dependence on temperature[2]. The results are represented graphically in Fig. 1. As will be seen from the curves, the magnetic anisotropy of the crystal, namely, $\chi_{\parallel} - \chi_{\perp}$, which was measured directly, diminishes numerically from about -28×10^{-6} at

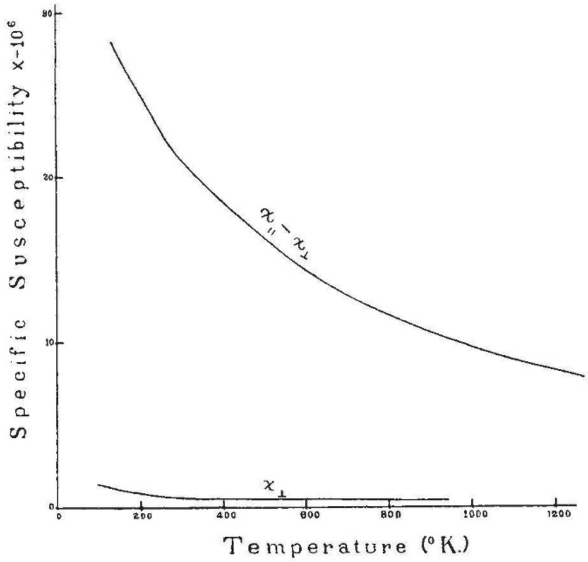

Fig. 1.

140° K., to about $-7 \cdot 8 \times 10^{-6}$ at 1,270° K., whereas the corresponding variation of $\chi_{\perp}$ is from about $-1 \cdot 4 \times 10^{-6}$ at 100° K., to $-0 \cdot 5 \times 10^{-6}$ at room temperature, and to $-0 \cdot 4 \times 10^{-6}$ at 940° K.

K. S. KRISHNAN.
N. GANGULI.

210 Bowbazar Street,
Calcutta.
Dec. 3.

[1] NATURE, **133**, 174 (1934); *Ind. J. Phys.*, **8**, 345 (1934); *Current Science*, **3**, 472 (1935); *Phil. Mag.*, **21**, 355 (1936).

[2] See Shoenberg and Zaki Uddin, *Proc. Roy. Soc.*, A, **156**, 687 (1936); and Stoner, *Proc. Roy. Soc.*, A, **152**, 672 (1935).

Examination of Passive Iron by Electron Diffraction

BY Dr. U. R. Evans's method[1] of electrolysis, almost transparent thin films were detached from the surface of electrolytic iron made passive by immersion in potassium chromate solution. These films were examined by means of a cathode ray of about 50 kilovolts. Spacings of the diffracting substance were calculated from the diameters of several diffraction rings and it was found, as the accompanying table shows, that the films are composed of γ-Fe_2O_3 or Fe_3O_4.

Rings	Indices of planes	Spacings (A.)	Side of unit cube (A.)
1	(200)	4·22	8·44
2	(220)	2·95	8·34
3	(311)	2·51	8·32
4	(400)	2·07	8·29
5	(422)	1·68	8·24
6	(440)	1·48	8·38
7	(600)	1·39	8·34
		mean a_0 =	8·34 A.

a_0 for Fe_3O_4 (X-ray) = 8·37 A.
a_0 for γ-Fe_2O_3 (X-ray) = 8·4 A.; 8·30 A.

As γ-Fe_2O_3 and Fe_3O_4 have almost the same spacings, it is impossible to distinguish between the two oxides. From chemical tests, however, we believe this oxide to be γ-Fe_2O_3. The films are ferro-magnetic and it is certain that they are not α-Fe_2O_3, contradicting the views of many previous workers. Good films are difficult to detach from the surface of iron (not passive) polished in air; but a few samples, fortunately obtained after considerable efforts, proved to be also γ-Fe_2O_3. The conclusion is that passive iron is a state of iron the surface of which is covered in a perfectly compact manner by a thin film of γ-Fe_2O_3. No clear diffraction pattern was obtainable by the reflection method, but three spacings (4·22 A., 2·51 A. and 1·48 A.) were calculated from the vague rings. No rings were observed by the reflection method from iron made passive in concentrated nitric acid, and no film was detached from it.

Details will be reported in the Scientific Papers of this Institute.

ICHIRÔ IITAKA.
SHIZUO MIYAKE.
TAKEO IIMORI.

Institute of Physical and
Chemical Research,
Tokyo.
Dec. 10.

[1] Evans, U. R., *J. Chem. Soc.*, **127**, 1020 (1927).

Geodesics within Matter

THE difficulties regarding the physical interpretation of null-geodesics and time-like geodesics inside matter, discussed in a recent letter by Dr. Silberstein[1], may be met by recourse to a process analogous to that employed in the classical theory of attractions. Thus, to measure intensity of force at a point in a medium, we carve out a small cavity and measure the force (or acceleration of a free particle) in the cavity.

There does not appear to be any difficulty in accepting Einstein's postulates that null-geodesics give the histories of light-pulses and time-like geodesics the histories of free particles, provided that in the application of these principles inside a continuous medium we understand that a thin tunnel in space-time is hollowed out to allow the light-pulse or particle to travel freely *in vacuo*. On that understanding, the Newtonian acceleration inside a small cavity in a liquid sphere agrees with the Einstein acceleration, as expressed in Dr. Silberstein's letter.

J. L. SYNGE.

Department of Applied Mathematics,
University of Toronto.
Dec. 23.

[1] NATURE, **138**, 1012 (1936).

Feeding Habits of Stick Insects

IN reference to the communication from Mr. Sidney T. E. Dark[1], and the observations from the Notre Dame Training College, Glasgow[2], relating to *the eating of dead cellulose by Carausius, it may* be of interest to record that these insects will occasionally eat paper.

When, some years ago, living stick insects were placed on exhibition in this Museum, temporary labels were suspended inside the cages. The labels were of two kinds, some of common white card resembling *Bristol board, but not so tough,* and others of thin strawboard faced with white paper. Some of the adult insects used to feed on the edges of these labels—arranging themselves astride the