

one another. The percentages of soda being too largely affected by the cumulative error of the other determinations, had better be left out of consideration. But even if we do so, we often meet with fluctuations which are too great to be taken as arising from analytical errors, and consequently must correspond to differences in the actual composition. I have taken great pains in trying to explain these differences by natural causes, but have not been very successful. The final results of my inquiries may be summed up as follows:—

“From my analyses (which I do not pretend exhaust the subject) it would appear that the composition of sea water salt is independent of the latitude and longitude whence the sample is taken. Nor can we trace any influence of the depth from which the sample comes, if we confine ourselves to the ratio to one another of chlorine, sulphuric acid, magnesia, potash, and *bromine*. I emphasise the bromine because, while present in very small proportion, it is taken up preferably by sea plants, and consequently must be presumed to be more liable than any of the major components to at least temporary local diminution. And yet my analyses of the three mixtures of Challenger waters, and of the Arran water referred to, gave identical values for the bromine present per 100 of chlorine. But the determinations of the lime in the same set of waters make it most highly probable that the proportion of this component increases with the depth. Referring to 100 parts of halogen calculated as chlorine, we find for the quantity of lime :—

In deep-sea waters—			
Mixture III.,	.	.	3·0307
In surface waters—			
Mixture I.,	.	.	3·0175
			<hr/>
Difference,	.	.	0·0132
In medium depth waters—			
Mixture II.,	.	.	3·0800
In surface waters,	.	.	3·0175
			<hr/>
Difference,	.	.	0·0125

and either of the two differences is five to six times as great as even the absolute sum of the probable errors of the respective two terms. A discussion of the quantities of lime brought out by the 77 analyses had given a similar result, but exaggerated the difference between deep-sea on the one hand and shallow or medium depth on the other.

“But there can be no doubt that, if I had applied even as exact a method in the 77 analyses as I did subsequently in the special investigation on the lime, I should have arrived at a greater difference than 0·013 between certain individual samples.

“The result under discussion received a valuable confirmation from the alkalinity