and if he only received eleven replies it cannot be denied that the writers of these replies fairly represented all sorts and conditions of men, and that the subject has been discussed, (1) in its academic aspect, (2) from the point of view of the experienced schoolmaster, and (3) from the standpoint of the engineer. The book contains a reprint of the recommendations of the Committee of the Mathematical Association on the Teaching of Elementary Mechanics.

What conclusions can the average reader infer from the divergent opinions expressed in this book?

(1) There is a general consensus of opinion that the teaching of mechanics should be more experimental and less dogmatic.

(2) Prof. Perry condemns the use of costly and complicated laboratory apparatus, and considers that more can be learnt from a cheap screw jack and a rusty old pulley than from costly Atwood's machines. In this he is perfectly right.

(3) If the teaching of mechanics is to be made more practical, greater attention should be paid to friction and other resistances which occur in nature. So long as friction is shelved into the background, mechanics cannot be anything but the study of what would happen under impossible conditions.

(4) The advocates of the poundal and the advocates of the slug will never agree.

(5) The academic side does not wish the poundal adopted for practical purposes (p. 13). In examination papers answers are never—well hardly ever—asked for in poundals, and generally a candidate would lose marks by giving the pull of a railway engine in poundals or tonals. But the academic teacher strongly objects to swallowing the slug, and not without reason.

(6) The engineering side is trying hard to force the slug down the throat of the academic teacher, its main plan of campaign consisting in attacking the poundal as unit of force.

(7) Both sides seem willing, up to a certain point, to allow beginners to solve elementary problems by the use of Newton's laws, according to which change of motion is proportional—not equal to the impressed force—a method which avoids both the poundal and the slug. But they still cling tenaciously to the modern substitute for Newton's statements.

(8) The engineering side has had to accept the C.G.S. dynamical units, and there seems no reason why schoolboys should not leave the equation $F=ma$ until they learn to work with the metric system.

(9) The universal adoption of the metric system affords the most probable direction for a compromise.

(10) Prof. Perry advocates (p. 61) teaching mechanics through force rather than through mass as the fundamental notion; and yet some remarks seem rather to indicate that he wishes *every schoolboy* to realise that force is the vector time flux of momentum.

(11) Many teachers condemn tonals, velos and celos, others strongly advocate them. One critic (p. 55) goes so far as to express regret "that for units of momentum and mass-acceleration we have no suitable names at all"; but does not the *poundal* meet his requirements when regarded as the unit of *mass-acceleration*? Surely it is the use of this unit for measuring *forces* (by naval engineers and others) that is open to the serious objections raised on p. 64.

(12) The same differences exist in regard to centrifugal force.

We have no wish to reopen controversies on these questions, but we cannot help thinking that if every schoolboy is to know the laws of motion, it is also important that every schoolboy should know a great deal about the laws of the country he lives in. He should also learn something about economics, something about choice and chance, in order that he may not develop into a gambler, some experimental and geometrical optics, and many other things besides, which he does not now learn. That "it must be good for all boys to learn something of measurement and how to use their hands" is a point on which all can agree with Prof. Perry. G. H. B.

OUR BOOK SHELF.

What Are We? By Leonard Joseph. Pp. xiii+394. (London: Kegan Paul, Trench, Trübner and Co., Ltd., 1906.) Price 15*s.* net.

"THEY say the owl was a baker's daughter. Lord, we know what we are, but know not what we may be." A certain incoherence in Ophelia's words would have prevented us at one time from regarding her as a possible authority on the metaphysical questions raised by the title to this book, but she is soundness, suggestiveness, and lucidity themselves when compared with Mr. Joseph.

Three peculiarities in this pretentious work will strike the observant reader:—(1) Excellent as "Chambers's Encyclopædia" and the paper called *Answers* are in their own place—and Prof. York Powell is said to have thought highly of the latter—we doubt if there are many scientific works of the first rank in this country in which these are paraded in the foot-notes or in the list of books consulted. (2) Mr. Joseph poses in the opening paragraphs as an orthodox believer whose motto is "Search the Scriptures, watch and pray," but confesses in the end, with much pride, that this is merely a device to secure for his pages a reading from unreasonable and stubborn church-goers. It would have been more tactful to assume that all his readers were reasonable human beings, or that, at any rate, the weight of the arguments adduced would of itself overcome all initial distrust. (3) Mr. Joseph argues soberly—if the term sober can be applied without contempt to one who apparently abhors total abstainers as amongst the most depraved of men—for sexual promiscuity. This is bad; indeed, it is even worse than the unsound physiology that defaces the last page, or than the wealth of padding which surrounds and encompasses what might have received adequate treatment in a sixpenny pamphlet.

The Human Mechanism, its Physiology and Hygiene and the Sanitation of its Surroundings. By Prof. Theodore Hough and Prof. W. T. Sedgwick. Pp. ix+564. (Boston and London: Ginn and Co., 1906.) Price 8*s.* 6*d.*

MANY writers of text-books on physiology for the lay public are quite incompetent to act as teachers of their fellow men, because they are unacquainted with the