

the atmosphere of some stars ; and it is suggested that the phenomena of variable stars may be due to a delicate state of equilibrium in the temperature of a star, which now produces the great absorption of the compound and now that of the elemental molecules.

II. *Mechanical Mixtures.*

The second part of the paper deals with the mechanical mixtures. Maps of the spectra of alloys of the following percentages are given :—

Sn and Cd	percentages of Cd	10.0, 5.0, 1.0, 0.15.
Pb and Zn	„ „ Zn	10.0, 5.0, 1.0, 0.1.
Pb and Mg	„ „ Mg	10.0, 1.0, 0.1, 0.01.

It is pointed out that the lines disappear from the spectrum as the percentage becomes less, the shortest lines disappearing first—and that although we have here the foreshadowing of a quantitative spectrum-analysis, the method is so rough as to be inapplicable.

It is then stated that further researches on a method which promises much greater accuracy are in progress.

The bearing of these results on our knowledge of the reversing layer of the sun's atmosphere is then discussed.

III. “Contributions to the Study of the Errant Annelides of the Older Palæozoic Rocks.” By H. ALLEYNE NICHOLSON, M.D., D.Sc., M.A., Ph.D., F.R.S.E., Professor of Natural History in University College, Toronto. Communicated by Professor RAMSAY, F.R.S., Director-General of the Geological Survey of the United Kingdom. Received December 30, 1872.

(Abstract.)

In this communication the author endeavours to elucidate the abundant and obscure organic remains which are found so commonly in the Palæozoic rocks, and especially in the Silurian strata of Britain, and which are generally known by the vague and convenient names of “Fucoids,” “Annelide-burrows,” and “tracks.” After expressing his opinion that the first step towards the study of these obscure fossils lies in the provisional grouping and naming of the more marked forms which are already known to exist, the author proceeds to divide the remains under consideration into two great groups. In the first of these groups are those fossils which are truly the *burrows* of marine worms, as distinguished from mere trails and surface-tracks. Some of these burrows (*Scolithus*) are more or less nearly vertical in direction as regards the strata in which they are found ; and they are to be looked upon as being true burrows of habitation. In this section are placed the genera *Scolithus*, *Arenicolites*, and *Histioderma*. Other burrows are of a totally

different nature from the preceding, and may reasonably be compared to the burrows of the recent lobworms. These burrows run more or less horizontally as compared with the laminae of deposition, or they penetrate the strata obliquely. They are not burrows of habitation, but are wandering tunnels excavated by the worm in its search after food. The fossils of this group, therefore, as preserved to us, are not the actual burrows themselves, but the burrows filled up with the sand or mud which the worm has passed through its alimentary canal. The burrows of this kind (including many forms previously described under the names of *Chondrites*, *Palæophycus*, &c.), the author groups together under the name of *Planolites*.

The second great group of Annelide-remains comprises genuine surface-trails or "tracks," which of necessity never pass below the surface of the bed on which they occur. Some of these remains, such as *Crossopodia*, are, beyond doubt, due to the operation of marine Annelides; but it may be a matter of question whether we have in these cases the actually petrified body of the worm, or merely the track produced by the passage of the animal over the surface of the mud or sand. The author, however, gives reasons for believing that the latter explanation is truly the correct one. Other fossils belonging to this group (such as *Myrianites*) are equally, beyond doubt, produced by the operations of marine animals; but it remains quite uncertain whether they have been formed by Annelides, Crustaceans, or Mollusks. Lastly, there are remains which appear to be really casts of the surface-trails of Annelides or other marine creatures, and which, therefore, are elevated above the surface of the bed on which they occur. Such remains may readily be confounded with those belonging to the genus *Planolites*, from which they are only distinguishable by the fact that they are strictly confined to a single surface of deposition. To fossils of this nature the author proposes to restrict the generic title of *Nemertites*.

Finally, the author describes some singular tracks apparently produced by Crustaceans belonging to the genus *Ceratiocaris*, and for which he proposes the generic name of *Caridolites*.

The following list comprises the species of fossils described in this communication:—

A. BURROWS.

I. Genus ARENICOLITES, Salter.

1. *Arenicolites sparsus*, Salter.
2. ——— *didymus*, Salter.
3. ——— *robustus*, Nicholson.

II. Genus SCOLITHUS, Haldemand.

4. *Scolithus canadensis*, Billings.
5. ——— *linearis*, Hall.
6. ——— *verticalis*, Hall.

III. Genus HISTIODERMA, Kinahan.

7. *Histioderma hibernicum*, Kinahan.

IV. Genus PLANOLITES, Nicholson.

8. *Planolites vulgaris*, Nicholson.

9. — *granosus*, Nicholson.

10. — *articulatus*, Nicholson.

B. TRAILS.

V. Genus CROSSOPODIA, M'Coy.

11. *Crossopodia scotica*, M'Coy.

12. — *lata*, M'Coy.

VI. Genus NEMERTITES, M'Leay.

13. *Nemertites Ollivanti*, Murchison.

14. — (*Palæochorda*) *major*, M'Coy.

15. — (*Palæochorda*) *minor*, M'Coy.

VII. Genus MYRIANITES, M'Leay.

16. *Myrianites tenuis*, M'Coy.

17. — *Murchisoni*, Emmons.

C. APPENDIX.

VIII. Genus CARIDOLITES, Nicholson.

18. *Caridolites Wilsoni*, Nicholson.

May 15, 1873.

WILLIAM SPOTTISWOODE, M.A., Treasurer and Vice-President, in the Chair.

Major Thomas George Montgomerie, R.E., was admitted into the Society.

The following communications were read:—

- I. "Determination of the Number of Electrostatic Units in the Electromagnetic Unit made in the Physical Laboratory of Glasgow University." By DUGALD M'KICHAN, M.A. Communicated by Sir WILLIAM THOMSON, F.R.S. &c. Received April 15, 1873.

(Abstract.)

The object of this paper is to describe experiments made at intervals from 1870 to 1872 in the Physical Laboratory of Glasgow University to determine the relation between the fundamental units in the two systems of absolute electrical measurement, the electromagnetic and the electrostatic. A summary is also given of the results of similar observations made by W. F. King in 1867 and 1868.