reached by the tide. *Murex erinaceus* was only found in these beds, and rare.

Proceeding northwards up the coast, the finest sections in Furness of the boulder clay are exhibited in the cliffs or sea-scarps of Moat Hill, Edge Bank, Beanwell Bank, and Tea Wood, with heights ranging from 50 to 90 feet. Large Carboniferous (or mountain) limestone, boulders, and angular blocks seem ready to slide down; while hard detached and fallen masses become separated in time by the dash and spray of the tides, and strew the shore. Some of the fallen blocks measure 20 feet in circumference, and retain deep groovings on their surfaces.

North of Ulverstone, the boulder clay reappears at Hammerside Point, and constitutes a hill of 60 feet altitude, with an unknown depth. After this, it caps the Carboniferous and Silurian rocks of Plumpton and Threadlow; and then retires back and is not seen again on our line of coast.

CORRESPONDENCE.

On the Outer Tegument of a Section of the Genus Trigonia.

Sir,—Permit me to direct the attention of palæontologists to a remarkable feature in a section of the genus Trigonia, which indicates a wider separation of that section from its congeneric allies, and also an unsuspected imperfection in the state of preservation of some of our most common Jurassic testacea. It has long been known that under the name of *Trigonia costata*, some very different forms of that genus have been figured and described by various authors from Jurassic rocks ranging from the Upper Lias to the Kimmeridge Clay, including fossils from Oolitic limestones, sandy rocks, argillaceous limestones, and from soft unctuous clays. Considering that the materials at the disposal of authors have been derived from such a variety of rocks, and of localities, both European and Oriental, and that such numbers of the great group of the Costatæ have been examined and compared by so many authorities, it might have been expected that their natural-history characters had been fully ascertained, and that the little we have still to learn respecting them would have reference only to the separation or union of species, and to a more accurate definition of their stratigraphical range. I was therefore recently much surprised upon applying my pocket lens to the surface of a fine example of *T. Calypso*, D'Orb., to find that it exhibited a beautifully ornamented surface, consisting of lines of minute granules arranged vertically, and in every respect agreeing with the outer tegument of Gresslya, Anatina, Goniomya, and Myacites, amongst the Myadæ or Anatinidæ. Of this latter family the fossil forms with granulated surfaces may be separated into two divisions, the one having large and widely separated lines of granules, the other with the granules also linear, but very minute, and the rows closely arranged; *Trigonia Calypso*, from the Scarborough Cornbrash, has this latter kind of ornamentation easily overlooked, and preserved only under the

most favourable circumstances. Other Trigoniæ with surfaces precisely similar are *T. elongata*, Sow., from the Cornbrash of the same locality, and from the Oxford Clay of Dorsetshire; *T. costata*, var. *lineolata*, Ag., from the grey limestone of Scarborough; another lunulate and lengthened form from the Upper Trigonia grit, Inferior Oolite near Stroud; *T. monilifera*, Ag., from the Coral Rag of Weymouth; and *T. marginata*, Lyc., from the Kimmeridge Clay of Wiltshire. This granulated surface occurring, as is now ascertained, in so many species of the costated Trigoniæ, whose general forms and other characters are very dissimilar, renders it evident that the whole group of the Costatæ is characterized by its presence, although we may only expect to discover it occasionally in specimens derived from fine argillaceous deposits, and cleared simply by washing, or by using only a light brush. The other sections of Trigonia having tubercles, varices, or serrated ribs upon the sides, appear to have been destitute of this granulated tegument, as are also the recent Trigoniæ. I would also venture to remark that the value of the granulated tegument as a ground of distinction in the groups of testacea, does not appear to be sufficiently appreciated by some palæontologists; that it is of higher value to us than as a separation between species, may be inferred from the fact that in the great family of the fossil Anatinidæ it characterizes all the species of the genera in which it occurs, and that the present appears to be the first known instance in which a well-defined genus can be separated into two sections, the one having the surface granulated, the other smooth: in Trigonia, however, it is found to pervade only a single but large and well-defined group, which in its general characters is as clearly separated from the other fossil groups as from the recent members of the genus.

JOHN LYCETT, M.D.

Scarborough, May 4th, 1864.

On the Nebular Theory.

Salford, May 17, 1864.

Sir,—In No. 75 of your 'Geologist,' I find an article on Planetary Orbits, etc., written with a considerable degree of ingenuity, in which you ask, and I suppose with no objection to a reply, for instances "of the evolution of light and heat by *slow* condensation of gaseous matter." Chemistry supplies us with abundance of proof in this respect. One of the most familiar is shale loaded with iron pyrites, which, when exposed to the influence of the atmosphere, often takes fire from the slow absorption of gaseous matter.

So, on the other hand, excessive heat has greater power than chemical affinity, and will, if supplied in sufficient intensity, release the condensed oxygen again from its compound. Metals, too, have a very great power to condense gaseous matter within their pores, and this power is generally proportionate to their spongy and divided character; but if heated, their affinity for gaseous bodies is likewise proportionately increased. But as I have just stated, heat has a greater power than chemical affinity, and therefore no condensation of gaseous matter could take place until it was sufficiently cooled to be within the range of chemical power.

Now the nebular theory assumes that condensation is the result of slow cooling, and could not have taken place in any other manner; consequently, no universal conflagration and condensation could simultaneously have taken place, as your reasoning supposes. Again, if we closely examine the crust of the earth, especially amongst the igneous rocks, with which we