tables, but may be used as they stand. The system of formulæ determines the simple equivalent of the two wires, copper or iron, when their capacity is sufficiently small to be left out of account. One wire is the return of the other, and they are equal in all respects.

Let (a, μ, σ) be the radius, permeability, and resistivity of a wire in C.G.S. units, f the frequency of alternation, and c the distance between the axes of the wires.

Writing

$$\lambda = 4\pi a(\mu f/\sigma)^{\frac{1}{2}}, \quad \rho = \log_e(\frac{2}{3}\pi a \cdot 10^{-10}).$$

Then

(a) For copper wires, provided $\lambda > 11$, so that the frequency is high, if (L, R) be the inductance and resistance per unit length of the pair,

$$L = 4 \left(1 - \frac{a^2}{\rho c^2} \right) \log_e \frac{c}{a} + \frac{4}{\lambda} \left(1 - \frac{2}{\lambda} \right) - \frac{4a^2}{\lambda c^2 \rho^3} \left(\rho - 4\rho + 3 \log_e \frac{c}{a} \right) \\ \frac{R}{8\pi f} = \frac{1}{\lambda} \left(1 + \frac{1}{\lambda} \right) - \frac{a^2}{\lambda c^2 \rho^3} \left(\rho - 2\rho - 1 \log_e \frac{c}{a} \right) + \frac{a^2}{\lambda c^2 \rho^3} \left\{ \rho^2 - 2 - 3\rho + 2\rho^2 \log_e \frac{c}{a} \right\}$$

where λ^{-3} , a^4/c^4 , and $a^2/\lambda^3 c^2 \rho$ have been neglected.

(b) For iron wires, ignoring also $\mu\lambda^{-3}$ and μ^{-3} ,

$$L = 4 \left(\log_e \frac{c}{a} - \frac{a^2}{\rho^3} \right) + \frac{4}{\lambda} \left(1 - \frac{2}{\lambda} \right) - \frac{2a^2}{\mu c^2} \left(\lambda - 1 \right) \left(\rho - 2 + \log_e \frac{c}{a} \right) \\ \frac{R}{4\pi f} = \frac{2\mu}{\lambda} \left(1 + \frac{1}{\lambda} + \frac{3}{4\lambda^2} \right) - \frac{a^2 \lambda}{\mu c^2} \left(2 - \rho - \log_e \frac{c}{a} \right) + \frac{a^2 \lambda^2}{c^2 \mu^2} \left(4\rho - 2 - \rho^2 - \rho \log_e \frac{c}{a} \right)$$

(c) For copper wires with low frequency,

$$L = 4 \log_e \frac{c}{a} + \frac{2\beta}{a^2} + \frac{4a^2}{c^2 D} \left(1 - 2\beta \rho z - \frac{\gamma}{z} \right) - \frac{8a^2}{c^2 D} \left(2a\rho z^2 - 2a\rho\gamma z - \beta z + 2\beta\gamma \right) \log_e \frac{c}{a} \\ \frac{R}{8\pi f} = \frac{\gamma}{a^2} - \frac{2a^2}{c^2 D} \left(\beta - 2a\rho z + 2\gamma\rho z^2 \right) + \frac{4a^2}{c^2 D} \log_e \left(\gamma^2 - \beta^2 - \gamma z + 2a\beta z \right)$$

where

$$D = 1 - 4\beta\rho z + 4a^2\rho^2 z^2, \quad 2z\sqrt{2} = \lambda, \\ a^2 z^{-2} = 1 - \frac{5}{12} z^4 + \frac{143}{720} z^8, \quad 2\beta z^{-3} = 1 - \frac{11}{24} z^4 + \frac{473}{2160} z^8 \\ \gamma z^{-1} = 1 - \frac{1}{3} z^4 + \frac{19}{120} z^8$$

and z^{12} , a^4/c^4 have been ignored.

(d) For iron wires under the same conditions, neglecting also μ^{-2} and $a^2 z^8/c^2$,

$$L = 4 \log_e \frac{c}{a} - \frac{4a^2}{c^2} + 1 - \frac{z^4}{24} + \frac{13z^8}{4320} - \frac{4a^2 z^4}{\mu c^2} \left(\rho + \log_e \frac{c}{a} \right) + \frac{8a^2}{\mu c^2} \left(1 + \frac{1}{6} z^4 \right) \\ \frac{R}{4\pi f} = \frac{\mu}{z^2} \left(1 - \frac{1}{12} z^4 - \frac{1}{180} z^8 \right) - \frac{4a^2 z^2}{\mu c^2} \left(1 - \frac{z^4}{24} \right) + \frac{4a^2 z^2}{\mu c^2} \left(\rho + \log_e \frac{c}{a} \right) \left(1 - \frac{1}{3} z^4 \right)$$

The results above appear to be capable of including all important practical cases in which the condition of small capacity is not violated. This condition restricts the length of the wires.

