

*The Chemical Composition of the Tests of Foraminifera.*—Another subject of some interest in connection with the bottom-deposits, as well as from a more purely biological point of view, is the chemical composition of the test in the various groups of Foraminifera. Although several recent schemes of classification are based upon the physical characters of the investment, which in turn depends to a great degree upon its chemical constituents, the question is one which has hitherto attracted but little attention. It has been commonly assumed that the tests of the so-called "calcareous" species, whether perforate or imperforate, are composed of carbonate of lime; whilst those of the "arenaceous" forms are constructed of siliceous sand incorporated by means of a calcareous or sometimes slightly ferruginous cement; but though this is true in a broad and general sense, it requires modification in many particulars before it can be accepted as a full or accurate expression of the facts.

The chief difficulties in the way of acquiring reliable information on such points are, firstly, that of obtaining a sufficient quantity of any single species for the purpose of chemical analysis; and, secondly, the amount of care requisite to free the tests both internally and externally from the mud or ooze in which they occur. Amongst the minuter Foraminifera these obstacles are almost insurmountable. Under rare conditions the necessary quantity of shells of the same species, or at any rate of the same genus, may sometimes be secured, but it has been found in practice almost impossible, by mere washing, to render them sufficiently clean to give trustworthy results. With larger specimens there is less trouble, and the sources of error are fewer; whilst such as are of a size to be handled individually without the aid of a microscope require comparatively little special treatment.

The analyses which I am now enabled to quote have, with two or three exceptions, been made by my friends Dr. C. R. A. Wright, F.R.S., of London, and Mr. J. T. Dunn, M.Sc., of Newcastle-on-Tyne; and I may be allowed again to acknowledge the valuable assistance which I have received from these gentlemen in connection with the various chemical questions that have arisen in the course of the present work.

In dealing with the composition of the test, it will be convenient to take the different groups of Foraminifera consecutively, beginning with the MILIOLIDÆ. Concerning the sub-family *Miliolininæ* there is not a great deal to be said. From a sample of the so-called "*Biloculina*-ooze," kindly supplied by Prof. G. O. Sars, an adequate number of shells of *Biloculina ringens* were obtained, which were carefully washed and submitted to analysis. Some doubt, however, was cast upon the result on account of the large proportion of silica which it gave, namely, 10.60 per cent.; the supposition being that, notwithstanding the care exercised in cleaning, the specimens still retained a certain amount of adherent ooze. It is not impossible that this may have been so. Nevertheless, in a subsequent correspondence with Mr. L. Schmelck of Christiania, the author of an elaborate report on the chemistry of the deep-sea deposits of the northern