

to choose the part with which to begin; but, on the whole, perhaps the "properties of matter" form the best starting point. The curriculum for Form I. provides (and wisely, I think) for an experimental course under this heading. But, surely, the discussion of "sensations and things," of "causes and effects," of "the absence of chance in the order of nature," is out of place here. There is little or no room for elementary treatment of these subjects, involving, as they do, ideas which are clearly bodied forth to the mind only after considerable experience and much mental discipline. Still more out of place seem such subjects as "matter," "the molecule," and "constitution of matter." The average pupil in Form I. is not yet prepared to weigh the merits and demerits of the molecule. His mental capacity can hardly be great enough to receive a theory which in its modern form is the outcome of such extensive physical and mathematical investigation. And besides, he does not require the theory. It is useless to him, since his mind is still almost a blank with respect to the facts which the theory is intended to explain. This course is altogether too ambitious. Force and energy are certainly, it seems to me, subjects beyond the accurate comprehension of boys and girls of fourteen. The term "force" has been the subject of keen debates among such men as Professors Tyndall and Tait—debates in which it was more than hinted by one of these distinguished men of science that the other did not know the correct use of the term, or, at any rate, did not use it correctly. It is doubtful, too, if the inherent difficulties in the study of sound, and light-waves can be in any degree overcome by pupils in the first Form. It is true that these subjects lend themselves both to attractive illustration and to interesting mathematical treatment;

but both, I think, may be better left for the Junior University class. Velocity of sound, relations of musical notes to length of strings, etc., intensity, and pitch might, perhaps, from the purely experimental point of view, be adapted to Form I. It is my opinion, too, that as an educational subject Frictional Electricity is simpler and more instructive than Voltaic Electricity. The whole course is described as "experimental," and this is rather surprising, as the experimental treatment of such subjects as "constitution of matter," "attraction," "sound waves," "refraction of sound," and "electric polarization," must tax rather severely, not only the ingenuity of the master, but the capacity of the pupils.

The course in Physics for Form II. is open to the same criticism. An experimental course in velocity, acceleration, mass, momentum, force, moment, couple, etc., must be a rather difficult undertaking. But I note that these are merely terms to be defined. It is said to be a wise thing to begin a philosophical discussion with definitions, but I doubt if this is the best method for an experimental course in elementary physics. I am quite aware that *most good universities require for matriculation a course in physics somewhat like the one under discussion*; but it is rather the rule than the exception to find the minds of the matriculants, stored as they may be with these definitions, laws and theories, yet profoundly ignorant of many simple and easily observed physical facts. I shall not attempt any detailed constructive criticism of this course. That I must leave to those who are more immediately concerned in the subject.

Chemistry is begun in Form II. The course is apparently a very simple one, but it violates the principles according to which the course in Physics has been criticized. Is it possible for