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H. S. ALLEN.

Blythwood Laboratory, Renfrew, N.B., June 27.

### The Teaching of Mathematics.

BEING myself a teacher of mathematics, I have followed with much interest the vigorous crusade against the neglect of suitable scientific and mathematical training conducted by Prof. Perry and others, and am in substantial agreement with Prof. Minchin's remarks in his review in your columns of the series of papers by Prof. Perry on "England's Neglect of Science."

One thing has struck me in connection with school "mathematical" teaching as being a very illogical course of procedure on the part of the dominant "classical cleric" instructors of youth alluded to—namely, the teaching of *arithmetic*. A boy, whether classically or otherwise educated, is considered a dunce if he is not merely not an expert with the multiplication table, but even if he is unacquainted with such things as recurring decimals, square and cube roots, &c., whereas no attempt is generally made to give an insight into *theory*, the results, *i.e.* the *rules*, are what he is expected to know.

So dissociated to the ordinary mind is the science of arithmetic from mathematics that I can remember a fellow collegian actually remarking, "Mathematicians are bad at arithmetic"! It seems to me, on the other hand, that Euclid is much more out of the line of what we mean by mathematics. In teaching Euclid as a mathematical "subject," and, as some claim, as an introduction to geometry, we are actually raising barriers to the progress of a learner in grasping the meaning and uses of geometry. We insist on the propositions being learned *in all their cases*, insisting on the absolute distinctness of propositions which are merely particular cases of the same proposition, thus tacitly suggesting the existence of some such commandment as "Thou shalt not recognise the Principle of Continuity"—we ignore the infinite and we teach to try and wriggle away from the notion of a "limit." In fact, nearly all that really constitutes mathematics is carefully avoided in teaching of Euclid, whereas I have found, when I have dared once or twice to depart from examination ideals, how true the following remarks of Mr. C. Taylor in his prolegomena to "The Introduction to the Ancient and Modern Geometry of Conics" are. When referring to the work of Boscovich, he says:—"It is remarkable that Boscovich enters upon these abstruse speculations in an elementary treatise for beginners. . . . The preface to the volume contains an earnest plea for the introduction of the modern ideas into the schools. He had taught the appendix *vis a voce* to his own tyros with the happiest results. . . . demonstrations are put before him (the tyro) in an unsuggestive form which gives no play to his inventive faculty; and thus it comes to pass that of the many students so few turn out genuine geometers. . . ."

I must not encroach further on your valuable space, although many points come to one's mind, such as the exclusion from so-called "higher algebra" papers of the theory of determinants, arithmetic without logarithms, applied mathematics without the calculus, &c., but, in hopes that the attack may be vigorously pushed home, subscribe myself yours sincerely,

Henry Smith School, Hartlepool.

F. L. WARD.

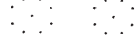
### Curious Rain drops.

ON Thursday last, July 11, about 6 p.m., the day having been sultry, the sky became dark and overcast, threatening rain. Only a few scattered drops fell, however (the threatened rain passing off), but these sparse rain-drops drew my attention by their curious appearance on the sill of the window near which I sat.

Each rain-drop had broken up into a number of smaller drops,

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which arranged themselves in a circular form around a central one, in the manner here shown



Perhaps some one of your readers would kindly explain the cause of this, and if it was due to some electrical condition of the atmosphere.

M. S.

Bowdon, Cheshire, July 14.

### THE MYCENÆAN QUESTION.<sup>1</sup>

THE occasion for the following remarks on that difficult and much disputed subject, the Mycenaean Question, is furnished by the appearance of the timely volume on the "Oldest Civilization of Greece," by Mr. H. R. Hall, of the British Museum, and as public interest in the whole question has been considerably quickened by the important discoveries of Mr. A. J. Evans in Crete, this book, in which certain of the principal results of the Cretan excavations are discussed, will be heartily welcomed by the broad-minded school of classical archaeologists in general, and by the student of ancient Oriental civilisations in particular.

It is now some twenty-five years since the spade of Schliemann brought to light the remains of the oldest civilisation of Greece; and as it was soon recognised that these remains belonged to the period of the Bronze Age, it was clear that they must be older than the classical period of Greek culture. The excavations which were made subsequently in several parts of the Greek world by the various investigators who were emulating



FIG. 1.—Representation of Mycenaean vases; from a fresco in the tomb of King Rameses III. at Thebes, B.C. 1200.

Schliemann's example proved that this Bronze Age culture was not confined to any particular part of Greece, but extended over the whole Hellenic area. Such discoveries compelled classical scholars to abandon many preconceived notions, and they found it necessary to revise entirely their ideas about the origins of Greek civilisation; it is not to be wondered at that many excellent scholars of the "old school" still find it difficult to make their views fall into line with the new order of things in classical archaeology. This is most evident when the dating of Mycenaean antiquities has to be considered, for if the Mycenaean culture, being of the Bronze Age, is necessarily pre-classical, its *floruit* must be assigned to the second millennium before Christ. An important confirmation of this view seems to be supplied by the evidence derived from the excavations which have been made in Egypt in recent years, where a large number of objects, pottery, &c., of Mycenaean origin have been found; and in many cases such objects have been discovered side by side with native Egyptian objects which must belong to the period which lies between B.C. 1500 and B.C. 1000. The discoveries of Mr. A. J. Evans, however, all seem to point to a still earlier date for the first development of

<sup>1</sup> "The Oldest Civilization of Greece: Studies of the Mycenaean Age." By H. R. Hall, M.A., Assistant in the Department of Egyptian and Assyrian Antiquities, British Museum. Pp. xxxiv + 346; with 76 illustrations. (London: D. Nutt, 1901.) Price 15s. net.