to be owing to the sharp folding of the chalk, causing irregular cavities to open in various places, these cavities being subsequently either filled with material from above, which would naturally be stratified, as is often the case with cave deposits, or, as in one instance that I examined, apparently always empty. The folding of the chalk shown in my woodcut can now be easily examined; but in 1868, as shown by Mr. Fisher, the beach was much higher.

The diagram, Fig. 4, of my paper, was only intended to give a general idea of my theory: of course in practice soft beds would take much more complicated folds, though their general direction is still distinctly traceable. Unfortunately, there are only short sections to be seen at right angles to the folds.

The extreme shallowness of the North Sea is such that ice even 250 feet thick would be more than sufficient to dam out all the water in the southern part, and supposing a submergence of 200 feet at the time of the Chalky Boulder-clay, about 500 feet of ice would do the same. At the same time the beds immediately below both the Till and the Chalky Boulder-clay are fresh-water and not marine. Nowhere in the south or east of England have I been able to obtain evidence of a contemporaneous marine fauna in any Boulder-clay. With regard to the so-called "Great Submergence," East Anglia has at present yielded no trace of it; and if it had affected this district, one would naturally expect to find remains of deep-water deposits in such a flat country.

CLEMENT REID.

THE TERM "SCHIST."

SIR,—The question raised by Dr. Callaway in the last number of the GEOLOGICAL MAGAZINE will doubtless elicit many answers embodying various shades of opinion. Be these opinions what they may, the word *Schist* has in one respect a definite signification in common with the word *schism*.

A schism is a split of some kind, it may be large or small. A fault is a schism; a joint-plane is a schism; cleavage is schismatic, and foliation and lamination also give rise to schismatic or schistose tendencies in the rocks in which they occur. I think, therefore, that Mr. Allport is perfectly justified in using the adjectives *schistose* and *fissile* synonymously.

The only restriction which long usage appears to have imposed upon the term "schist" is that, whether a foliated or a laminated rock, the planes of fission (if planes they can be called, for they are often small and irregular surfaces of parting) should coincide either with the direction of lamination or with that of foliation. Foliation and lamination are not always coincident.

It seems no reason that because the chief foliated rocks are spoken of as "crystalline schists" that therefore, no other rock, no matter how fissile, should be excluded from the benefit of a term to which its structure may quite well entitle it.

To express my own opinion, I should say that I fail to appreciate Jukes's definition, and that in common with Mr. Allport I use *schistose* and *fissile* as convertible terms when the fission is not of that

perfect kind which characterizes slates and shales. I would, therefore, restrict the term "schistose" to an imperfect or irregularly fissile structure. In this respect I take it that a schist differs from a shale. The definitions of such closely-allied terms must, however, depend upon preponderance of evidence concerning the special and distinct senses in which they have been employed. Their correct application, therefore, is essentially based upon usage.

FRANK RUTLEY.

LINNARSSON'S RECENT DISCOVERIES IN SWEDEN.

SIR,—I have to thank Messrs. Linnarsson and Nathorst, of the Swedish Geological Survey, for kindly suggesting the following corrections of my paper on "Linnarsson's Recent Discoveries in Sweden," as published in the January and February parts of the GEOLOGICAL MAGAZINE for the present year.

Page 34, line 35. For *Murchisoni*-bed read *Phyllograptus* Zone.

Page 35, line 28, etc. *Retiolites* Beds. This term is restricted by the Swedish geologists to the strata denominated by myself the Zone of *Cyrtograptus Murchisoni*.

Page 36, line 9. *For* highest *Silurian* strata in Scania, *read* highest *Graptolitic* strata in Scania.

Page 68, line 6 from bottom. *For* regarded as distinct *read* regarded as identical.

Page 70, line 15. Dr. Nathorst was not responsible for the original reference of *Conocoryphe exsulans*, Linnars., to *Cono. coronatus*, Barr. He merely adopted the identification previously made by Messrs. Lundgren and Linnarsson (Geol. Fören. Förhand. 1876, Band iii. No. 9, p. 3, note).

ST. ANDREWS, *April* 19*th*, 1880. CHAS. LAPWORTH.

THE MICROSCOPIC STRUCTURE OF ATELEOCYSTITES.[1]

SIR,—I have examined by vertical and horizontal sections the shells of *Ateleocystites*, of *Marsupiocrinites*, and of the Trilobite (*Calymene*), all from the Wenlock Limestone, Dudley, which you sent me. That of *Ateleocystites* does not show under the microscope the normal calcareous network which is so fairly constant in the Echinodermata; but the undoubted Echinoderm, *Marsupiocrinites*, was identical in all respects with the former genus. This I attribute to extreme metamorphic action. However, one must not lose sight of the fact that the network structure might, even in the living animal, have been disguised by its interstices being filled with carbonate of lime, a condition often found where there is friction between parts (*e.g.* between head of spine and tubercle, etc.), and to a certain extent probably in old parts (*e.g.* the basals of old Pentacrinites). The Trilobite showed the ordinary tubular structure found in the thicker-shelled Crustacea. It is evident, from the above, that *the apparent absence* of the calcareous network in *Ateleocystites* does not invalidate its being an Echinoderm. C. STEWART.

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ALBERT EMBANKMENT, LONDON, S.E., *April* 23*rd*, 1880.

[1] This note was unfortunately received by the Editor too late for insertion at p. 200 *ante*, where it should have appeared.

ERRATUM—In Dr. Callaway's letter, April, 1880, p. 188, last line, for *as* read *us*.