the Greenland coast, and a foot and a half along its opposite margin, and in consequence of this slope proceeds several degrees into the Strait. But as Baffin's Bay and Davis Strait, as has been said before, are traversed by a polar current descending towards the south-east, it ought to have an inclination in that direction; and it is on this account that the current from the east coast of Greenland, after advancing for some time into Davis Strait, is forced to run westwards towards the coast of Labrador, along which it then flows southwards after joining the current from Baffin's Bay. The two united polar currents, whose delivery may be estimated at 1,200,000,000 cubic feet per second, have a breadth of fifty miles, a speed of $\frac{5}{6}$ of a foot per second, and a depth of about 250 fathoms. They flow to the south-east, under the influence of the earth's rotation, which raises them towards the coasts of Labrador and Newfoundland, and continue their course along the latter towards the Gulf Stream until they have doubled Cape Race, when they bend westward and make for Florida.

If now we return to the warm current which, from the Gulf Stream, curves round the south of Iceland, and then spreads itself gradually over the cold waters of the Atlantic, we see that on its arrival at the south point of Greenland, it rises from left to right, from the Gulf Stream to Cape Farewell, about 2¼ feet, which shows clearly that its course is really to the south. Moreover, this elevation from left to right enables us to give a more satisfactory account of the conditions of currents. In short, the western margin of the warm current accompanying the polar current, ought, along the latter, to have a depth of 1,000 feet and a speed of $\frac{3}{4}$ of a foot; and as the speed of the current diminishes regularly in approaching the Gulf Stream, and as all the parts of the current follow, as far as Cape Farewell, a direction nearly parallel, it follows that the speed along the Gulf Stream ought to be at the rate of about ½ a foot per second. But if the returning branch of the Gulf Stream proceeds to the south-west with a fall of ½ a foot on its west border, it follows that the depth of the current ought to be 76 feet. By determining in the same way the depth for a certain number of points of a transverse section, and by calculating according to these data the total delivery of the current, we find that it is raised to 410,000,000 cubic feet per second, which perfectly accords with the result which we ought to obtain. If next we inquire how the various parts of the warm surface current move under the united action of the slope and the earth's rotation, we ascertain that this current ought to follow the course of the polar current which gradually absorbs the waters that penetrate underneath, the water of the current being more dense than that of the polar current, and we find at the same time that in thus flowing towards the polar current the water ought to spread itself all over the Atlantic as far as Newfoundland.

After having thus shown that the preceding theory accounts in a tolerably complete manner for all the movements of the ocean currents, I shall add, in conclusion, that it is very possible, considering our imperfect knowledge of the progress of currents, that many details may be very different from those which have been expounded above; but, so far as the main question is concerned, I believe I am entitled to say with confidence that the laws of ocean currents are pretty much those which I have attempted to establish.

That these laws are equally applicable to the atmospheric currents is evident, and it is scarcely necessary to repeat, that in periods when the differences of temperature on the surface of the globe were greater than at present, all these currents were much stronger, and of a nature otherwise very energetic.

SCIENTIFIC SERIALS

THE *Quarterly Journal of Microscopical Science* for October, 1871. "The origin and distribution of Microzymes (Bacteria) in water, and the circumstances which determine their existence in the tissues and liquids of the living body," by Dr. Burdon Sanderson, F.R.S. This paper is occupied chiefly by details of experiments to determine the conditions which are fatal or favourable to the existence of microzymes in the liquid or gaseous fluids by which we are surrounded, in order to approach one degree nearer to an understanding of their influence on the processes which go on in the living body. After a definition of "microzymes" the author proceeds to their chemical composition and their relation to the media in which they grow. This portion is brief and incomplete. The remainder of the paper is occupied with the experiments, which are grouped under these three sections. (1) Experimental determination of the conditions which govern the development of microzymes in certain organic liquids to be used as tests. Having found in a number of cases that either contact with surfaces which had not been superheated, or the admixture of water which had not been boiled, was the exclusive cause of the growth of microzymes in the experimental liquid, it was inferred that water is the primary source from whence the germinal particles of bacteria are derived whenever they seem to originate spontaneously in organic solutions. A number of experiments were made with different varieties of water in ordinary use, in order to confirm the observations already made, and to ascertain if all waters possess the properties in question in a like degree. These experiments are detailed under the second section (2) Distribution of the Germal Matter of Microzymes in ordinary Water. The results under this head were not deemed satisfactory. (3) Circumstances which determine the existence of microzymes in organic liquids and tissues, that is, whether the tissues and liquids of the living body participate in the zymotic property which exists in water and moist substances. The conclusion drawn from the facts is, that "it has appeared certain that there is no developmental connection between microzymes and torula cells, and that their apparent association is one of mere juxtaposition. Thus fungi are not developed, notwithstanding the presence of microzymes in the same liquid in which, microzymes being absent, but air having access, they appear with the greatest readiness." Finally, the writer is certain that, although air is the main source of what he calls fungus impregnation, as distinguished from impregnation with microzymes, yet the two acts may take place at the same moment, germs of torula being often contained in the same liquid media as the germ particles of microzymes. — "On the Colouring Matter of some Aphides," by H. C. Sorby, F.R.S. — "Observations and Experiments on the Red Blood Corpuscles, chiefly with regard to the Action of Gases and Vapours," by E. Ray Lankester. — "On Undulina, the type of a new group of Infusoria," by E. Ray Lankester. — "On the Circulation in the wings of *Blatta Orientalis* and other Insects, and on a new method of injecting the vessels of insects," by H. N. Moseley. After describing the method adopted for preparing and fixing the wings of insects for examination of the circulation, the writer proceeds to his experiences with the cockroach. The corpuscles in *Blatta* are so large that the circulation may readily be seen with a high power of a simple dissecting microscope. If an insect be carefully tied, the circulation may be observed in action for as long as twelve hours. Abundance of parasites were found in the blood vessels of *Blatta* and coleopterous insects. The method recommended for the injection of the circulatory system of insects is through the largest artery on the front border of the wing, and the injecting fluid is indigo carmine. — "On the production of Spores in the Radiolaria," by Prof. L. Cienkowski; translated from vol. vii., part 4, of the "Archiv. für Mikroskop. Anatomie." The observations on which this paper is based were mainly made upon Collosphæra and Collozoum. The capsule is the source of the zoospores. In the mature capsule the contents break up into a quantity of little spheroids. — "On the Peripheral Distribution of non-medullated Nerve-fibres," by E. Klein. The writer purposes treating of the nerves of the cornea, those of the nictitating membrane of the frog, of the canal in the tail of the rabbit, and of the mesentery. The present communication is confined to the nerves of the cornea, the remaining subjects are to be embodied in a second paper.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, Nov. 22. — The Rev. Thomas Wiltshire, M.A., in the chair. Mr. Samuel Baillie Coxon was elected a Fellow of the Society. The following communications were read:—1. "Notes on some Fossils from the Devonian Rocks of the Witzenberg Flats, Cape Colony." By Prof. T. Rupert Jones, F.G.S. In this paper the author noticed some Devonian fossils like those of the Bokkeveld, found on Mr. Louw's farm on the Witzenberg Flats, Tulbagh. *Orthoceras vittatum*, Sandberger, was added to the South African list of fossils. The fossils under notice were stated by the author to help to substantiate the late Dr. Rubidge's view, that the old schists termed "Silurian" by Bain are of Devonian age, and continuous across the colony. Their presence in the Witzenberg Flats was also