

**AN ELEMENTARY  
COURSE OF  
PRACTICAL PHYSICS**

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An elementary course of practical physics by A. M. Worthington

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## INTRODUCTION.

AMONG a series of questions lately circulated amongst the scientific masters of the larger public schools by a Committee of the Head Masters' Conference, and which, with the answers to them, were published as an Appendix to their Report for 1877, was the following:—

“Suggestions as to how far Physical Laboratory work is possible at School, having regard to the time at a boy's disposal.”

Out of eighteen answers, only two are favourable; the following from Rugby warmly so:—

“Most desirable that Physical Laboratory work should be done in all schools where Physical Science is taught—1st, Because manipulation and observation is an important education in itself; 2d, Because it is necessary to elevate Science from a mere cram subject.”

The spirit of the other answers seems well represented in the following, from the Royal Naval College:—

“I do not think Physical Laboratory work of much educational value, unless accompanied by measurements. Experiments merely qualitative only lead to play. Measurements can be made only by costly instruments. I should be inclined to discontinue Physical Laboratory work in schools, except in the case of senior boys. A master cannot take more than seven or eight boys at a time. Each experiment would average two hours. Single hours now and then useless.”

It seems indeed generally admitted that practical work in Physics is very desirable, but the difficulties are thought to be insurmountable. Accordingly the stress is laid on practical work in Chemistry, not because it is a better subject from an educational point of view, but because such is thought to be the only course available.

Yet it will hardly be denied by any scientific man, that from an educational point of view the first place should be accorded to the study of Physics. Logically it precedes all the other experimental sciences, every one of which has its own special instruments and mechanical appliances, whose action is purely physical, and the ability of the scientific man to advance our knowledge in any direction depends very largely on the readiness with which he understands, handles, and devises such appliances. And yet this fundamental study, which should beyond all others be sound and thorough, is in danger of being left in the condition of "a mere cram subject."

The reason is to be sought in the fact, that nearly all who have tried practical work in Physics with junior boys have aimed too high. They have seen no alternative between "merely qualitative work only leading to play," and "measurements by costly instruments requiring on an average two hours for each experiment." For the elementary course which follows no costly apparatus is required, but exact measures are demanded, within the limits of the apparatus.

The course was originally devised for a class of twelve boys, whose average age was rather under fourteen, and was in use for some time at the Salt Schools, where the time taken for it was a school year of two separate hours a week. The result was very encouraging, and the same course is about to be used for a class of thirty boys at Clifton College.