gamic, that these subjects can no longer be treated of *pari passu* with the structural, if this latter is to be brought up to the present state of knowledge in a work of the scope and design of the author's "Text-Book." This has determined Dr. Gray to enlarge the scope of his work, to retain the authorship of one volume, which is devoted to Morphology, Taxonomy, and Phytography, re-writing these throughout, to assign another upon Vegetable Histology and Physiology to his colleague, Prof. Goodall; a third, which will be an Introduction to Cryptogamous Plants, to another colleague, Prof. Farlow; and to complete the series by a fourth, from his own pen, on the Morphology and Classification of Flowering Plants, their Distribution, Products, &c.

Thus, when complete, we shall have from the most eminent botanical professors in the New World as comprehensive an introduction to the study of the Vegetable Kingdom as the nineteenth century is likely to produce.

OUR BOOK SHELF

Light and Heat; the Manifestations to our Senses of the Two Opposite Forces of Attraction and Repulsion in Nature. By Capt. W. Sedgwick, R.E. (London: Hodgson and Son, 1880.)

THE reviewer who says what he thinks is sometimes thought unkind. The author's paradoxes require no commentary but themselves to be duly appraised by scientific readers.

"The explanation of the fact that a spot of light is seen alike when pressure is applied to the outside of the eye, and when a single ray of light passes into the eye, is that the ray of light really makes itself manifest to our sense of vision by exerting a pull upon the retina of the eye . . . it follows, of course, that light is a pulling or an attractive force, and is therefore opposed to heat, which, as is well known, is a pushing or repulsive force." (Pp. 14 and 15.)

"Light consists of a large amount of the attractive force, mixed with a small amount of the repulsive force. Heat, on the other hand, consists of a large amount of the repulsive, with a small amount of the attractive force." (P. 28.)

"We have in the growth of plants and trees a beautiful exemplification of the action of heat and light as expansive and attractive forces. The young shoots are extended by the expansive power of heat, and then the attractive power of light comes into play" . . . (P. 38.)

"It may be objected that gravity cannot be the same force as light, because, if it were, it would be greater by day than by night." (P. 42.)

"There is ample evidence all about us to testify to the fact that light is an attractive force. Indeed *we ourselves bear witness to the fact by our fondness for fireworks and illuminations*" . . . (P. 38.)

"Light being the manifestation, in the free state, to our senses of the attractive or cohesive force . . . the fact that the production of light is made the first act in the creation of the world, in the account given us in the Book of Genesis, becomes intelligible." (P. 42.)

"I ask for no other favour, and for no mercy." (P. 3.)

We believe we have sufficiently complied with the gallant captain's request. S. P. T.

The Land and Freshwater Shells of the British Isles. By Richard Rimmer, F.L.S. (London: David Bogue, 1880.)

THIS unpretending and well-written volume is dedicated to the artisans, with many of whom, especially in the North of England, the subject is very popular. The dedication is qualified, viz.: "To those of my countrymen among the working classes who wisely employ their leisure hours in the pursuit of useful and elevating knowledge, with the hope that others among their ranks may be induced to forsake the paths of profitless and degrading dissipation." William Edward, the Banff shoemaker, is (thanks to Mr. Smiles) a celebrated example of the more intelligent workman; and we know of others who, however, "carent vate sacro." The book is very readable; it gives an excellent account of the habits of our land and freshwater mollusks, as well as of their various habitats, and it is not burdened with any synonymy or useless aliases. It is founded on Dr. Gwyn Jeffreys' "British Conchology." But the present work has a drawback. Eight out of the eleven plates give photographs of the shells, which are produced by the "Albertype" process; and the figures, especially of the smaller species, are so blurred or smudgy as to be almost undistinguishable. Plate X. is very good, representing magnified views of the British species of *Vertigo*. There is a useful glossary.

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. No notice is taken of anonymous communications.*]

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

Novel Celestial Object

THE search for planetary nebulæ, described in NATURE, vol. xxii. p. 327, was continued for several evenings without revealing any new object, although it is estimated that the spectra of about 100,000 stars were examined. On the evening of August 28 an object entered the field which presented a faint continuous spectrum with a bright band near each end. Clouds interfered and barely permitted an identification with Oeltzen 17681, or a position in 1880 of R.A. 18h. 1m. 17s., Dec. – 21° 16′.

This object might be mistaken for a temporary star like that in Corona in 1863, and the bands assumed to correspond to the hydrogen lines C and F. This view is contraverted by the permanency of the object which was observed by Argelander in 1849, and at the Washington Observatory in 1848 and 1849. In all these cases its magnitude was estimated as 8, or very nearly its present brightness. No variation of light was detected between August 28 and September 1. The star Oeltzen 17648 precedes it very nearly a minute, and is only four minutes north, so that their light can be easily compared. As they are nearly equal, a slight change would be quickly recognised.

A further examination of the spectrum showed that the less refrangible band is near D, and the other between F and G. The images of both, but particularly of the second, are much elongated by the prism, showing that they are bands, and not lines. The limits of wave-length of the first band are approximately 5,800 and 5,850; those of the second, 4,670 and 4,730. A band at 5,400 and some other fainter bands were also suspected, but their existence is not certain.

The discovery of this object greatly increases the difficulty of distinguishing between a star and a planetary nebula. If the disk is used as a test, the first object described in the paper referred to above might easily be taken for a star. If we define a nebula by its spectrum of bright lines on a faint continuous spectrum, the object now under consideration becomes a nebula. Whether it is a mass of incandescent gas resembling a nebula in character, but not in constitution, or whether it is a star with a vast atmosphere of incandescent gas of a material not as yet known to us, are questions which cannot yet be decided.

Cambridge, U.S., September 2 EDWARD C. PICKERING

Experiments on the States of Matter

THE exploration of the new region which I have lately opened up has led to so many results with both scientific and technical bearings that I have been unable to leave this city for some time to attend any scientific meetings, and I would beg leave, with your kind permission, to make, through the medium of your valuable columns, a few remarks on some recent scientific work.