Oregon, Flanders Island, Tasmania, &c.), and these, like the Faroe specimens, have, on optical examination, always proved to consist of thomsonite, and not of

stilbite. It therefore appeared to be desirable to place on record the fact that in many cases the name sphærostilbite has been applied in the past, and is still being applied, to material consisting of thomsonite, and not of stilbite.

At the same time the fact remains that stilbite can, and in fact does occur in spherical radiating aggregates. In the British Museum collection, besides the well-known "puflerite" from Puflerloch, Seisser Alps, there are specimens of stilbite in the form of spheres showing radiated structure from the Faroe Islands; Goschenen Alps; Rezbanya, Hungary; Arendal, Norway, &c.; but in these cases the mineral shows the optical characters of stilbite, and like stilbite does not gelatinise with acids.

Conclusions.

1. In all probability no such mineral as that described by Beudant as sphærostilbite exists, viz. a mineral occurring in spherical aggregates with a specific gravity of 2·31, gelatinising with acids, and having approximately the chemical composition of stilbite.

2. In all probability Heddle's sphærostilbite, described as consisting of stilbite implanted upon mesolite, is identical with the material described above, which consists of thomsonite in sheaf-like aggregates implanted upon the more compact thomsonite in the form of spherical aggregates (mesole or faroelite).

3. To avoid confusion the name sphærostilbite should be discarded, for it cannot be justly applied to specimens of stilbite in spherical aggregates, since they do not gelatinise with acids.