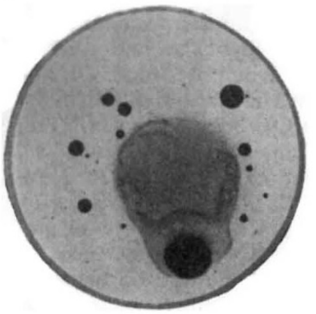
Inorganic "Feeding."

AT the January meeting of the Physical Society, and also at the recent conversazione of the Royal Society, I showed an experiment in which one globule of liquid (dimethyl aniline), floating on the surface of water, captures and absorbs other floating globules (orthotoluidine), the movements resembling those of an amœba. I have now succeeded in photographing the process, and in the accompanying print the larger globule is seen in the act of engulfing the smaller and darker-coloured one. To secure contrast, the orthotoluidine was coloured with indigo.



An interesting extension of this experiment is provided by placing a small drop of quinoline on the surface after the absorption of the orthotoluidine is nearly complete. This drop approaches the large globule and makes contact, when it is violently repelled; it again approaches, and is then repelled with less force; and this alternate attraction and repulsion continues until the quinoline drop appears to be nibbling at the edge of the large globule, into which it is finally absorbed. The interesting feature of this process is that at each contact a mutual interchange of liquid occurs; and only when the quinoline has become mixed with a considerable quantity of the liquid composing the larger globule does absorption take place.

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EXPERIMENTAL DEMONSTRATION OF AN AMPERE MOLECULAR CURRENT IN A NEARLY PERFECT CONDUCTOR.

IT has long been known that the electrical resistance of metals falls with a reduction of temperature in an approximately straight line law, indicating that, in the neighbourhood of absolute zero, there would be no resistance whatever. Prof. H. Kamerlingh Onnes, of Leyden, has carried experiments on this subject down to extremely low temperatures, and has found that it is at a point a few degrees above absolute zero that the resistance of certain pure metals practically vanishes. His later experiments illustrate the properties of these almost resistanceless bodies, or, as he terms them, "super-conductors," in a very striking way. Taking a closed coil of lead wire, he cooled it down by immersion in liquid helium to a temperature at which its resistance is of the order of 2×10^{-10} that at normal temperatures. He then induced a current in the coil, which, instead of ceasing with the E.M.F., was shown to persist with scarcely sensible diminution for as long a period as the coil could be kept cold. As there was practically no resistance, there was practically no dissipation of energy, and the system behaved like the imagined molecular currents of Ampère, and realised the conception of Maxwell as to a conductor without resistance.

The little coil in question was made of 1,000 turns of lead wire 1/70 mm. diameter, wound on a brass bobbin, and with its ends fused together. Its resistance at a normal temperature was 734 ohms, and it was calculated that the induced current would then only persist for 1/70,000th of a second after removal of the E.M.F. When cooled by liquid helium to 1·8° K. (abs.) the "relaxation time," according to previous determination of the resistance, should be a matter of days. The limiting value to which the current might be raised before the ordinary resistance suddenly makes its appearance had also been calculated, and found to be 0·8 amperes at 1·8° K. The coil was contained in a suitable vessel introduced between the poles of a large electromagnet, which was excited before the liquid helium was poured in. After the coil had been cooled down, the current was cut off from the magnet and a current thus induced. The unexcited magnet was then removed, and the persistence of a current of about 0·6 ampere in the lead coil was demonstrated by a magnetometer arrangement. During an hour no decrease in the magnetic moment produced could be observed, although the temperature had risen to 4·26° K. (that of helium boiling at atmospheric pressure). When the coil was lifted out of the helium the current ceased immediately as the temperature rose above 6° K., which is the "vanishing point" of the resistance of lead.

The experiment was repeated with the windings of the coil parallel to the field, to prove that the effect was not due to some magnetic property of the material of the wire or bobbin, which might only appear at these temperatures; and only a slight effect, such as might be accounted for by asymmetry of the coil, was observed. Further experiments were tried to measure the actual rate of falling off of the current due to the residual micro-resistance, and a falling off of less than 1 per cent. per hour (somewhat less than had been calculated) was all that could be observed. Other experiments finally disposed of all idea of direct magnetic action, and the actual presence of a continuing current was proved independently by attaching galvanometer leads to the points on the coil, and suddenly cutting the wire between them under the helium, when a swing of the galvanometer needle was observed, while the magnetometer immediately went to zero.

