

agreements and differences among these shells in their several stages of growth were given in this paper, prefaced with some remarks on morphological science as illustrated by the *Meduse*, the *Echinodermata*, and *Crustacea*. The following are Dr. Wright's conclusions:—*Ammonites planicostatus*, Sow., is the young of *Am. Dudressieri*, D'Orb. It has at first smooth ribs, flattened on the back; each rib then develops a spine near the back, which has become broad and flat; the spines afterwards diminish in size, becoming blunt tubercles, and even disappearing altogether in old shells. *Am. semicostatus*, Y. & B., is nearly smooth when young, without the keel or ribs, which are prominent in middle-aged shells. *Am. bifer*, Quenstedt, is smooth when young, acquires ribs when older; and differs considerably when aged, the ribs becoming recurved processes. *Am. Jamesoni*, Sow., is an adult form, with ribs undulating over the back; *Am. Reynardi*, D'Orb., represents the middle age of the same species, with dorsal tubercles on the ribs and no keel; and *Am. Bronnii*, Roemer, is the young form, with ribs, tubercles, and dorsal keel. Lastly, *Am. capricornus*, Schlot., is very difficult to identify in its many forms; indeed, no less than six so-called species have been described out of the various phases of its growth: in early age it is *Am. maculatus*, Y. & B., and *Am. planicosta*, d'Orb.; a little older it is *Am. laticostatus*, Sow.; still older, and when the last whorl has become suddenly enlarged with two lateral rows of small tubercles, it is *Am. heterogenus*, Y. & B., and *Am. Henleyi*, Sow. By a careful study of the morphological characters which Ammonites exhibit, the number of the so-called species will be greatly reduced, and their diagnosis simplified. This will be a boon to the palæontologist, now that the value of Ammonites is more generally recognized; for among all the Invertebrata, they are the surest indicators of the stratigraphical position of the different zones of life in the Secondary rocks.

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CORRESPONDENCE.

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EOZOON CANADENSE IN CONNEMARA MARBLE FROM THE  
BINABOLA MOUNTAINS.

*To the Editor of the GEOLOGICAL MAGAZINE.*

MY DEAR SIR,—I send you two or three slides with films (mounted and ground slices) of the Irish green marble containing the fossil which I suppose to be the same as *Eozoön Canadense*; in fact, I can see no difference whatever. In the hand-specimen, however, the Irish differs much from the Canadian, as the best films are got, not from the banded dark-green, or from that with blue patches, but from the pale-green, translucent, apparently homogeneous portions; that with blue patches showing but little trace of the Foraminiferal structure. The quarry producing the best specimens is that on the north-west flank of the most south-westerly of the Binabola Moun-

tains.\* The green marble is found at various points, in a NW. direction, or thereabouts, from this spot; and it apparently forms a bed with a 'strike' of about NW.—SE.; and it rises in many places like a wall above the mica-schist of the country, the latter rock having been more easily denuded. The northern end of the bed is far more calcareous than the southern, and there the Eozoan specimens are very unsatisfactory. As it is many years since I collected my specimens, these notes of the locality are from memory, and may be corrected by later observation. This marble gives way in parts to the action of acid (but not so easily as the Canadian marble that Sir W. Logan gave me), leaving tubuli like a white velvet coating on the cell-masses, and with an occasional thread going right across. It seems as if the carbonate of lime has here been replaced partly by some other mineral, resisting the acid.—Yours very truly,

W. A. SANFORD.

NYNEHEAD COURT, WELLINGTON: Dec. 27, 1864.

