On a new form of Phosphorite.—By Henry Hamilton Gunn, Associate Royal School of Mines; F.G.S.

IN making an examination of some samples of Phosphorite, recently discovered in Southern Russia, I was much struck by the unusual appearance of the substance, and after a closer examination came to the conclusion that it was a new form of the mineral, and ought to be brought before the notice of this society, in order that its occurrence and physical structure might be recorded and discussed.

The mineral which forms the subject of this paper occurs in rounded masses, varying in size from 5 to 9 inches in diameter. The outer surface is smooth and presents an appearance highly suggestive of the form being due to the action of running water, but upon fracturing several of these balls I found in every instance that they were composed of a number of fibres radiating from the centre, of small size, and of a blueish grey colour, having a hardness of about 4.

These balls are not solid throughout, but near the centre contain fissures similar to those found in Septaria and Clay Ironstone, and these fissures are in every case coated with a thin film of Phosphorite, of a yellowish brown colour, and this I think may possibly be a small quantity of Staffelite.

I have taken the specific gravity of the phosphorite and find it to be about 3·25, and also append an analysis made by Mr Oxton, who found—

Phosphoric Acid	35·18
Carbonic Acid	1·50
Lime	47·88
Oxides of Iron and Alumina	2·65
Silica	8·25
Water in Combination	1·80
Do. at 212°	30
Undetermined	2·97
Equal to Tribasic Phosphate of Lime	76·88
and Carbonate of Lime	3·41

Other analyses have shewn a still greater percentage of phosphoric acid, and some as much as 82 to 84 per cent. of tribasic phosphate, so that in spite of its unpromising appearance it is really rich in the element so valuable for agricultural purposes.

I have carefully examined these specimens to try and discover whether there was any trace of organic origin in them, but without success, and have arrived at the conclusion that they have been formed by slow segregation from the containing rock.

The specimens on which these observations are made were found a few miles to the north east of Kicheneff, upon the flanks of some hills where they had weathered out from the rock, and found thickly strewing the hill sides, large quantities are also found in the valleys, which one may readily credit if it is born in mind that the *form* would facilitate the rapid transportation, and that this harder material, which otherwise would tend by accumulation to protect the rock from denundation, by being rapidly removed, would hasten its destruction, and form considerable accumulations at a lower level where it would find a resting place.

The rocks from which these segregations were derived are according to the excellent survey of the late Sir Roderick Murchison, of lower silurian age, and consist chiefly of limestones and shales. The section which he gives is as follows—

Pentamerus Limestone.
Plata or thin bedded Limestones.
Orthoceratic Limestone.
Bituminous Schist.
Grit and Sandstone.
Shale.

Which of the foregoing beds they have been derived from I have been unable to ascertain, but I feel assured it is from one of the limestones, as a small piece of rock which was attached to one of the specimens was undoubtedly limestone, and I think it possible that further examinations of these rocks might shew that these phosphate deposits occupy the same geological horizon as those recently discovered in Wales.

Strata of this age (at least they are described as such), extend from Kamenetz past Yampol and follow the course of the Dniester for a distance of about 45 miles, both banks of which are formed of these rocks, which extend for a distance of about 5 or 6 miles on each side of the river.

DISCUSSION.

Mr. SORBY thought the nodules had the appearance of masses of organic origin.

Mr. COLLINS pointed out that they contained iron pyrites, although the analyses made no mention of sulphur. He thought they might be pseudomorphous after ordinary pyritous nodules.