Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 1002.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Passage of Helium through Compact Solids

IN NATURE of January 5, p. 30, experiments were described showing that gelatine, celluloid and cellophane, like vitreous silica, will allow helium (but not air) to pass fairly freely through them at the ordinary temperature. I have since found that vitreous boron trioxide has the same property. Vitreous borax, like the common glasses, does not possess it.

As regards the behaviour of single crystals, I have tried a number of them, and have failed to prove the passage of helium at the ordinary temperature through any. The provisional positive result with a beryl crystal before reported has proved to be erroneous, and is withdrawn.

Experiments on crystals at a higher temperature are in hand. The known facts about the extraction of helium from minerals by heat suggest that a positive result is likely.

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May 31.

Isotopic Constitution of Platinum and Rhodium

THE analysis of the platinum ions from a high-frequency spark[1], using a new spectrograph, shows that this element consists of five isotopes with masses 192, 194, 195, 196, 198. The middle three form a triplet of almost equal strength, while the heaviest is decidedly weaker and the lightest very faint.

In the new spectrograph, the ions are deflected through 90° in a cylindrical condenser and are then further deflected through 180° by a magnetic field. The distances and radii of curvature are arranged so as to bring a divergent bundle of ions with small differences in their energies to a focus at the centre of the photographic plate. With a slit 0·1 mm. wide, images of about the same width were obtained, giving a resolving power of 1 in 1,000. Using an alloy of platinum with 10 per cent rhodium as electrodes of the spark, the isotopes of platinum were widely separated, and the doubly charged platinum ions could be compared directly with the rhodium isotope at 103, previously observed by Dr. Aston. No comparison to the latter could be found even though the main line was much over-exposed. From its position we would expect platinum to have very nearly integral masses. On this assumption the average of six photographs gave an atomic weight of 102·92 ± 0·03 for rhodium, in approximate agreement with the chemical atomic weight.

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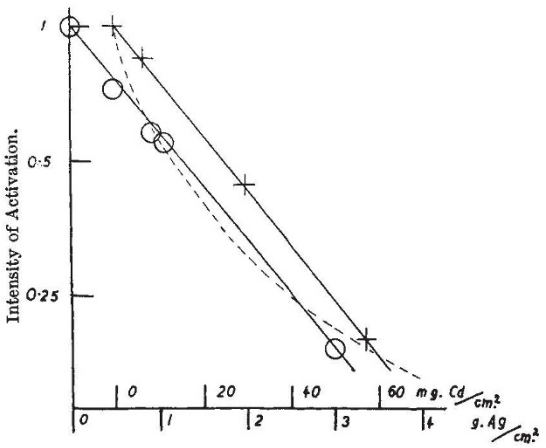
May 23.

[1] NATURE, **135**, 541, April 6, 1935.

Absorption of Slow Neutrons

FERMI and others[1] have shown that slow neutrons are very strongly absorbed by various elements; they found that the absorption curves are by no means exponential. The arrangement used in their experiments was to put the flat test-piece between sheets of the absorber inside a hole in the paraffin block that contained the source. Experiments that we have made under similar conditions have led to the same result, the absorption observed being the same whether the activation of the 20 sec. or the 2 min. period of silver is taken as measure of the intensity.



Thickness of Absorber.

FIG. 1.

With this arrangement, however, no simple law of absorption can be expected. So we have tried to find an arrangement in which the measured absorption gives directly the true absorption coefficient. The measurements were made in the following way:

(1) The test piece of silver and the absorber were placed outside the paraffin block containing the source, which consisted of 150 mC. radium emanation mixed with beryllium. If the test piece is put inside a hole in the paraffin, a neutron which has already crossed the test piece once can be scattered back again so as to return to the test piece, so that the effective thickness of the absorber becomes greater than the measured value. In our arrangement no neutron can reach the test piece a second time after having passed through it once.

(2) The paraffin block was shaped so that there was no wax in the direct path (about 20 cm.) between the source and the test piece; the activation produced by fast neutrons could therefore be allowed for, by subtracting the activity produced in the absence of paraffin.