*Note by the EDITOR.*

Mr. W. A. Sanford, F.G.S., first wrote to me on November 25, 1864, of his finding Eozoal structure in the Connemara marble; but he did not then feel certain enough of his conclusions to put them in print. When he felt sure, however, of his results, he kindly sent me the 'slides' above mentioned; and having got some pieces of 'Irish Green' from marble-works in London, I verified his discovery by experiment. My specimens, however, of the light-green, translucent, serpentinous marble have yielded much more readily to dilute acid than Mr. Sanford's specimens; and, excepting that the silicate replacing the 'Sarcodæ' of the *Eozoön* is lighter than in a specimen with which Sir W. Logan favoured me, there is no real difference between the two. The various-formed chambers, the shell of varying thickness,—either very thin and traversed with fine tubuli, the silicate filling which (when bared) resembles white velvet-pile, or thick and traversed with brush-like threads, representing the pseudopodian passages of the 'supplemental shell' (or 'vascular system'),—are all present; though I have not so carefully prepared them as they are shown in specimens of the Canadian Eozoan rock prepared and given me by Dr. Carpenter, whose researches (as read before the Geological Society—see *GEOL. MAG.* Vol. II. p. 35) have even added to Dr. Dawson's almost exhaustive description (see *GEOL. MAG.* Vol. I. p. 226) of this fossil. The best way, perhaps, to examine the rock for *Eozoön* is to strike off thin chips of the marble, parallel with a smooth face, cut across the wavy white and green laminae, as nearly at right angles as practicable (the direction in which ornamental slabs of this marble are often cut), and to submit the chips to the action of very weak dilute acid (not sulphuric); and the peculiar structure, at first sight merely granular (where the mass is more green than white), but showing to the prac-

\* An account of the Geology of the Connemara Mountains, with their beautiful green marble, quartz-rock, and mica-schists, illustrated by a section, may be seen in Murchison's 'Siluria,' 2nd edit. p. 100, &c.—EDR.

tised eye green stony matter replacing tiers of the many-segmented 'Sarcodæ,' together with delicate greenish-white threads for 'pseudopodial filaments,' and for 'stolons,' of the different sizes and in the different positions peculiar to the structure of *Foraminifera*, can readily be detected. The loose morsels also, fallen in the water, are (as Dr. Carpenter showed me) especially instructive, if carefully dried and mounted.—T. R. J.

## GEOLOGICAL 'NOTES AND QUERIES.'

*To the Editor.*

MY DEAR SIR,—In the early part of the past year, I ventured to suggest to the Council of that very useful body, the 'Geologists' Association,' that an extension of the aid they were giving to geological observers would result from the periodical publication, monthly or quarterly, of a 'Notes and Queries.' To illustrate my meaning practically, I took the further liberty of contributing the first number, having sundry enquiries myself to make, needing, like others, co-operative help. This little *olla podrida* of mine the Association published, with an official foot-note of approval and explanation. But though still convinced of the value of such means of distributing and acquiring help within the limits of the 'Association,' I am so greatly of opinion that more extended and equally valuable aid may result from embodying the scheme with that of the GEOLOGICAL MAGAZINE, that I beg for some small space wherein to remark upon it. Although a desultory system of notes and enquiries did obtain during the existence of the respected predecessor of the GEOLOGICAL MAGAZINE, the scheme upon which it was cast differed somewhat from the arrangement I would suggest.

My remarks upon the plan need be but short. The arrangement in that valuable friend of Literary men, 'Notes and Queries,' is the one which I should like to see applied to the help of Geological students: everyone being familiar with this model, I need not describe it. My remarks will be rather directed towards indicating subjects which may both lead to the help of individuals, and at the same time advance the progress of the science.

The very suggestive article by Professor Rupert Jones which inaugurated the New Year, and to which, unknowingly, I added a kind of postscriptal paper, will save me mentioning our wants as regards the palæontological, physical, and petrological studies which belong to the older half of the Palæozoic epoch; and save my bringing forward, as a witness of the usefulness of my plan, any more puzzled student of rocks older than the 'Mid-Silurian' student. At this stage in the chronicle of past time begin my inquiries.

1. Will some one kindly ask what are now the boundaries of the 'Middle Silurian,' and what are its frontier relationships with rocks above and rocks below? 2. Also whether the May Hill Sandstone, or any 'Llandovery' rock, is being worked now anywhere in Britain? While making these queries, I call the attention of the Malvern geologists, and other observers situated thereabouts, to the *extraordinary* abundance of *Tentaculites* in the Upper Llandovery Sand-