MEMORIAL STATUE OF CAPT. COOK.

ON Tuesday, July 7, Prince Arthur of Connaught unveiled a statue of Captain Cook, which stands on the Mall side of the Admiralty Arch, at the end of the Processional Road. The proposal to erect the statue was made in 1908 by Sir J. H. Carruthers, who pointed out that there was no memorial of Captain Cook in London. The matter was taken up by the British Empire League, and a general committee, under the presidency of the Rt. Hon. Herbert Samuel, M.P., was formed to promote the erection of a statue. The necessary funds were raised, and in 1911 Sir T. Brock, R.A., was commissioned to execute the memorial. One hundred and thirty-five years have elapsed since Cook met his death at the hands of savages in the Sandwich Islands, and it is remarkable that no monument to his memory should have been erected in the capital of the Empire. But if the statue is late it is undoubtedly adequate. The British Empire League deserves the gratitude of all citizens of the empire for its public spirit in raising so worthy a monument to one who extended the imperial bounds.

But James Cook (1728–1779) was more than this. He was a geographer of no mean standing, and his name will go down to posterity as one of the earliest of British discoverers. His three

Photo.] [*A. Burchell, Fulham.*
Statue of Capt. Cook.

voyages, all of them scientific, are well known by now. The first (1768–1770) was undertaken at the instance of the Admiralty, which was moved thereto by the Royal Society, for the purpose of prosecuting geographical researches in the Pacific Ocean. Several well-known men of science accompanied Cook on his voyage, on which, among other things, he struck the coasts of New Zealand and Australia. Round the former he sailed with complete success, examining it in detail; his name is associated with the channel which separates North from South Island (Cook's Strait). Of both New Zealand and Australia he took possession for Great Britain. The second voyage (1772–1775) had for its object the supposed southern continent in the Pacific, and Cook was able to prove finally that no such continent existed. It is worthy of note that on this second journey he reached latitude 71°49′ S. The third expedition was fitted out in 1776, and was principally to settle the question of the North West passage. It was on this voyage, in 1779, that Cook was killed.

Besides his contributions to geography, Cook was also an astronomer and mathematician. His skill as a geographical surveyor he had already shown as early as 1760, when he sounded and surveyed the St. Lawrence river and published a chart of the channel from Quebec to the sea. This activity he continued when, in 1763, he was appointed "Marine Surveyor of the Coast of Newfoundland and Labrador." It was shortly after this appointment that the Royal Society elected him one of its Fellows, on his giving an account of an eclipse of the sun which he had observed on the south coast of Newfoundland.

THE WILDS OF NEW ZEALAND.[1]

DR. J. M. BELL was for six years the director of the Geological Survey of New Zealand, and during his service there his duties and inclinations carried him into several of the most remote and least settled areas. A series of valuable memoirs on New Zealand geology has already testified to the enthusiasm and energy with which he threw himself into his work. In this volume he records his general reminiscences of his travels, and describes his numerous adventures by the flooded rivers, on the mountains, and in the bush, and narrates various incidents in the early history of the dominion. He was greatly impressed by the rich variety in both the topography and geology of New Zealand, and was delighted with its superb scenery, which is illustrated by a well-selected collection of excellent photographs by the Government Tourist Department, and by a series of artistically coloured sketches by his companion, Mr. C. H. Eastlake.

One of the first chapters describes the north-western province of the North Island, where Dr. Bell went to inspect the diggings for Kauri gum, which by 1912 had yielded produce to the value of more than 16,000,000*l*. In connection with his visit to the Thames goldfield, he summarises its mining history, and in connection with the volcanic fields of the North Island, describes his winter ascent of the volcano Ngauruhoe, a climb rendered difficult as the snow around the base was loose and soft, while that on the final slope was dangerously hard and steep. He also describes again the famous eruption of Tarawera, but the Black Geyser, Waimangu, it may be remarked, ceased to discharge daily six months earlier than the time mentioned by Dr. Bell. The most adventurous journey described in the volume was an attempt with Prof. Marshall, of Dunedin, to reach Mt. Arthur in Karamea, the north-

1 "The Wilds of Maoriland." By Dr. J. M. Bell. Pp. xiii+253+plate London: Macmillan and Co., Ltd., 1914.) Price 15*s*.