

two, as well as the smooth extremity of the shields, have been broken off. The impression of the external surface, seen on the matrix, shows that the axis of the thoracic segments was marked with scattered tubercles. The cephalic shield and pygidium appear to have been minutely granulate. On a portion of the latter these granulations have a scaly form, as in some other species of the genus. The ends of the pleuræ are broad and rounded. (See Fig. 2 a.)

The horizon of the fossil is the upper part of the Arisaig series of Nova Scotia, equivalent to the Lower Helderberg of New York and Pennsylvania, and to the Ludlow of England. The matrix of the specimen contained *Chonetes Nova-Scotica*, Hall; *Megambonia cancellata*, Hall; *Avicula Honeymani*, Hall; *Beyrichia pustulosa*, Hall; and other fossils characteristic of that horizon.

This fine species is evidently a close ally of *H. Knightii* of the English Ludlow, though it differs considerably in details of structure. According to Mr. Salter's determination of some specimens from Arisaig placed in his hands by Dr. Honeyman, *H. Knightii* is also found at that place;¹ but I have not met with any specimens of it. The representative of this species in the Lower Helderberg of New York is *H. Vanuxemii* of Hall.²

Both of these species serve to illustrate that distinctness of the Atlantic border area of North America from the inland plateau of the continent, on which I have elsewhere remarked.³ Both in the Upper Silurian and Carboniferous, the rocks and fossils of Nova Scotia can be more easily correlated with those of Great Britain than with those of New York and Pennsylvania. So much did this fact strike the late Mr. Salter that he even thought it possible to correlate the fossils of the Arisaig section with those of individual members of the English Upper Silurian.⁴

IV.—IS THERE A BASE TO THE CARBONIFEROUS ROCKS IN TEESDALE? A QUESTION FOR SILURIAN GEOLOGISTS.

By J. R. DAKYNS, Esq.;

Of H. M. Geological Survey of England and Wales.

DURING a recent excursion into Teesdale I paid a visit to certain Mica trap-dykes discovered by my friend Mr. W. Gunn, and to a section of the Carboniferous beds below the Whin Sill of Falcon Clints, near Caldron Snout, which suggested the question whether there is not a base to the Carboniferous beds in that part of Teesdale.

The section below the Whin Sill has, I believe, been described by Sedgwick. Suffice it to say that the lowest bed there exposed at the very foot of the crags, just above the alluvium of the Tees, is a breccia that reminds one, who knows the beds, of the breccia so often found at the base of the Carboniferous in Yorkshire. The next section seen in going down the stream is at the old Pencil Mill, on the banks of the Tees below Cronkley Scar. Here the beds, which were once wrought for slate pencils, consist of hardened

¹ Honeyman, Geol. Journal, vol. xx.

² Palæontology of New York, vol. iii.

³ Acadian Geology and Story of the Earth.

⁴ Honeyman, *l. c.*

shale, apparently at a high dip, which the Carboniferous beds of the neighbourhood are not, traversed by several dykes of mica trap. These dykes are quite unlike anything else in the country; but resemble similar dykes in the Kendal country, where they are never known to pierce the Carboniferous beds, but are exclusively confined to the Silurian rocks. The hardened shale traversed by these dykes in Teesdale is not unlike Skiddaw slate, which also was once similarly worked for slate pencils in Westmoreland; but I cannot assert, merely after a short visit on a stormy Sunday afternoon in November, that the shale is not hardened Carboniferous shale, hardened by the dykes: but the beds are as much like Skiddaw slate as Carboniferous shale, perhaps more so; and this similarity, together with the apparent high inclination, and the Silurian character of the dykes, when taken along with the breccia at the base of Falcon Clints, leads one to ask the question at the head of this notice.

V.—THE LHERZOLITE OF ARIÈGE.

By the Rev. T. G. BONNEY, M.A., F.G.S.;

Fellow and late Tutor of St. John's College, Cambridge.

THE rock Lherzolite has been described by Prof. Zirkel in his valuable *Beiträge zur Geologischen Kenntniss der Pyrenäen* (*Zeitschrift der Deutsch. Geol. Gesel.*, vol. xix. p. 68), but is generally passed over with the briefest mention or entirely omitted in English works on Geology. Even in Cotta's "Rocks Classified and Described" it is barely noticed, and the word is left out in the index. On this account, and seeing that, so far as I am aware, no description of its microscopic structure has yet been published, a notice, embodying the results of Prof. Zirkel's paper, and of a brief visit of my own to this not very accessible locality, may be useful to students.

Lherzolite is a crystalline aggregate of the minerals olivine, enstatite, and diopside, with some picotite, in texture varying from finely to rather coarsely granular; that from the locality visited by myself being, on the whole, of the former character. It obtains its name from the *Étang de Lherz*, a small tarn in the Eastern Pyrenees (Dept. Ariège), above Aulus, in the valley of the Garbet, 38 kil. from St. Giron, and near the Col d' Ercé (or Port de Lherz), an easy pass (5341') leading to Videssos in the valley of the Oriège. The rock entirely surrounds the *Étang*, and is the largest of a linear series of seven exposures in the vicinity of Videssos.

The *Étang de Lherz* is a shallow tarn occupying apparently a true rock-basin, the longer axis of which lies roughly N. and S. The water escapes from the northern end by soaking through some peaty ground. On the western side is a tiny island. The tarn is surrounded by rounded masses (probably once ice-worn) and fallen blocks of the Lherzolite, which also rises from the western shore in a craggy hill. A furlong or less from the eastern shore limestone shows through the grass and stretches away in that direction, forming the general mass of the country. The tarn is not in the line of the main valley of the Garbet, but in a sort of open upland glen, a little