

VII.—*Descriptions of some peculiar screw-like Fossils from the Chemung Rocks.*

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In the sandstones of the Chemung Group in Northern Pennsylvania and Southern New York, have been found a number of cylindrical or fusiform bodies, traversed by spiral raised ridges, which have been something of a puzzle to those who have collected them. At first sight, they would seem to bear a close relationship to some species of *Spirangium*, particularly *Sp. Quenstedti*, Sch. (*Palæoxyris*. Quenstedt, Handbuch d. Petrefacten, Tab. LXXXII, Fig. 9), and *Sp. Gilewii*, Romanowski, (Geol. Turkestan, p. 135, Taf. 23, Fig. 3).

But in these, as in all the other species of *Spirangium* described, the fusiform body is traversed by six or more spiral raised lines, instead of two as in the specimens under consideration.

The geological horizons of these fossils are also different, *Spirangium* ranging from the Coal-measures to the Wealden, while our screw-like casts, to which the name *Spiraxis* is now given, are confined, so far as yet known, to the Chemung.

The resemblance between some of the species of *Spiraxis* and the species of *Spirangium* enumerated above, is so striking that it is difficult to resist the conviction that they are of similar character and somewhat closely related. *Spirangium* has been generally considered as a fruit of some kind, and the first species noted was described by Brongniart under the name of *Palæoxyris regularis*, (Ann. Sc. Nat., 1re Sér., Vol. XV, p. 456) from a conviction that it was the fruit of a plant allied to *Xyris*. Ettingshausen has also suggested that *Spirangium* is the fruit of an extinct plant related to the living *Bromelia*, and so has called it *Palæobromelia*, (Abhandl. d. K. K. Geol. Reichsan-

stalt, 1, 3, p. 3). These views have not been generally accepted, however, and no satisfactory conclusion has been reached in regard to the botanical relations of *Spirangium*.

The first impression of the writer in examining the fossils now under consideration, was that they were the stems of algae. They are mere casts, all traces of the original structure having disappeared, as is generally the case with fossilized sea-weeds. It is also true that in the same and adjacent formations the remains of fucoids with spiral fronds, *Spirophyton*, are not uncommon. The stems of *Spirophyton*, however, are never found stripped of the fronds, and nothing which resembles the fossils before us has been detected in a careful examination of the upper extremity of the stems of *Spirophyton*. The Archimedes Screw, *Retepora Archimedes*, has a great resemblance in form to these fossils, but that is a calcareous animal organism, of which the structure is very easily made out, for the salient revolving ridges which it bears are only the bases from which the expanded fronds of a Bryozoon have been torn away. On the contrary, *Spiraxis* is a simple cast, no calcareous matter remaining, as would certainly be the case if it represented a coral or mollusk. The original substance has entirely disappeared, and yet it had sufficient solidity to form a defined mould in the sand where it was buried; and when the organic tissue disappeared, as it did completely, the cavity was filled by infiltration, and a perfect cast was thus produced. Nothing is more common than to find the casts of sea-weeds formed in this way; but it is also true that sponges are sometimes fossilized in a similar manner. The group of *Dictyospongia*, formerly considered sea-weeds, and described under the name of *Dictyophyton*, generally exhibit the same absence of organic structure, and are simply casts in the sandstone; but they have been referred to of late by all writers as sponges, and in some instances slight traces of original tissue have been preserved, which place their true character beyond a doubt. Among the sponges there are none known to the writer which exhibit anything like the regular spiral structure which is characteristic of our fossils; but a tendency to a spiral mode of growth appears in some sponges, and is very distinctly seen in *Hyalonema*, and in *Siphonocælia*, Roemer, (*Stachyspongia*, Zittel). No positive evidence can therefore yet be adduced to satisfy the

questions which have been asked in regard to the biological relations of these singular "sandstone screws" from the Chemung. The interior, in all cases yet observed, is composed of sand, with sometimes small quartz pebbles. These indicate that the organic tissue was soft, and early disappeared, leaving a cavity which was filled in with sand and fine gravel introduced through an orifice at one extremity. The upper end is conical and, in several specimens which I possess, complete; but the lower end is broken off, and the nature of the part removed remains unknown. It is possible that we have nearly the entire organism, and that it was fusiform with two conical extremities. This is, however, less probable than that it continued below in some sort of a stem that served as a support. Doubtless future discoveries will solve this problem.

The specimens in my possession may be concisely described as follows:

SPIRAXIS. (nov. gen.)

Body cylindrical, or sub-fusiform, somewhat abruptly conical above, more gradually tapering below; surface traversed by two parallel revolving spiral ridges, in some species closely approximated, in others separated by intervals half as wide as the diameter; no traces of internal structure or distinct surface-markings visible.

