

**MATHEMATICAL
DRAWING INSTRUMENTS,
AND HOW TO USE THEM**

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Mathematical Drawing Instruments, and How to Use Them by F. Edward Hulme

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BY

F. EDWARD HULME, F.L.S., F.S.A.,

ART-MASTER OF MARLBOROUGH COLLEGE;

AUTHOR OF "PRINCIPLES OF ORNAMENTAL ART," "FAMILIAR WILD FLOWERS,"
"SUGGESTIONS IN FLORAL DESIGN," ETC.

"Drawing is the A B C of the architect, engineer, and surveyor."
SIR ISAMBARD BRUNEL.

"Drawing supplies us with a power whereby long descriptions and
pages of writing are at once superseded, and thus it is a condensed
shorthand as well as a universal language."

R. REDGRAVE, R.A.



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INTRODUCTION.

THE use of mathematical instruments enters so largely into various kinds of technical drawing, that some few suggestions as to their employment cannot but be of service to many who find themselves for the first time in their lives the possessors of a box of drawing instruments, and who therefore have all their experience yet to learn. Having for many years been engaged in teaching the use of such things, and thereby become acquainted with the difficulties of the novice, we would desire to give all such the benefit of our own experience, and to smooth their path before them as far as may be possible.

The student who provides his own things is at once met on the very threshold by a difficulty—the choice of a suitable box of instruments. He sees in the shop-windows a card of things marked “one shilling the set;” and, on the other

hand, in consulting the catalogue of a first-class maker, he finds that even twenty guineas would not buy some of the sets enumerated with such tempting richness of detail. Somewhere between these extremes is the very thing he wants, but where the happy mean may be is a mystery to him.

It will be noticed that we assign the true position of the hoped-for box somewhere between the extremes; for we would at once hasten to say that few things are so dear as cheap instruments. The legitimate difficulties of drawing with instruments are sufficiently great to the beginner without complicating them by the introduction of pens that will not mark, screws that will not turn, and all the other troubles that assail any one rash enough to buy things at a price that absolutely forbids good workmanship. On the other hand, even where the pecuniary question raises no bar to considerable expenditure, it is rather a mistake for the novice to get an expensive box; he had far better get one with fewer instruments, and learn thoroughly what can be done with those, before getting what may be considered to some extent luxuries, and the preliminary failures will have been got through at the risk of damaging instruments of comparatively small cost. When the student has passed through his novitiate, has learned to take care of his things, and has, moreover, learned the real nature of the work he has to do, and what means

will most effectually do it, he can then go in for a more complete set of implements.

For a beginner, an expenditure of three or four pounds should give him all that is needful to make a very effective start: this should include a board, T square, &c.; and even half this might in many cases be found sufficient. The surest way of getting value for the money is to go at once to some good maker; his charges will probably seem somewhat high, but it must be remembered that he got his reputation by the production of good things, and that his name will be a sufficient warranty. The novice should beware of second-hand cases, as they are often considerably worn, while at other times the name veils a fraud: it is merely an attempt to pass off some worthless things that have never had a previous owner at all. It is always safer, too, to buy a set that has the maker's name stamped somewhere, either on the box or on some of the instruments.

It must be borne in mind, in calculating expense, that when the draughtsman has once got a sufficient knowledge of how to treat his instruments to justify him in getting a good set the expense comes once for all: unlike the daily bread-and-butter, an ever-recurring charge, a good box of instruments is a possession for life. The instruments we ourselves use we have had now some twenty years, and there is no reasonable