be essentially higher, perhaps of the order of 10×10^6 e.v.

Similar results have been obtained in the case of mercury irradiated by slow neutrons.

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[1] *Z. Phys.*, **97**, 242 (1935) and **47**, 265 (1935).
[2] *Z. Phys.*, **97**, 64 (1935).
[3] cf. Hulme, *Proc. Roy. Soc.*, A, **138**, 643 (1932) and Taylor and Mott, *Proc. Roy. Soc.*, A, **138**, 665 (1932).
[4] Jaeger and Hulme, *Proc. Roy. Soc.*, A, **148**, 708 (1935).

Selective Scattering of Slow Neutrons

SEVERAL investigators have made measurements on the scattering of slow neutrons by paraffin wax, in general, however, confining themselves to one particular method of detection of the slow neutrons, namely, the β-ray activity induced in a rhodium detector[1]. Further knowledge can be gained by the use of detectors of different elements.

A radon-beryllium source of fast neutrons was placed inside, and 8 cm. below the top surface of, a large block of paraffin wax. Thin specimens of copper (0·3 gm./cm.²), silver (0·08 gm./cm.²) and iodine (0·15 gm./cm.²) were placed in turn on this top surface and could be backed with a further thin layer of wax. The arrangement resembles one already used in the experiments of Amaldi and others[1]. The β-ray activity induced in any specimen was compared for various thicknesses of the backing layer. To ensure that the measurements dealt only with those neutrons which had suffered one or more collisions in the large block, a small correction was applied in respect of the activity induced in the absence of the block of wax, the source, specimen and backing layer remaining fixed. Fig. 1 shows the results obtained.

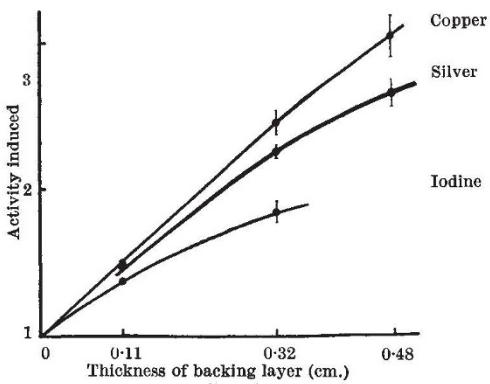

FIG. 1.

The increase in activity is due to the scattering back of slow neutrons from the backing layer and is seen to vary from element to element. Let us consider the two extreme cases, copper and iodine. Two explanations, not mutually exclusive, are possible. The neutrons absorbed by iodine either are not scattered back by the wax in such large numbers as those absorbed by copper, or are scattered back with less favourable velocities. The second explanation can apply only if the neutrons in question have velocities greater than those of thermal agitation, for no change in the velocity distribution can occur when thermal neutrons are scattered by matter at the same temperature. The first explanation, which I think the more important, implies a difference between the mean free paths in wax of the two sets of neutrons and hence a corresponding difference between their energies. How great this difference must be will depend upon how rapid is the variation of scattering cross-section with velocity. A theory of the interaction of slow neutrons (those with energies of less than 10,000 e.v.) with matter, developed by Amaldi and others[1] and by Bethe[2], has shown that whereas the cross-section of any nucleus for absorption is a function both of the nucleus and of the velocity of the neutron, the cross-section for scattering is independent of the velocity, being a function of the nucleus only. Were we to assume the correctness both of this interpretation of the present results and of the theory of scattering, we could say that a fair proportion of the neutrons absorbed by iodine in this experiment must have energies greater than 10,000 e.v.

Whether this theory be correct or not (and there are grave reasons to doubt its validity with respect to absorption[3]), either explanation of the present experiment shows that many of the neutrons absorbed by iodine have velocities different from those effective for copper. Since these latter are known to be very largely of thermal velocities, it seems that the neutrons absorbed by iodine and responsible for its strong selective absorption[4] are of velocities greater than thermal. This fits in well with the relatively small effect of the temperature of the neutrons upon their absorption into the iodine nucleus.

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Dec. 20.

[1] Amaldi and others, *Proc. Roy. Soc.*, A, **149**, 531 (1935).
[2] Bethe, *Phys. Rev.*, **47**, 747 (1935).
[3] Dunning and others, *Phys. Rev.*, **48**, 275 (1935). Szilard, NATURE, **136**, 950 (1935). Moon and Tillman, *Proc. Roy. Soc.*, A, **153**, 476 (1936).
[4] Tillman and Moon, NATURE, **136**, 66 (1935).

Yellow Rock Salt from Hall in Tirol

SINCE the fundamental researches of H. Siedentopf on the constitution of blue rock salt, the work done in this Institute and in the laboratories in Göttingen (R. W. Pohl), Halle (A. Smekal) and Berlin (O. Hahn) has gone far to prove that the natural blue rock salt owes its colour to some radiation, most likely of radioactive origin. An argument sometimes brought forward against this view was based on the fact that the primary colouring of rock salt by radiation is yellow, a colour not found in natural rock salt, such yellow salt as exists being coloured not by radiation, but by the presence of iron or hydrocarbons

The purpose of this note is to direct attention to a discovery by O. Schauberger[1], an engineer of the Austrian Salt Mines, who has found a natural yellow rock salt in Hall in Tirol, with all the characteristics of the primary radiation colouring. Through the courtesy of the authorities in charge of the Austrian Salt Mines, we have been able to investigate