Two species are known to me, viz.,

1. *Spiraxis major*, n. sp.

PL. XVIII, FIG. 1.

Body cylindrical, about one inch in diameter, terminating above in a conical summit, traversed by two strong spiral revolving ridges which cross the axis at an angle of about 45°. These ridges are flattened or sulcated and somewhat roughened, as though for the attachment of some frond-like appendage. They are separated by broad, deep and smooth furrows about three times the width of the flattened summit of the ridge; the surface of the furrow is smooth or obscurely granulated.

Only a single specimen of this species is known, but this is remarkably well preserved. It is about 7 inches in length by one in diameter. The summit is complete, but it is broken off below, leaving the entire form uncertain. It apparently shows a tendency to narrow downward, and the spiral ridges are there somewhat more widely separated, as though tending to open and become obsolete.

Formation and locality, Chemung Rocks, Southern New York.

2. *Spiraxis Randallii*, n. sp.

PL. XVIII, FIGS. 2, 3.

Body fusiform, three or four inches in length by six to eight lines in diameter; surface marked by two revolving and closely approximated ridges, which below are broad and flattened or rounded, and separated by narrow furrows, above acute and narrow, separated by broader furrows.

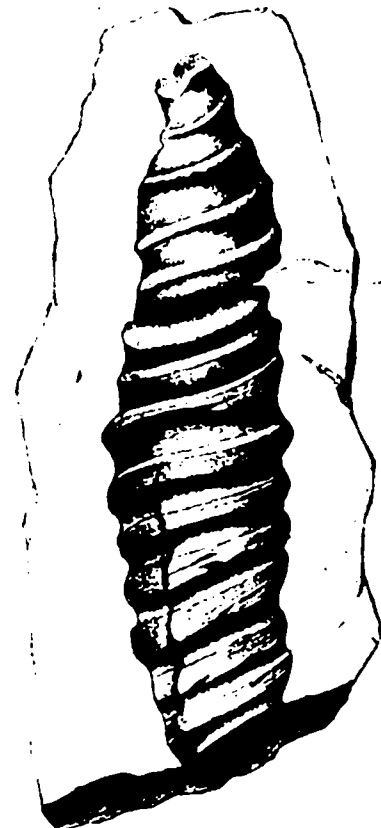
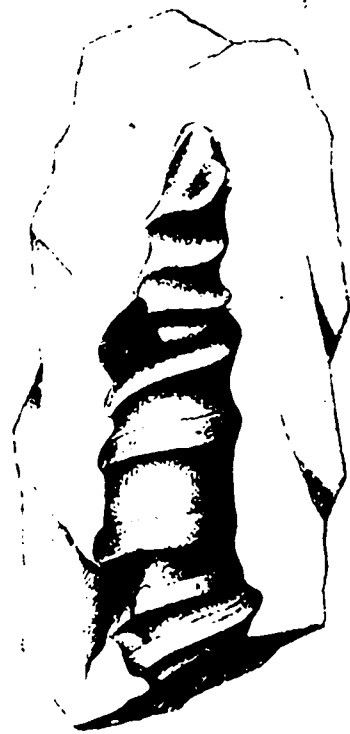
From *S. major* this species may be distinguished by its smaller size, its somewhat curved or sinuous form, and the closer approximation of the raised ridges, which are also more flattened and relatively broader.

Formation and locality, Chemung Group, Warren, Penna., where it was first obtained by Mr. F. A. Randall, to whom it is dedicated.

Since the above descriptions were written, Prof. James Hall, of Albany, and Prof. H. S. Williams, of Cornell University, have kindly sent to me for examination the considerable number of specimens of *Spiraxis* which they have obtained from the Chemung rocks of Northern Pennsylvania and Southern New York. Of these, all those received from Prof. Hall represent the species *S. Randallii*; none are more complete than those now figured, and none exhibit characters which throw any light on the biological relations of these fossils. Among the specimens sent by Prof. Williams, is one larger than the others, much curved and flattened and having the spiral ridges relatively broad and flat. It approaches most nearly to *S. Randallii* and may be only a phase of that species, but more material will be required before this question can be settled.

It is to be hoped that by the publication of this notice of these singular organisms, the attention of those who are making collections from the Chemung rocks will be specially directed to them, and that by the discovery of specimens which are better preserved, or by tracing their connections or relations as they lie in the rock, their true nature may be determined.

The originals of the figures now given are in the Geological Cabinet of the School of Mines of Columbia College.



1 SPIRAXIS MAJOR 2 3 SPIRAXIS RANDALLI

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