demonstrated principles. It is of the nature of the case, that with these opinions the certain basis of the actual, and of what can be empirically proved, is left. It must also not be forgotten that these conclusions only give some sort of clue as to which of the present undecomposable bodies are of more complicated, and which of simpler composition, and nothing as to what the simpler substances are which are contained in the more complicated. Consideration of the atomic heats may declare something as to the structure of a compound atom, but can give no information as to the qualitative nature of the simpler substances used in the construction of the compound atoms. But even if these conclusions are not free from uncertainty and imperfection, they appear to me worthy of attention in a subject which is still so shroudedin darkness as the nature of the undecomposed bodies."

III. "On some Foraminifera from the North Atlantic and Arctic Oceans, including Davis Strait and Baffin Bay." By W. Kitchen Parker, F.Z.S., and Professor T. Rupert Jones, F.G.S. Communicated by Professor Huxley. Received April 26, 1864.

(Abstract.)

Having received specimens of sea-bottom, by favour of friends, from Baffin Bay (soundings taken in one of Sir E. Parry's expeditions), from the Hunde Islands in Davis Strait (dredgings by Dr. P. C. Sutherland), from the coast of Norway (dredgings by Messrs. M'Andrew and Barrett), and from the whole width of the North Atlantic (soundings by Commander Dayman), the authors have been enabled to form a tolerably correct estimate of the range and respective abundance of several species of Foraminifera in the Northern seas; and the more perfectly by taking Professor Williamson's and Mr. H. B. Brady's researches in British Foraminifera as supplying the means of estimating the Foraminiferal fauna of the shallower sea-zones at the eastern end of the great "Celtic Province," and the less perfect researches of Professor Bailey on the North American coast, for the opposite, or "Virginian" end,—thus presenting for the first time the whole of a Foraminiferal fauna as a natural-history group, with its internal and external relationships.

The relative abundance or scarcity and the locations of the several species and chief varieties are shown by Tables; and their distribution in other seas (South Atlantic, Pacific, and Indian Oceans, and the Mediterranean and Red Seas) is also tabulated; and in the descriptive part of the memoir notes on their distribution, both in the recent and the fossil state, are carefully given.

In the description of the species and varieties there are observations made on those forms which have been either little understood, hitherto

unknown, or mistaken; and the relationship, by structure or by imitation, of the species and varieties is dwelt upon. For the description of the better-known Foraminifera, the memoir refers to the works of Williamson and Carpenter.

The authors enumerate 109 specific and varietal forms, most of which receive descriptive comment, and all of which are figured in five plates (two for the North Atlantic and three for the Arctic Foraminifera) with upwards of 340 figures.

The relationships of the *Lagenæ* are specially treated of. *Uvigerina*, *Globigerina*, and especially some of the *Rotalinæ* (*Planorbulina*, *Discorbina*, *Rotalia*, *Pulvinulina*) and *Polystomella* (including *Nonionina*) are among those which are well represented in the fauna under description, and have received much attention in the memoir.

The Society then adjourned over the Whitsuntide Recess to Thursday, May 26.

May 26, 1864.

Major-General SABINE, President, in the Chair.

The following communications were read:—

I. "Note on the Variations of Density produced by Heat in Mineral Substances." By Dr. T. L. PHIPSON, F.C.S., &c. Communicated by Professor TYNDALL. Received April 16, 1864.

That any mineral substance, whether crystallized or not, should *diminish* in density by the action of heat might be looked upon as a natural consequence of dilatation being produced in every case and becoming permanent. Such diminution of density occurs with idocrase, Labradorite, felspar, quartz, amphibole, pyroxene, peridote, Samarskite, porcelain, and glass. But Gadolinite, zircons, and yellow obsidians *augment* in density from the same cause. This again may be explained by assuming that under the influence of a powerful heat these substances undergo some permanent molecular change. But in this Note I have to show that this molecular change is *not permanent* but intermittent, at least as regards the species I have examined, and probably with all the others. Such researches, while tending to elucidate certain points of chemical geology, may likewise add something to our present knowledge of the modes of action of heat.

My experiments were undertaken to prove an interesting fact announced formerly by Magnus, namely, that specimens of idocrase after fusion had diminished considerably in density without undergoing any change of composition: before fusion their specific gravity ranged from 3·349 to 3·45, and after fusion only 2·93 to 2·945. Having lately received specimens of this and other minerals brought from Vesuvius in January last by my friend Henry Rutter, Esq., I determined upon repeating this experiment of