education authorities in establishing and administering schemes for the advancement of apprentices.

Perhaps the most important feature of the Memorandum is the distinction which it draws between the major and the minor course. Industrial training has suffered hitherto from a lack of proper appreciation of the differences between the training required by the future artisan (or "tradesman") on the one hand, and the future "technical" man (whether designer, manager, or commercial representative) on the other. The distinction now drawn does not, however, go deep enough. The Memorandum does not sufficiently discourage the prevailing notion that the ideal evening student first enters evening classes at fourteen, and continues to attend such classes for seven years. Thus, instead of insisting that the technical student should remain at a secondary school until he is at least sixteen, and then, perhaps, enter his major (senior) course when he enters works, the Memorandum contemplates that the technical student and the trade student shall both follow the same junior (evening) course from fourteen to sixteen. It would surely be better that the trade student's own minor course should begin at fourteen instead of at sixteen, and attract him, by its special adaptation to the circumstances of his particular trade, from the moment when he leaves his day school. Moreover, since the trade student will as a rule have less opportunity for general reading in later life, his minor course might well include some "citizenship" subjects, such as industrial history considered at first from the point of view of his particular trade.

More than half of the Memorandum is devoted to "outlines of work" for various recommended courses. This portion is full of most useful suggestions. Some, however, are open to objection, or, at least, to criticism. Thus there is a curious confusion between *weight* and *mass* on page 20 ("$g \times$ force = mass $\times$ linear acceleration," which would make g a pure number, independent of the system of units employed). It is also doubtful whether the conception of "work" is really so difficult as to justify the suggested postponement of its introduction until the second year of the senior course. Again, the four years' (major) course in mathematics outlined in the Memorandum might with advantage be less "practical" in its first two years, during which some time might well be found for geometry.

ENGLISH MATHEMATICS.

THE *Mathematical Gazette* has recently published a translation of an address delivered by Prof. Gino Loria to the International Congress of Historical Studies. This is a well-proportioned and detached estimate of the main contributions of England to the body of mathematical science, from the earliest available records to the present time. An important suggestion is made that it may be possible to find in some of our libraries manuscript works by some of those early writers who, unlike ourselves, did not hasten to publish their discoveries, and were often surprised by death. In this connection the names of Bradwardine, Richard of Wallingford, John Maudith, and Tonstall are mentioned. Another note is that James Gregory made lengthy stays in Italy, and was therefore probably acquainted with the work of Galileo; so the question arises how far Newton may have been influenced by the achievements of the great Italian philosopher. Prof. Loria suggests inquiry about this as an important piece of research.

Prof. Loria emphasises, with justice, the fact that the renascence of English mathematics in the nineteenth century coincided with a better knowledge and appreciation of work being done abroad. The greatness of Newton, like that of Euclid and Archimedes, had a sort of benumbing effect upon his successors, and even contemporaries; although, of course, there are exceptions, like Maclaurin and Brook Taylor and Waring. It is also pointed out that even now there are certain branches of mathematics which Englishmen persistently ignore, or else treat by obsolete and clumsy methods. The example given is descriptive geometry; and it is noted that Brook Taylor laid down the principles of this subject in a way perfectly analogous to that adopted long afterwards, and independently, by Fiedler. It is not stated by Prof. Loria, but it is a fact that most of our text-books on descriptive geometry are simply contemptible, from a scientific point of view, and not to be compared with Fiedler's treatise, or the classic work of Monge, which does in the main follow the lines of what we call descriptive geometry, in the restricted sense of orthogonal projection.

Even able students who use these books, and attain great practical efficiency, have no conception at all of the subject as a whole, and are baffled by the simplest problems about traces of lines and planes. So far as we know, there is only one good treatise on descriptive geometry in the English language, and that is in the "Penny Cyclopædia," where so many other treasures have been buried and forgotten. This leads to the remark that Prof. Loria has a proper appreciation of the works of De Morgan, and laments that they are so inaccessible; with this sentiment we cordially agree.

An Italian is as likely as anyone to sympathise with English modes of thought; so any conclusion drawn from this address is likely to be flattering rather than the reverse. We must remember, too, that, when we speak of English mathematicians, we are apt to include such men as Maclaurin, Rowan Hamilton, and Sylvester, who were not Englishmen at all. But even in this inclusive sense of the term "English" one cannot but feel that Continental opinion about English mathematics is almost bound to be analogous to that about English literature in general. Newton *is* English, and, like Shakespeare, or Dante, or Goethe, incomparable; but we have lesser men, of a more distinctly national type, who may, perhaps, be more justly appreciated at home than abroad. As an example, we may instance W. H. Fox Talbot, now only vaguely remembered in connection with photography. As a mathematician he is, of course, not to be compared with Abel; nevertheless he did investigate some cases of Abel's theorem in a very instructive and fundamental way, implicitly showing that the theorem is really a deduction from the known facts about symmetric functions of the roots of an equation, and the elementary theory of partial fractions. We are inclined to believe that the simplest proof of Abel's theorem will ultimately follow the lines that Talbot has indicated.

There are many points in the address to which we cannot refer; but one that deserves mention is that Newton is reported to have said that the style of the ancient geometers is the only one appropriate to any mathematical treatise worthy of the name. Judging by the "Principia," it is probable that this story is authentic.

G. B. M.

PUBLIC HEALTH.

THE Medical Officer's Supplement to the forty-third Annual Report of the Local Government Board for 1913–14 (Cd. 7612, price 1*s.* 11*d.*), while it deals mainly with matters primarily of medical interest, of necessity includes within its scope much that is of value to all scientific minds.

The question of infant mortality occupies a pro-