the target of its own radiation. This showed itself, for example, in the first order by the fact that the base-line due to general radiation was always much lower on the short wave-length side of the γ line than on its long wave-length side.

This absorption by the target of the radiation which leaves it has been mentioned by other authors, including Walter (*Zs. f. Physik*, 20, p. 268 (1923)). This effect of the K critical absorption in the target substance would produce, in spectra of high resolution, a narrow shelf of constant intensity on the short wave-length side of the γ line, followed by a large decrease in intensity on the short wave-length side of the critical absorption wave-length, which is very close to the γ line. It seems possible that such an effect might be mistaken for a faint line on the short wave-length side of γ, lying between γ and the critical absorption wave-length. The lines reported by Leide were very faint and the wave-lengths given lie within 0·06 per cent. (about 12 seconds of arc) of the accepted values for the K critical absorption limits. The K critical absorption wave-length lies about 45 seconds of arc from the γ line in the first order. Due to the importance which may be attached to the presence of this line in molybdenum and palladium, it is to be hoped that the possibility of confusion on the photographic plate with the absorption limit itself may be removed.

SAMUEL K. ALLISON.

Jefferson Physical Laboratory,
Harvard University,
Cambridge Mass., U.S.A.

A Substitute for a Liquid Air Trap for Mercury Vapour in Vacuum Systems.

As is well known, the speed and simplicity of the mercury vapour condensation pump has led to its almost universal adoption in the production of extremely high vacua. It suffers from the disadvantage that, while it rapidly removes gases and vapours from the vessel to be exhausted, it does not remove mercury vapour. Consequently, it is necessary to freeze the mercury vapour in a trap between the pump and vessel to be exhausted, by immersing the trap in liquid air. The cost of making liquid air, the difficulty of getting it in certain laboratories, and, in some researches, the need for keeping the mercury trap in action for several weeks without a break, suggested the desirability of looking for some alternative method.

In our search for an alternative method, we have found that the alkali metals have an extraordinary power for absorbing mercury vapour, and may therefore be used as a mercury trap in place of liquid air. Our practice is to put a small piece of sodium or potassium (a gram is ample) into a trap between the diffusion pump and the apparatus to be exhausted, and to distil it, after the vacuum has been obtained, on to the sides of the trap, thus lining it with the metal for a few centimetres. The trap may be of the usual liquid air type, or it may be merely a bent tube with the metallic lining of distilled metal distributed over the inside surface at and near the bend.

Using an ionisation gauge for the vessel to be exhausted, we have found that the pressure of mercury vapour in it with a potassium-lined trap between it and the pump is certainly less than 5×10^{-9} mm. We have made direct comparisons between the trapping power of a potassium-lined tube and that of the usual liquid air trap, the same ionisation gauge measuring the pressure reduction. We have found that the potassium-lined trap is quite as satisfactory as liquid air. The residual pressures obtained in various tests seem to depend entirely upon the vigour with which the ionisation gauge and connecting tubes were outgassed by heat treatment before the measurements were made, and not at all upon whether liquid air or metallic potassium is used to trap the mercury. We are convinced that the lowest pressure obtained, namely, 5×10^{-9} mm., is partly, and possibly nearly all, due to residual gases owing to insufficient heat treatment, and that this figure is merely an upper limit to the vapour pressure of mercury in a vacuum system beyond a potassium-lined trap.

The passage of several litres of moderately dry air at atmospheric pressure over the potassium has no serious effect on its power to trap mercury vapour, although one might well have feared such would be the case from the discoloration of the surface produced by the air.

From a practical point of view, it is of importance to know how long the alkali metals retain their power to act as a mercury vapour barrier. In one test, in which sodium was the active metal, the pressure in the ionisation gauge beyond the trap after twenty-five days was within 50 per cent. of its initial value (2×10^{-7} mm.). We do not know whether to attribute this slight pressure increase to loss of absorbing power by the metal, or to gradual evolution of gas.

In a second test, we used the first appearance of mercury lines in the spectrum of helium, at less than 0·01 mm. pressure, as a criterion of the diminution of the trapping power of a potassium-lined trap for mercury vapour. The mercury lines did not appear until the eleventh week, in which time the potassium had absorbed a little more than 150 per cent. of its own weight of mercury.

A full account of this work will be published in the *Philosophical Magazine*.

A. LL. HUGHES.
F. E. POINDEXTER.

Washington University,
Saint Louis, U.S.A.,
May 18.

The Oogenesis of Lumbricus.

IN a recently published number of the *Quarterly Journal of Microscopical Science*, Mr. Leslie Harvey, of the department of zoology of the Imperial College of Science, London, has given an account of the cytoplasmic inclusions of the egg of Lumbricus. Mr. Harvey describes yolk formation in this animal, and, on the basis of his work on this one form, criticises my previous investigations on Limnæa, and, by inference, that of my pupils on certain other forms. He merely quotes an old paper of mine, remarking a little discourteously that "a glance at this paper will show that really very little is known about the formation of yolk." He has not mentioned my recent work on Saccocirrus, the only other annelid studied by modern methods, nor has he read Dr. Rogers Brambell's more recent paper on "Yolk" in the *British Journal of Experimental Biology*, where the collected observations of several of my associates are discussed ably, the molluscan oogenesis re-investigated, and the general views on yolk-formation held in this laboratory stated.

Mr. Harvey's main criticism is that he cannot find any metamorphosis of Golgi bodies into yolk in Lumbricus, and that therefore my work on Limnæa and that of my pupils on Patella is under suspicion. Mr. Harvey puts himself in the position of a man who, on the strength of a study of the anatomy of Lumbricus, denies the results of another man who has found a radula and a shell in Patella. Before entering into a criticism of my work on Patella, which has been confirmed and extended by Dr. Ludford and Dr.