itself ought also to form a pseudomorphic deposit of the same kind.

Accepting, then, Sir Wyville Thomson's theory, the manganiferous deposit might be accounted for as follows :—

Manganese occurs in sea-water in very small quantities, sufficient, nevertheless, for detection. Forchammer has detected it together with iron and silica ; as also have Figuer and Mialhe.[1] It is, besides, almost invariably found in the waters of some springs, according to Prof. T. Sterry Hunt,[2] and spring-water sooner or later finds its way to the ocean. Again, it is found in the ashes of plants,[3] and it is therefore not unlikely that it may be secreted by other organisms, such as foraminifera, molluscs, &c.—in fact, Bischof found in the outer scale of oyster-shells 0·61 per cent. of ferric oxide, with some oxide of manganese[4]—and as its carbonate is isomorphous with that of lime and iron, it is perfectly probable that these should be found associated together, as indeed they usually are. Supposing, then, *Globigerina* shells to consist of carbonate of lime, with small traces of carbonate of iron, carbonate of manganese, peroxide of iron, and silicate of alumina, the following changes might take place while the shell was passing through water charged with carbonic acid gas and oxygen.

All the carbonates would first be dissolved. Then the carbonates of iron and manganese would be oxidised, as they readily part with carbonic acid in presence of oxygen, and the liberated carbonic acid would, no doubt, act on a fresh portion of the mixed carbonates. The silicate of alumina and peroxide of iron already in the shell[5] would not be affected. Thus there would be a continual deposition of silicate of alumina, peroxide of iron, and peroxide of manganese, very likely both hydrated. It is taken for granted here that the red clay is merely a silicate of alumina coloured by peroxide of iron, and not a double silicate of iron and alumina. It does not seem quite clear which is really meant in any of the reports. Alumina is found in small traces in river- and sea-water, perhaps in many cases as the silicate, which is soluble in minute proportions. Or it might originally exist as sulphate, in that state enter into the structure of marine organisms, and subsequently undergo alteration to silicate. Alumina has been found in small quantities in plants, but how combined is not yet known.

I believe the principal deposits of manganese ores are found in connection with limestone or dolomitic rocks, probably for the most part originally disseminated through them in small proportions, and subsequently concentrated in particular localities by the action of infiltrating water, and the nearest approach to the phenomenon described by Sir Wyville Thomson appears to be met with in the associated limestone, dolomite, iron ore, and nodular manganese ore of the Lahn district, as recorded by Bischof.[6] At the place where the iron and manganese beds are worked, there are several clay beds, varying from a few feet to several fathoms in thickness. These Bischof considers are the result of the continuous action of water containing carbonic acid, the argillaceous limestone being converted into clay. The manganese and iron ores lie beneath the clay beds, and it is most likely that these minerals were extracted from the argillaceous limestone at the same time as the carbonate of lime, having doubtless existed in small quantities as carbonates in the organisms forming the mass. In fact the lower clay beds still contain some manganese. There is thus considerable analogy between the two cases, the difference being that these old limestones having been formed in mass, in not very deep water, were not liable to be dissolved—immediately on the death of the organisms whose skeletons they were—by the action of sea-water, that part being played ages afterwards by atmospheric water. The result has been mainly the same, however, viz., the production of clay from the limestone, together with nodular manganese. Possibly had the corals, &c., forming that limestone had the opportunity of falling slowly, and each isolated, through a sufficient depth of sea-water, the result would have been a manganiferous mud, similar to these deep-sea clays.

As to the nodular structure of the manganese oxide, it is of course referable to the same mysterious molecular attraction which determines the segregation of all the carbonate of iron in the case of clay-ironstone in fire-clays and shales, and silica, as in chalk flints.

Since the above was written, the last number of the *Proceedings* of the Royal Society (vol. xxiv. No. 170), with Preliminary Reports on the Cruise of the *Challenger*, by Sir C. Wyville Thomson and colleagues, has come to hand. These reports contain a full description of the manganiferous muds, but no theory as to the origin of the manganese is as yet put forward.

