Letters to the Editor.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

The Apparatus of Dr. Russ.

I HOPE Dr. Hartridge will pardon my suggestion that he is dismissing the possible effects of temperature too lightly.

In the Phil. Trans. Roy. Soc. of 1792, p. 86, Mr. Bennett described apparatus of great sensibility, in which a piece of dragon-fly wing or thistledown carried on a light arm suspended by a spider line in a closed case responded with amazing sensibility to the heat from a person at a distance in virtue of convection currents set up by the warmer side of the case. It is not surprising that suggestions of animal magnetism should have been made, *e.g.* that the right hand should act oppositely to the left, but the author of the paper ignored these, and was content with explanations based upon known laws of physics.

A little later (1798) Cavendish in his famous paper on the mean density of the earth showed how potent minute differences of temperature were to disturb even the 2-in. balls of lead that he suspended from the ends of his lever.

In 1862 Joule described in the Proc. Lit. and Phil. Soc. Manchester, p. 73, a convection thermometer in which a glass tube 2 ft. long and 4 in. in diameter was divided longitudinally into two portions by a diametrical partition extending to within about 1 in. of the top and bottom. "In the top space a bit of magnetised sewing-needle, furnished with a glass index, is suspended by a single filament of silk." The draught up on the warmer side and down on the cooler side caused the needle to be deflected, acting on the glass index as a wind-vane. This was found to be a superlatively delicate radiation thermometer.

In 1890, in conjunction with the late Dr. Watson and Mr. Briscoe, I showed to the Physical Society (*Phil. Mag.*, 1891, p. 59) an experiment which increased the delicacy of the Joule thermometer very greatly by replacing the straw and silk by a mirror and counterweight hung by a quartz fibre, but we found that by no system of screening, even in a cellar, could we maintain such quiet in the air as to allow the mirror to remain anywhere near the neutral position or to remain at rest. One side or the other was the hotter, and this was always changing. If we had never succeeded in obtaining a real state of rest the delicacy would have been useless. We, however, hit upon a plan which did keep the two sides strictly alike in temperature. We surrounded the tube by an exterior glass tube kept turning on its axis rapidly by clockwork all day. As the exterior glass was opaque to "dark heat" and no light was allowed to fall on the tube, the inner tube could not have one side hotter than the other, and then the mirror came to its neutral position and was very fairly steady there, so that heat developed electrically on one side of the partition in warming the air gave rise to deflections which could be measured with some certainty.

In all the delicate work that I have done with quartz-fibre suspensions the strictest attention to freedom from disturbance by air movement was essential to success. Only by such special care can air movements of so small an amount as 1 in. in a fortnight or so be avoided, and if not avoided a stable zero on which everything must depend is impossible.

In no ordinary large apparatus of the physical laboratory is the air ever quiet, and in the closed box of Dr. Russ is it safe to suppose that there are not convection currents abundantly able to cause deflection of anything suspended by a single silk fibre?

C. V. BOYS.

The Designation of the Radium Equivalent.

IN all problems that are primarily concerned with strictly radio-active phenomena the quantity λN, denoting the number of atoms transformed in a unit of time, plays a very important part. In such problems comparable amounts of different radio-elements are such as correspond to the same value of λN. There is need for a name to denote the amount of any radio-element, irrespective of family, that is thus comparable to one gram of radium. If, tentatively, we use the letter r to denote this desired name, then an r of any material may be defined as that amount of the material that will produce transformed atoms at the same rate as transformed atoms are produced by one gram of radium. The quantity r plays in radio-activity a part that is analogous to that played by the gram-molecule in physical chemistry, and the advantages to be secured by naming it are quite similar to those that were secured by the introduction of the term "gram-molecule."

As the curie is an r of radium emanation, the adoption of a new name to denote the quantity r will give two names for the same quantity of radium emanation. The majority of those with whom the subject has been discussed regarded this as undesirable. They consider it better to redefine the curie so as to cover the entire field.

I shall be glad if you will publish this letter so that a further expression of opinion may be obtained. A more detailed presentation of the subject will shortly appear in the Journal of the Washington Academy of Sciences.

N. ERNEST DORSEY.

Bureau of Standards, July 30.

Pisidium clessini in British Lochs.

DR. ANNANDALE (NATURE, August 18, p. 778) assumes from Mr. B. B. Woodward's letter that this species is a deep-water form, but this is not so. *P. clessini* is abundant in some of the Welsh and Kerry tarns, where Mr. Charles Oldham and I have collected it in from 1 to 4 ft. of water. It is a form which I have had under observation for some years past—indeed, since I first collected it on Brandon Mountain in Co. Kerry in 1910.

Not being able to identify it with any described species of Pisidium, I have several times been on the point of figuring it as new. At the last moment, however, I have always been checked by the fact that I was not satisfied that it was a good species. This view, I may say, is shared by my colleagues, Mr. Charles Oldham and Mr. R. A. Phillips. We are not satisfied that *P. clessini* is anything but a cold-water (depauperate) form of the widespread *P. casertanum*. This latter occurs abundantly also in many mountain tarns, but is always—in our experience—conspicuous by its absence in those in which *P. clessini* occurs.

Superficially, *P. clessini* is very distinct, and Dr. Odhner is satisfied that its anatomical characters render it necessary that we should regard it as a species; yet he has not been able to assure me that these characters are not the result of starvation acting over a prolonged period on a number of generations. For my own part I shall not be satisfied in its standing as a species until I can find it living in association