LETTERS TO THE EDITOR.

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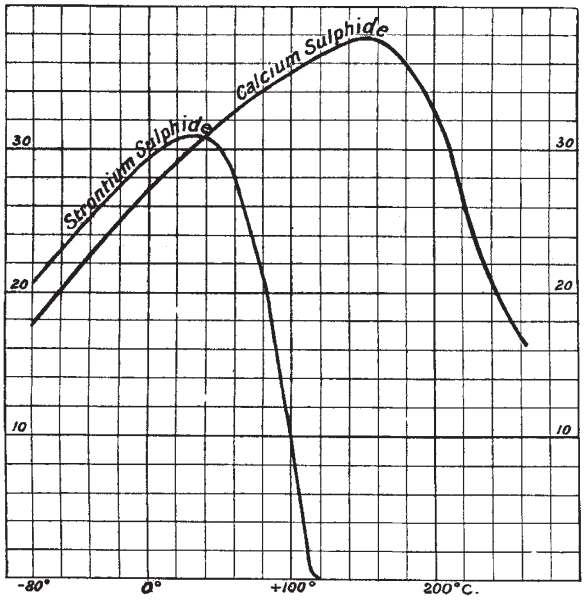
Effect of Change in Temperature on Phosphorescent Substances.

WHEN a substance that possesses phosphorescent properties is exposed to suitable light vibrations, it is found to glow with a certain brightness when the light is shut off.

When such substances are exposed under *similar conditions* for a sufficient length of time the intensity of the phosphorescent light emitted reaches a maximum, which maximum is constant for each substance.

If now the temperature of the substance under observation be altered, the other conditions remaining the same, it is found that the maximum intensity of the light emitted varies with the temperature, and that the maximum for any temperature is constant for that temperature.

The light to which the substances under observation were exposed was that from a spark discharge of a Leyden jar coupled up with the terminals of an induction coil. The instant the spark is stopped, the intensity of the light emitted by the substance is estimated by a photometer devised for the purpose. The principle of the photometer consists in diminishing light



that shines through an aperture of given area, by interposing thin sheets of oil paper. A slip of glass is also interposed, of the same colour as the light emitted by the phosphorescent substance. As yet this photometer has only been used to compare the maximum intensity of the light emitted from the same substance at different temperatures. Now let us suppose, for example, that with a specimen of calcium sulphide at -40° C. ten papers had to be interposed before the light emitted from the sulphide and that from the photometer were of equal intensity; while at 96° C. only seven papers had to be interposed. By taking the reciprocal of the antilog of 10 and the reciprocal of the antilog of 7, we have a rough measure of the relative intensity of the light emitted at -40° and $+96^{\circ}$ respectively. The antilogs were plotted to scale, and from the curves thus obtained, the accompanying reciprocal curves, showing how the light emitted varies with the temperature, were plotted.

RALPH CUSACK.

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Sinistral Screws.

IF mechanical screws "bear" upon natural spirals, as of the *Gasteropoda* (NATURE, May 27, p. 79), it may be worth while to observe that sinistral forms survive in art, as in nature.

The silversmiths of Western India still commonly use a sinistral screw of very primitive form, a pin with a wire twisted round it, especially in the buckles of silver belts; things of very common wear. Europeans, coming into possession of such jewellery, are often sorely puzzled how to open and shut it. Yet these people are as right-handed as we; and write, as we do, "*with* the sun."

W. F. SINCLAIR.

102 Cheyne Walk, Chelsea, S.W., May 28.

Luminous Phenomena observed on Mountains.

THE following account of an occurrence somewhat similar to those recently recorded in NATURE may be of interest. I will give it in the observer's (Rev. W. E. Postlethwaite) own words.

"On March 5, at 9 p.m., I was crossing the Towans, wind north-west; a slight shower came on, which lasted about ten minutes. During that time my hat-brim, ferrule of walking-stick, finger-tips, and the edges of a book I was carrying were phosphorescent, the same colour, and in some places as bright, as the light emitted by a glow-worm. The light was the brightest on the windward side."

The "Towans" referred to in the foregoing account are near Helston, Cornwall, on the sea coast, with an altitude ranging from sea-level to 174 feet above, and with a general downward inclination towards the north-west.

Trewirgie, Redruth, May 29. ARTHUR P. JENKIN.

The Designation of Wave-Clouds.

IN a general article on the "Photographic Observation of Clouds," published in NATURE of February 4 (vol. lv. p. 332), you call attention to the wave-clouds, the origin of which was first explained by Helmholtz, and remark that the name of "Wogen wolken" has been suggested as their designation. May I call your attention to a paper I read before the Linnean Society of New South Wales on August 29, 1894, in which the name *undulus* is suggested for the ripple- or wave-clouds. The name has the advantage of falling easily into line with Howard's nomenclature. And some name is necessary, for out of combinations of the elementary forms *stratus*, *cumulus*, *cirrus*, and *undulus* can be derived most of the diversified and ever-changing cloud-groups, which never cease to delight and astonish the eye and mind of man.

A. H. S. LUCAS.

Newington College, Sydney, April 16.

THE BAKERIAN LECTURE.—ON THE MECHANICAL EQUIVALENT OF HEAT.[1]

THE purpose of this research differs essentially from that of any previous research on the mechanical equivalent of heat. In order to diminish the loss of heat by radiation, as well as to obtain the equivalent for water in the neighbourhood of ordinary temperatures, the ranges of temperature over which the previous dynamical measurements have been made are greatly less than the standard interval between the physically fixed points of temperature to which all thermal measures are referred, and so have of necessity involved the use of scales, the intervals of which depend on the constancy of the relative expansions of such substances as glass, mercury, and air. On the other hand, in this research the object has been to determine the mechanical equivalent of the total heat necessary to raise the temperature of water over the standard interval of temperature, and thus to obtain directly the equivalent of the mean specific heat between the freezing and boiling points.

This undertaking is the result of the occurrence of circumstances which afforded an opportunity such as might not again occur. This consisted in the facilities offered by the appliances which formed the original equipment of the Whitworth Engineering Laboratory, in 1888, the more essential of these being an engine of 100 H.P., working one of Prof. Reynolds' hydraulic brakes. This brake maintains any constant moment of

1 By Prof. Osborne Reynolds, F.R.S., and W. H. Moorby. Read before the Royal Society, May 20. [Abstract.]