EDWARD T. HARDMAN,
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[1] Bischof, "Chem. Geo.," vol. i., pp. 99–108.
[2] "Chem. and Geo. Essays," p. 143.
[3] Fownes' "Man. of Chem.," p. 469 ; also Watts' "Chem. Dict."
[4] *Op. cit.*, vol. i., p. 198.
[5] It may be that there is a trace of uncombined ferric oxide already in these shells, since the *Globigerina* ooze, when treated with very dilute acid, leaves a red sediment like the "red clay" (see "The Cruise of the *Challenger*," NATURE, vol. xiv. p. 96). Sir Wyville hesitates to claim for the silicate of alumina and peroxide of iron that they exist in that form in the shells, rather supposing them to be products of alteration. But the latter is certainly found in some shells and in red corals. It has been shown by Prof. A. H. Church that the red chalk of Hunstanton, treated with very weak acid, yields a residue closely resembling the deep-sea "red clay."—*Chem. News*, xxxi. p. 199.
[6] *Op. cit.*, vol. iii. p. 193.

Mr. Wallace on the Distribution of Passerine Birds

IN Mr. Wallace's recently-published work on Geographical Distribution, in more than one place the results arrived at from an inspection of his elaborate tables of genera and families do not agree with the numbers he uses in considering the general bearing of the facts adduced. Thus in his "General Remarks on the Distribution of the Passeres," vol. ii. pp. 299-302, he says (*l.c.* p. 300) : "The families that are confined to single regions are not very numerous, except in the case of the Neotropical region, which has *five*, the Australian has only *three*, the Oriental one, Ethiopian one, and the other regions have no peculiar families." Adopting his tables of the families of the Passeres, I find the numbers should be really as follows :—

Neotropical	7	... Fams. Nos.	39[a], 40, 41, 42, 44, 45, 46.
Australian	5	... ,, ,,	21, 22, 25, 49, 50.
Oriental	3	... ,, ,,	11, 12, 43.

The Nearctic region should also be mentioned as possessing one peculiar family, *i.e.* Chamæidæ. The statement that none of the turdoid Passerine families are exclusively American must also be modified to meet this fact. There are three families (*i.e.* Paictidæ, Pittidæ, Eurylæmidæ), instead of *two*, of the Formicaroid Passeres in the Old World, of which the Pittidæ can hardly be said to have only a "very restricted distribution."

The Australian genus Struthidea, of doubtful position, seems omitted altogether.

W. A. FORBES
Cambridge, Oct. 30

Antedon Rosaceus (Comatula rosacea)

THERE are one or two rather hasty conclusions in the letters you have recently published upon the feather-star, which I will take the liberty of pointing out. My friend, Major Lang, arguing from his experience in Torbay, says : "It is evident that the habitat of Comatula is strictly defined, viz., in comparatively deep water, and amongst rocks." Last year, however, I took it in Salcombe Estuary, in shallow water, and not among rocks, but among the *Zostera marina*, to which numbers of the young stalked form were sticking. The well-known marine zoologist, Mr. Hincks, tells me that he took both the adult and stalked forms in great abundance in the same locality more than twenty years ago.

The President of the Birmingham Natural History and Microscopical Society, in commenting upon Major Lang's letter and other notices of the capture of the feather-star, says, "It is a most remarkable circumstance, therefore, that in the space of about three years, the species should have become numerous to the extent alluded to by Major Lang, more than a hundred being taken in one haul of the dredge." But this rapid increase in the numbers of the species since 1873 is imaginary, for dredgings in the two previous years had yielded the adult form by bucketsful from the neighbourhood of the Thatcher Rock.

In regard to the name, one can only wish for a scientific dictator to restore Lamarck's happily appropriate designation *Comatula*, in place of the earlier name, Antedon, the meaning and pronunciation of which are alike difficult to determine. It would be interesting to learn from political economists, in what category of labour, productive or unproductive, those investigations should be reckoned, which end in displacing some name universally received and understood in favour of one forgotten and obsolete. Justice to the ancient observer is pleaded as a chief reason for these revivals. But it is a poor renown to have helped to increase the ever-growing burden of scientific nomenclature.

Torquay, Nov. 6 THOMAS R. R. STEBBING