Letters to the Editor.

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Ether-drift and the Relativity Theory.

THE brief messages in the daily press with regard to Prof. D. C. Miller's experiment have aroused much interest and bewilderment; it is therefore of great value to have Dr. Silberstein's authoritative account in NATURE for May 23. Comment on the experiments themselves would be out of place until the details are published; but it may not be premature to point out that the surprising hypothesis of ether-drift, by which it is proposed to account for the results, is disproved in advance by the daily measurements at astronomical observatories. These measurements constitute a test for differential ether-drift much more delicate than the Michelson-Morley experiment.

According to Dr. Silberstein's summary, the ether is gliding over the earth at a speed which increases from about zero at ordinary ground-level to 10 km. per sec. at the summit of Mt. Wilson. There is thus a rapid rotational motion of this part of the ether. So early as 1845, Sir George Stokes showed that in order to conform with the astronomical facts of aberration the motion (if any) of the ether must be *irrotational*.

The difficulty is seen vividly if we consider the curvature of a ray of light coming to us from a star, taking account of this ether-flow. A ray which is vertical at the summit of Mt. Wilson will on reaching sea-level have an inclination of 7″. Thus observations of absolute star-position at mountain observatories and at sea-level will be discordant by amounts of this order. An error of the order 7″, variable according to the time of day, would play havoc with fundamental astronomy.

The Michelson-Morley experiment was originally performed because it was thought—mistakenly, as we now realise—that it would measure *absolute* ether-drift. For many years it was in sole possession of this field of inquiry. In the new application to *differential* ether-drift it is invading a field in which the facts have long been established by delicate observations, and it is difficult to regard it as a serious competitor.

A. S. EDDINGTON.

Observatory, Cambridge,
May 25.

The Faraday Benzene Centenary.

IN a recent letter (NATURE, April 18), I ventured to counsel chemists to go back to the land—to study Faraday. Since then, in the *Times* (May 16), I have urged that Faraday's great discovery of benzene, one hundred years ago, should henceforth be commemorated on June 16, the day on which it was communicated to the Royal Society of London. Surely we should make this a saint's day in our chemical calendar. The public has its Saint Lubbock's days, for the mere purpose of resting from its labours—in days when labour is beginning to be regarded as a work of supererogation. Why not a chemists' rest-day for the purpose of contemplation: to give emphasis to our recognition of the importance of Faraday's discovery and its astounding consequences: more particularly, as an outward and visible sign of our belief in the method we wield in our search for truth?

As an analytical achievement and as an astounding demonstration of the power of the human intellect to penetrate into the mysteries of matter, the great benzene chapter in organic chemistry, built upon the foundations Faraday laid, may be ranked above all others. It is for chemists to show that our science of chemistry has a mission in society—to make, at least, its simple principles understood. This we must do, if workers in any way believe that the method they wield is of moral significance and not a mere means of dissecting Nature.

It is clear that the politicians are not with us and that even industry has but a half-hearted belief in our ability to serve it. That the public do not understand us is certain. Our nation is behind other nations in appreciation of the work done by the scientific inquirer and its value to society. An occasion like the approaching centenary would command wide sympathy abroad but ordinary engagements will come before it with our politicians. We owe it to ourselves to break down the barriers of ignorance, there in large measure because of our constant disregard of opportunity and our failure to cultivate public attention and appreciation.

At whatever effort, chemists are called upon to give proof, at the approaching centenary celebrations, that they, at least, can appreciate the spirit in which Faraday led the way in the battle against ignorance, as an exponent of the laboratory method and as a philosopher. The advice he tendered, best studied in his writings and in the striking biography we owe to Bence Jones, is of incomparable value. It were well if we had a book of excerpts of his sayings, to guide us in our moments of weakness and keep us in the straight and ever narrow path of scientific rectitude. The poets have their anthologies: why not the philosophers?

Let us, at least, now show that we are not wanting in public spirit in our own cause.

HENRY E. ARMSTRONG.

Depth-recording with Plankton-nets.

THE concise account given by Mr. F. S. Russell in NATURE of April 25, of the behaviour of ring-trawl nets when towed, enables an attempt to be made to solve the paradox of his diagrams. The shape of the warp during each haul may be compared with an imaginary catenary of reference. For this purpose the resistance of the net may be replaced by a horizontal force acting at the lowest point of an imaginary warp constituting a true catenary, and use may be made of Mr. Russell's observation that it is the practice to keep the angle of entry of the warp into the water constant at 40° With a constant angle of 40°, the ratio of *bight* to *dip* of a true catenary is 5·4954, and the ratio of *span* to *dip* is 4·9955, bight and span being measured between supports at a common level. In terms of these two constants, and of the particulars of the wire-rope, may be calculated the tension at the winch, the tension at the lowest point of the catenary, and the resistance of the warp through the water. Moreover, from the given particulars of the net an estimate may be made of its resistance for any required speed. Then, by equating the expression for this resistance, to the tension at the lowest point of the catenary, the speed through the water may be estimated. At high speeds there would be disturbances; but as Mr. Russell states that the engine was run "dead slow," there is sufficient probability of an approach to a solution that will not encroach too far into the region of piscatorial credulity, to justify this method of interpretation.