

## LETTERS TO THE EDITOR.

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The Blondlot *n*-Rays.

SINCE the date of my last letter on this subject, published in your columns on January 21, I have made further numerous endeavours to confirm M. Blondlot's experiments.

It is by no means difficult to obtain some of the effects that M. Blondlot describes, but, so far as my observations go, these effects, when obtained, are in every case due simply to heat.

As mentioned by a previous correspondent, the luminosity of calcium sulphide is considerably affected by minute differences in temperature. For instance, a coin taken from one's pocket and held at the back of a calcium sulphide screen will, in a few seconds, show through the screen as a disc of increased luminosity, the effect being due to the warmth of the coin; or again, when two small calcium sulphide screens are placed upon two pieces of similar metal differing in temperature by only about 2° F., it is easy to discover which of the two pieces of metal is the warmer by the superior luminosity of the screen placed upon it.

This, I think, is the explanation of the experiment described in the advertisement columns of your issue of February 18, where it is stated that "if one of these screens be laid on the floor when it is very feebly fluorescing it will be invisible, but its light will increase when it is placed on the top of the foot and the muscles put into action."

I have repeated this experiment with home-made screens with entire success, my method being to use two screens each about 16 mm. by 2 mm. in size, of normally equal luminosity. When one is placed on the foot it brightens up considerably as compared with the other. This experiment is at first sight most convincing, but unfortunately for the *n*-ray theory I find no necessity for the presence of the foot at all. A boot newly taken off and still retaining some warmth, or any other warm object, acts equally well, while if one screen be placed on the foot and the other upon a can of water heated to the same temperature as the foot, no difference between the luminosity of the two screens can be detected. Again, the foot experiment does not succeed if a good thickness of paper or cardboard is placed between the foot and the screen so as to prevent the transference of warmth to the latter.

Prior to the date of my last letter, I had tried a similar experiment to that described by Mr. J. B. Burke in your issue of February 18. In my case a large calcium sulphide screen was exposed to a high power Nernst lamp, one half being shaded with lead and the other with several thicknesses of black paper, so that only half was exposed to the *n*-rays. Visually no difference could be detected in the brightness of the two halves of the screen, but on exposing a gelatino bromide photographic film in contact with the screen for some three minutes it was found on development that the portion of the photographic film that was in contact with the half of the screen that was shaded by the paper only was considerably more fogged than the other half. Here again, however, the result was clearly due to heat, the black paper being perceptibly warm to the touch, as when, in place of paper, a thin aluminium sheet was employed and the experiment repeated, no difference at all could be noted between the two halves of the developed photographic film.

Since making this experiment I have, when using two very small separate screens, one shaded only by very thin aluminium and the other by thick lead, succeeded in observing some slight excess in brightness in the former over the latter, but this has been discernible only when the aluminium had become appreciably warmed by the heat radiated from the lamp, so that the difference in temperature would, in the light of my other experiments, entirely account for the effect.

It is, indeed, very difficult altogether to eliminate the heat coming either from a Nernst lamp or an Auer burner except by using materials such as, for instance, water,

which, according to M. Blondlot, is opaque to the *n*-rays. This in itself is instructive, as is also the point noted by M. Blondlot that the brightening of the screen under the influence of the *n*-rays is not instantaneous but is gradual, as also are most thermic effects.

During the past fortnight there have been published details of some new investigations made by M. Gutton and communicated by Prof. Poincaré to the French Academy of Sciences, according to which the luminosity of calcium sulphide screens is increased by their being placed in a non-uniform magnetic field. It is stated by M. Gutton that only a weak field is necessary, and that the effect is very sensitive.

Having spent considerable time in endeavouring to confirm this observation without the slightest success, it would interest me to know whether anyone else has tried it and with what result.

As everyone who has experimented on similar lines is aware, investigations of these descriptions are full of pitfalls, and it is very easy to see what one expects. For instance, if two or more faintly but equally luminous calcium sulphide screens of small dimensions, placed two or three inches apart, are observed, one will occasionally appear to become dim, and it is quite easy with a little practice, while looking directly at the screens, to make any one of them actually disappear at will, this being due to certain portions of the retina being much less sensitive to these weak radiations than other portions. However, one can scarcely suppose that a man of science of M. Blondlot's antecedents and experiences can have deceived himself or have been deceived by others in regard to the numerous positive results that he has obtained, and those who have unsuccessfully tried the experiments can only imagine that, assuming that the phenomena observed are really objective, they are only visible to certain individuals. Whether the persons who can or those who cannot see these effects have abnormal sight further investigations alone can show.

66 Victoria Street, London, S.W., February 23.

A. A. CAMPBELL SWINTON.

## Chalk-stuff Gas.

IN his notice of my "Papers on Education," in taking exception to my nomenclature, Prof. Smithells has touched on a question of much importance to teachers. "Chalk gas seems unnecessary," he says, "even as a temporary name for carbon dioxide. Why not 'Fixed air,' which is both descriptive and historical?" A young student (about eighteen years old) who went through my course two or three years ago, who has read the article, writes to me unsolicited a letter on the subject, from which I may be allowed to quote the following passage:—"One remark struck me. The reviewer wants to know the advantage of calling CO<sub>2</sub> chalk-stuff-gas and suggests that the classic old 'Fixed air' would be better. He does not seem to appreciate that by calling the gas 'Fixed air' you must presuppose that it is fixed and hence all that the word 'Fixed' entails of a knowledge of the gas; whereas, your name is eminently descriptive and entails no knowledge of the gas at all but simply describes the source from which it was first obtained."

I could not state my case more happily. I regard the use of names which are obviously appropriate at the time when the work is done, which do not involve giving the case away, as of extreme importance. In these days we are somewhat spoilt by the use of names which are significant of composition if not of structure; we are too prone to introduce them without consideration when teaching beginners; it is often desirable to give names temporarily. It must not be forgotten that the Germans, even at the present day, openly speak of acid-stuff and water-stuff; we do likewise in using the names oxygen and hydrogen, although our devotion to classics leads us perhaps to disguise the fact. In teaching beginners I advisedly speak of the gas from chalk (or limestone) *stuff*, because chalk has a definite geological connotation; we deal only with the substance of which it chiefly consists.

HENRY E. ARMSTRONG.

IN alluding to the subject of names in the notice of Prof. Armstrong's book, my chief object was to deprecate the excessive violence of the objections which I have so often