

sition of vectors were assumed outright. The author is probably now the only surviving writer on dynamics who persists in muddling up force and acceleration by calling acceleration (a purely kinematical quantity in itself) an "accelerating force," and he adds to the muddle by writing $v = ft$ where all modern writers would put $v = at$. What the student is to understand by "a force capable of generating in one second a velocity represented by DE " (p. 27) is difficult to see, when the mass on which the force is to act is nowhere stated, and when it is not even stated or hinted that there is any mass at all to be acted on. On p. 41 the author states that "in this country the ounce avoirdupois is so taken that one thousand of them will just balance a cubic foot of distilled water." This is not so, at least in *this* country, for the mass of the ounce depends on the standard pound, and this was established without any reference to a standard volume of water. The definition is wrong; the fact it states is a mere coincidence; and the coincidence itself is not exact: a cubic foot of water does *not* weigh 1000 ounces. On the same page the author tells the reader to ascertain with respect to a certain mass the velocity which "a given pressure or impulse" will impress upon it; "the mass being inversely proportional to this velocity." The confusion between *pressure*, which cannot be expressed except in terms of force divided by area, and *impulse*, which is expressed as force multiplied by time, is truly amazing. Is time the reciprocal of an area? Again, on page 42 the author is speaking of a certain force capable of sustaining a certain weight for one second of time, and he says "it would require twice as powerful a force to enable it to resist the action of gravity for two seconds, three times for three, and so on." This is news indeed. In the section on hydrostatics, no sooner has the student learned that a pressure of one pound per square inch is equal to 100 lbs. per 100 square inches, than he comes to such a statement as the following (p. 52): "The pressure therefore exerted by a mass of fluid upon the bottom of a vessel containing it is proportional to the area of the base," &c. Here the author jumps, without one word of warning to the student as to his change in the use of words, from using the word *pressure* in its proper sense of so many *pounds-per-square-inch*, to using the word in the sense of so many *pounds*, in which case it is no longer a "pressure" but a "force." It may be said perhaps that these things are but slips of the pen. Perhaps they are; but in a teacher who undertakes to write a text-book of "first principles" slips of such a kind are unpardonable. No such confusion of thought would be tolerated in the pupil who had read Wormell's "Dynamics," or Lodge's "Mechanics," or Maxwell's "Matter and Motion," or Thomson and Tait's lesser volume. If Mr. Lynn does not intend his text-book to be cast aside as worse than useless, he must at once correct blundering modes of thought that can only mislead the student.

Éléments de Mécanique, avec de nombreux Exercices. Par F. I. C. Pp. 282. (Paris: Poussielgue Frères.)

THIS is the concluding volume of a series of elementary class-books on pure and applied mathematics issued by l'Institut des Frères Écoles chrétiennes, a French Society which showed in the Technical Schools at the recent Health Exhibition a noteworthy collection of specimens of work done in their schools, along with the educational apparatus used therein.

The character of the book before us harmonises with the evident sympathy of the Society with the manufacturing industries of the districts in which their schools are situated. We are furnished with an introduction to applied as well as to theoretical mechanics. There are good diagrams and descriptions of weighing-machines, cranes, and other lifting-tackle in the section on statics; the longest chapter in kinematics is concerned with the

simpler forms of mechanism; and in dynamics there is a full discussion of the principle of work and its application to mechanics.

The text is clear, as far as it goes; but we think the general exposition of the theory too concise, many important points being relegated to the exercises at the end of each chapter.

There is a good collection of problems filling the last fifty pages of the book, but no examples are worked out in the text, and there are no results given to any of the exercises. Clearly, pupils using the book would require a good teacher at hand, who could devote ample time to the subject.

We should wish to see a book like this with a few select students, but, having regard to general class instruction, we do not think the mode of treatment a happy one. We feel called upon, however, to give a cordial recognition to the expansion in the direction of technical instruction, to the liberal supply of good diagrams, and to much freshness of treatment, both in text and examples, in the work before us. A. R. W.

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.]

Chemical Research in Great Britain

AT the anniversary meeting of the Chemical Society held March 31, 1884, the President read an address to the Fellows, which contains a series of remarks upon the prosecution of original research in England requiring some notice, particularly as a separate issue of the address has been circulated by the author. Attention is directed to the fact that we have an increased number of laboratories in Great Britain¹ and greater facilities for the prosecution of research through the aid of the Government grant and the Chemical Society's fund. Notwithstanding this the startling and anomalous fact is to be observed that the number of papers read before the Society is declining year by year.

After speaking in terms of praise of the degree of Doctor of Philosophy of Germany, which necessitates the prosecution of some original investigation, there follow some remarks which read like a serious reflection on a number of professors who have won distinction through unremunerative devotion to scientific teaching and research.

"The past neglect of research will, it is to be feared, have a more lasting influence on the progress of chemistry in this country than may appear at first sight, and in this way. Those who have been students in laboratories where the importance of this kind of work is not recognised, advance in their positions, becoming assistant demonstrators, &c., and eventually professors, and as they have not learnt to practically realise the value of research by being in the habit of conducting it themselves, or of seeing others do so, when they become professors they will naturally not encourage students to undertake it in their laboratories, and it is to be feared that we are already suffering in this way, and that this is one of the causes why the new laboratories which have been opened are doing so little to add to our store of fresh knowledge."

It will be questioned whether such a statement can be justified when it is mentioned that there happens to be lying on the table before the writer four reprints of papers recently received from the respective Professors of Chemistry in four of the new colleges; three of these memoirs are published in the *Philosophical Transactions* of the Royal Society, while a fifth occupant of one of the newly created chairs not long since received the Longstaff Medal. The whole subject seems scarcely to have been so well considered as to lead to a just appreciation of the cir-

¹ The term used is the United Kingdom, which includes Ireland. There has been no increase in the number of laboratories in Ireland, and only an increase of one in Scotland.