

The plates illustrate most fully the points made out, in many cases a longitudinal section of the skull of the animal at birth being printed in red over a drawing of one of adult age, both drawings having been reduced to scales which render comparisons of form possible.

LETTERS TO THE EDITOR.

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Suggested Nomenclature of Radiant Energy.

HAVING recently had occasion to develop the first principles of the theory of inter-stellar radiation, I soon felt the want of some short and convenient word to express that form of ethereal wave-effect known as "radiant energy," "radiant heat," "light," "rays of the spectrum," &c. Radiant energy is doubtless the most accurate of these expressions, but it is subject to the objection of being a description rather than a name. The nomenclature of the subject has come down from a time when it was supposed that there were three distinct kinds of rays in the spectrum, severally known as light, heat, and actinic rays. It is, I believe, not much more than half a century since several eminent physicists and teachers supposed that the heat rays of the spectrum could be separated from the light rays having equal refrangibility by the absorption of a transparent medium; and that even the light rays of different colours might be separated in the same way. I cannot but think that the general understanding and application of the now received theory of the subject, which recognises in this form of energy no differences of kind except wave-length, has been materially retarded by the want of a corresponding nomenclature.

The use of the word "light" for ethereal waves having a length between certain definite limits, while there is no corresponding word for other waves, is evidently unscientific. Notwithstanding the great practical usefulness of light, its distinctive property of affecting the optic nerve in a certain way can claim only a secondary place in physics. Indeed, it has long seemed to me that the banishment of the word "light" from physics was a desideratum.

After various attempts I hit upon the very simple term *radiance*, as one which seemed well-fitted to supply the want in question. The vague and poetic idea hitherto associated with it is an advantage, because it enables us to adapt it to the case in hand with greater readiness than we could adapt a word which already had some well-defined meaning. Shakespeare speaks of the "sacred radiance of the sun"; while Milton describes the Deity as "Girt with omnipotence, with radiance crowned." We can thus adopt the word to express scientifically what we now consider to be electro-magnetic waves, or ethereal waves, without that clashing of ideas which might arise from making a new application of an old word, and without the awkwardness of coining a new one.

The necessary derivatives and compounds of the word can be formed with as much ease as we should expect in the case. The verb "radiate" will mean to emit radiance. I do not think any confusion will arise if we use the word "illuminate" to signify the throwing of radiance upon a material body, although in ordinary language it implies light. Possibly the extent to which it is used in a tropical sense may facilitate the widening of its literal meaning. *Radiometry* would mean the measure of radiance, and an instrument for effecting such a measure would naturally be called a radiometer. It is perhaps unfortunate that the instrument in question should then assume the name of Crookes' beautiful little instrument, but an apology may be found in the fact that the latter has not been used for the purpose of exact measurement. The use of the word "radiometry" offers no such difficulty.

I am still a little perplexed for a word which shall express the quality hitherto called transparency, diathermancy, &c. Apparently we have no alternative but to continue the use of one of these objectionable words, or invent some such new word as transradiant, or transradious.

The proper measure of radiance, and the only measure which can be regarded as of real importance in physics, should be the amount of energy radiated in unit time. This measure is equivalent to

that of heat generated in unit time in the absorption of radiance by a perfectly black body. If we reflect that this, and this alone, measures the actual loss of internal energy by a radiating body of any kind, whether ball of iron in a laboratory, planet, star, or nebula, the importance of some simple nomenclature of measurement will be evident. I should be much pleased if physicists would find by actual trial whether the use of the proposed words comes as natural to them as it has to me.

SIMON NEWCOMB.

The Postal Transmission of Natural History Specimens.

It has always been recognised that scientific research is greatly furthered by the exchange of the various objects with which that research is concerned. For the transmission of objects of Natural History from one country to another, the mails have offered a cheap, speedy, and trustworthy means. Heretofore, through the laxity with which the regulations on the subject have been enforced, it has been possible to enter such objects in the mails of the Universal Postal Union as samples of merchandise and under the rates of postage therefor. From official information lately received from the Post Office Department of the United States it appears that such a rating is entirely unauthorised by existing provisions, and that objects of Natural History may be mailed to countries of the Union only, at the rates required for letters. The United States Post Office Department also stated that it had recently submitted a proposition to the countries composing the Postal Union to modify the regulations so that such specimens might be received into the mails at the same rates as samples of merchandise, but that a sufficient number of those countries had voted against the proposition to defeat it.

This Academy has therefore resolved to address the various scientific bodies, with which it is in communication, in those countries whose Governments have voted against the proposition, and to request those scientific bodies to memorialise their respective Governments in favour of the same.

The Governments of Austria, Bolivia, British India, Canada, Germany, Great Britain, Guatemala, Hungary, Japan, Norway, Portugal, Russia, Spain, Sweden, Tunis, Uruguay, and Venezuela having voted in the negative, this Academy respectfully requests the favourable consideration of this question by scientific societies, and begs that they take such steps as they deem advisable to inform the Postal authorities of their respective Governments of the manifest advantages to scientific research which would result from the adoption of the proposed modification, and to request those authorities to take such steps as may result in the adoption of the same.

The letter rate for postage (Universal Postal Union) is ten times that required for samples of merchandise; such a rate for specimens of Natural History is virtually prohibitive.

This Academy would respectfully urge upon scientific societies prompt action in this matter, if it meets with that approval which we so strongly desire.

ISAAC J. WISTAR, *President*.

EDW. J. NOLAN, *Recording Secretary*.

Philadelphia, November 14.

Flame.

HOWEVER thoroughly a B.A. audience may have allowed Prof. Smithells, by means of his beautiful experimental demonstrations, to hypnotise them into unquestioning belief in his conclusions, those who read the account of his lecture in the pages of NATURE will not all be equally disinclined to question the validity of some of his arguments.

To tell us that Dalton, as a matter of fact, long ago settled the question as to which has the preference—the carbon or the hydrogen—when a hydrocarbon is burnt with insufficient oxygen, is, after all, but to appeal to the gallery; and this and other conclusions arrived at by Prof. Smithells appear to me to involve the use of that process of circular reasoning which consists in taking for granted that which is to be proved—a method which at the present day finds such favour in certain quarters.

As I discussed this matter somewhat in detail in a correspondence with Sir G. G. Stokes last year (*Chem. Soc. Proceedings*, 1892, No. 106, p. 22), it is unnecessary to go fully into it now. Any number of analyses showing the presence of hydrogen in the products of combustion may be quoted without materially ad-