

From these experiments we conclude that serial reaction time offers a clear-cut index of psychomotor change under heat stress of this order.

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¹ Teichner, W. H., *Psych. Bull.*, **51**, 2 (1954).

² Fraser, D. C., in National Coal Board Medical Research Memorandum No. 1 (1955).

Fixation of Iodine in Selenium

THE following observations were made in carrying out some tracer experiments on the selenium-iodine system, using the radioactive isotope iodine-131.

It was found that iodine could be adsorbed on to selenium powder from a solution containing iodine-131, and measurements of the total γ -ray activity of a sample of the selenium were made: (i) after the powder had been thoroughly dried; (ii) after it had been melted and at once cooled to an amorphous solid; and (iii) after further heating in an open tube for 7 hr. at 550° C.

No significant differences were found among the three activities, from which it was concluded that less than 1 per cent of the iodine initially present was removed during the heat treatment. An autoradiograph of a section through the specimen at the end of the experiment showed a macroscopically uniform distribution of iodine-131 activity.

This evidence supports the generally accepted view that halogen atoms can be bound in the selenium structure, probably at the ends of chains of selenium atoms. If it is assumed that iodine and bromine behave similarly in this respect, this conclusion does not agree with that of Nijland¹, who states that no stable bonds exist between selenium chains and bromine atoms.

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¹ Nijland, L. M., *Philips Research Reports*, **9**, 259 (1954).

Production of Anisotropy in a Permanent Magnet by Pressure

H. P. J. WIJN and others¹ have described a novel method of making 'Ferroxcube' with a square hysteresis loop. Glass with a higher coefficient of expansion than the 'Ferroxcube' was fixed to a ring-shaped sample at an elevated temperature; the resulting strain at room temperature produced a square hysteresis loop. An experiment has been performed to show that a similar effect is possible with a permanent magnet alloy.

Since a large magnetostriction appeared necessary, 35 per cent cobalt steel was chosen for the experiment. The magnetostriction is positive, and in consequence a longitudinal tension or a lateral pressure will favour a square loop. A lateral pressure was obtained in a bar of cobalt steel about 1½ in. long and ½ in. in diameter in the following manner. A hole 0.002 in. less in diameter than the cobalt steel was made in a stainless steel block. This block was heated to 450° C., the cobalt steel was cooled in liquid air and the stainless steel block was shrunk on to the cobalt steel specimen. The cobalt steel had been previously

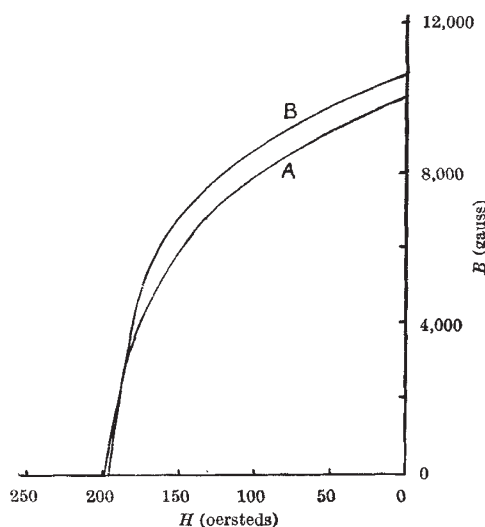


Fig. 1. (A) Normal curve; (B) under compression

hardened, aged at 150° C. and cooled in liquid air before testing, so that any changes in properties after the shrinking are likely to be due to the pressure and not to the temperature cycle during the shrinking operation.

The test values obtained are shown in Fig. 1.

The improvement obtained by pressure, although not spectacular, is amply demonstrated.

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¹ Wijn, H. P. J., Gorter, E. W., Esveldt, C. J., and Geldermans, P., *Philips Tech. Rev.*, **16**, 49 (1954).

Localized Corona Discharges at a Negative Electrode

THE form of the d.c. corona discharge in air differs according to the polarity of the electrode near which it occurs. In an electrode system comprising a wire and a coaxially mounted ring, the discharge appeared as a continuous bright sheath around the wire when it was positive, but as a series of separate tufts when it was negative with respect to the ring.

In an investigation of the latter effect, a jet of mercury was substituted for the wire, giving a clean and smooth electrode surface which was also moving rapidly with respect to the electric field. With the jet negative to the ring, no stationary tufts were observed. It was confirmed by photography with a flash of microsecond duration that the jet, though not accurately parallel-sided, was smooth in the region where discharges occurred. The influence of the moving layer of air at the surface of the mercury jet was simulated by blowing air from a nozzle along a wire at the surface of which tufted discharges were occurring, the effect being that the tufts persisted but with some vibration along the wire.

The nature of the light emitted was investigated with a photomultiplier, wide-band amplifier and oscilloscope and was found to be similar in the cases of both jet and wire. It consisted of pulses, of duration about 10⁻⁷ sec., separated by irregular intervals having durations of microsecond order.