For a four-figure accuracy, the capacity must in general satisfy the two conditions

$$C \frac{1}{2} (3f/2)^{-1} 10^{-3} \\ C \frac{1}{2} (6Lf/2)^{-1} 10^{-4}$$

where C is the capacity per unit length and l is the length of either wire. For a capacity of a microfarad per kilometre $C = 10^{-20}$.

J. W. NICHOLSON.

Trinity College, Cambridge, April 21.

Gigantocypris and the "Challenger."

THE writer of the note on "Some Marine and Fresh-water Organisms" (NATURE, April 8) quotes from Herr Lüders (Zeitschr. wiss. Zool., xcii., [1], p. 103, 1909) the statement that the giant Ostracod Gigantocypris was first

obtained by the Challenger Expedition. It may perhaps be worth while to point out that this statement has no foundation in fact. It was first made in 1895 by Dr. G. W. Müller (Bull. Mus. Comp. Zool. Harvard, xxvii., p. 165), who quotes a passage from the "Challenger-Briefe" of R. v. Willemoes Suhm (Zeitschr. wiss. Zool., xxiv., p. 13, 1874), where it is stated that the Challenger dredged between Prince Edward Island and the Crozets a fragmentary specimen of a gigantic Ostracod. Dr. Müller suggests that this may have been a Gigantocypris, and he continues:—"Leider fehlen nähere Angaben über das Thier, und in den Challengerostracoden ist es nicht erwähnt." Herr Lüders, in his recent paper, accepts the identification, and echoes the lament. As a matter of fact, the specimen described by Willemoes Suhm is still safely preserved in the British Museum, but it is not an Ostracod at all! Long before Müller conjectured that it might be a Gigantocypris, Prof. G. O. Sars had described and figured it as one of the two co-types of the remarkable phyllocarid crustacean *Nebaliopsis typica* (Rep. Phyllocarida Challenger, p. 22, 1887). Prof. Sars says:—"It is apparently this form that was mentioned by the late Dr. v. Willemoes Suhm in a letter to Prof. v. Siebold as a gigantic Ostracode. This strange mistake may be readily explained by the incompleteness of the first specimen obtained, of which only the carapace and a small fragment of the body was brought up in the dredge." The statement might have been made still more emphatic. The description and the dimensions given by Willemoes Suhm, as well as the locality, put it beyond doubt that he was speaking of the identical specimen which is figured on Plate III., Fig. 5, of Prof. Sars's report.

W. T. CALMAN.

British Museum (Natural History), Cromwell Road, S.W., April 15.

Persistent Trail of a Meteor on March 14.

I RECENTLY sent the Cape Astronomer Royal an account of an unusual meteor which I saw, and he has suggested that I forward an account to you.

On the evening of March 14 I was walking along the sea-shore looking south-west; the sun had set, and the sky was still bright with sunlight. A few clouds were slowly drifting from the south-east, when suddenly, about 7.45 p.m., I saw what looked like a large rocket dart from behind a cloud, rush across the sky from west to east, and disappear over the Table Mountain range in the direction of False Bay. The track of the meteor was shown by a brilliant, apparently glowing, streak of silvery light, which remained stationary in the sky like a long ribbon of fire for fully ten minutes. The "tail" then gradually assumed a wavy form, and slowly faded out of sight. The peculiarity consisted in the persistence of the "tail" or track of the meteor, as I suppose it was. On looking into Sir Robert Ball's book, "The Story of the Heavens," I find an account strangely akin to mine, and I should like to know the reason for the persistence of the luminous track, which must have been very bright to have shown so plainly against the sun-lit sky. Our southern skies are wonderfully brilliant, owing, doubtless, to the clearness of our air; and I have often seen meteors flash across the sky, but never before have I seen such a magnificent display as that described above.

EDWARD J. STEER.

Box 42, Cape Town, March 22.

Lignum Nephriticum.

I MUST thank Mr. Benham for directing attention (April 8) to the early observations of Boyle quoted by Faraday. I have erred in good company; Stokes himself was apparently unaware of Boyle's experiment, and the "Optics" of Basset, Glazebrook, Preston, Tait, and Winkelmann all seem to regard Brewster and Herschel as the first discoverers of fluorescence.

Dr. Stapf's letter in NATURE of April 22 confirms the conclusions of a recent correspondence in the *Gardeners' Chronicle*; letters of March 20 and April 3 give reasons for assigning *Lignum Nephriticum* to a Mexican tree known as Coatli or Tlapalcypatl.

JOHN H. SHAXBY.
University College of South Wales and Monmouthshire, Cardiff, April 23.