

It appears from this, as from a former example, that it is necessary to take the same word in two perfectly different meanings according as it is met with in the first (or ordinary dynamical) part of the book, and in the later (or thermodynamical) part. Such at least is the case with the two specially important terms, *Pressure* and *Efficiency*.

It is perhaps hypercritical to call attention to peculiarities of expression which, however they may puzzle him, can scarcely mislead the student. Else we might ask why (p. 8) a point is "*animated* by any number of velocities," or "*subjected* to any number of simultaneous velocities," or why "*additional velocity*" is said in contrast (p. 12) to be "*received*."

We have marked at least a score of places, in addition to those already noticed, in which the same or similar confusion occurs:—and yet we have *read* in all only about a fourth of the book here and there, having glanced over the rest much more hastily. But it is enough to have said, while illustrating our remarks by simple instances, that this is certainly not a book for beginners, nor for any one whose hold of the exact meaning of scientific terms is precarious:—though it may be consulted without danger (scarcely, we should think, with actual pleasure) by a student who, already soundly educated in the *principles* of Dynamics, desires to get a rapid and condensed *résumé* of their development by mathematical methods.

The principle of dual authorship rarely works well in practice. One of the authors of this book invariably speaks of *Centre of mass* (or of *inertia*) of a body, the other as invariably of *Centre of gravity*. And their responsibility has been so thoroughly divided, that *neither* of these terms is defined, so far as we can find (even with the help of the Index), anywhere in the volume. Again, one of the authors seems to have been always on the look-out to put in a little bit of Kinematics wherever he had a chance. And surely a third must have been at work, whose function was to stick in some sections on the *Rotation of a Rigid Body* (p. 92) between the sections on *Circular Orbits* and those on the *Simple Pendulum*.

The extraordinary *Olla podrida* of Schell is one of the authorities mentioned in the *Preface* as having been largely borrowed from. The book would certainly have been very much better had that work been let alone; though no work more richly deserves to be plundered in its turn than does that of Schell, who simply adopts (and too frequently distorts) whatever pleases him.

#### OUR BOOK SHELF

*Les Organismes problématiques des Anciennes Mers.* By the Marquis de Saporta. (Paris: Masson, 1884.)

THE views expressed in Saporta and Marion's "*Evolution des Cryptogames*" (reviewed at length in *NATURE*, vol. xxiv. pp. 73, 558) as to the origin of certain markings commonly met with in palæozoic rocks, has led to a long discussion in which many have taken part, the chief champions on either side being Dr. Nathorst, the distinguished Swedish botanist, and the Marquis de Saporta. Dr. Nathorst maintains that they are tracks left by moving or burrowing animals or other inorganic markings, whilst Saporta holds to his original opinion that very many of them are casts of primæval *algæ*, of kinds now extinct. Nearly all of these markings are in bas-relief on the under surfaces of slabs as if they were moulds of prints or im-

pressions traced in the ancient muds, thus at first sight greatly favouring Nathorst's view of their origin. Saporta demonstrates on the other hand that this is a by no means uncommon mode of fossilisation among undoubted plants, and when we reflect on the composition of *algæ*, we shall see that scarcely any other mode of fossilisation among them is possible. A leathery olive green sea-weed lying on an oozy mud would cause an indentation, and if subsequently covered up, would keep the old surface from contact with the fresh mud, until it might, under favourable conditions, have become sufficiently hardened to retain the impression. The sea-weed, as most olive weeds do now, if left in water or fresh mud, would eventually completely dissolve away, leaving no perceptible organic trace of its presence. The cavity thus left would be filled in at last by the overlying mud, and only a cleavage plane would remain, following the contour of the under side of the weed, and marking its former presence. Sometimes, though rarely, the sea-weed might not decay until a cleavage plane had been established around its entire circumference, without leaving the smallest trace of its internal structure, as we often find is the case with far more resisting cryptogamic stems in the older rocks. This Saporta finds is the case with the *Bilobites*, one of the most vexed of all the "*Organismes problématiques*," and he relies with good reason upon their occasional occurrence in this condition and on their reticulated structure to support his contention that they cannot be mere worm tracks or burrows, and that in point of fact they can be naught but the impressions of primordial *algæ*.

J. S. G.

#### 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 insure the appearance even of communications containing interesting and novel facts.]

#### Civilisation and Eyesight

MY attention has only recently been called to a communication from Lord Rayleigh, which appears in *NATURE* for the 12th inst. (p. 340), and on which I crave permission to make a few observations. Lord Rayleigh questions whether the eyes of savages, "*merely as optical instruments*," are greatly superior to our own; and suggests that any superiority which savages possess may depend upon "*attention and practice in the interpretation of minute indications*." He explains that "*the resolving power of an optical instrument is limited by its aperture*," and then proceeds as follows:—

"With a given aperture no perfection of execution will carry the power to resolve double stars, or stripes alternately dark and bright, beyond a certain point, calculable by the laws of optics from the wave-length of light. With sufficient approximation we may say that a double star cannot be fairly resolved unless its components subtend an angle exceeding that subtended by the wave-length of light at a distance equal to the aperture. If we take the aperture of the eye as one-fifth of an inch, and the wave-length of light as 1-40,000th of an inch, this angle is found to be about two minutes; and we are forced to the conclusion that there is no room for the eye of the savage to be much superior in resolving power to those of civilised physicists, whose powers approach at no great distance the theoretical limit as determined by the aperture."

I understand this to mean that optical conditions limit the resolving power of the eye to objects which subtend a visual angle of about two minutes, and that civilised physicists approach this theoretical limit at no great distance.

With great submission to the high authority of Lord Rayleigh, I venture to question whether we have any data from which to draw conclusions with regard to the possible optical powers of the eyes of the human race. We should probably fall into grave error if we were to argue from the reduced eye of Listing,