

**A DESCRIPTIVE TREATISE ON  
MATHEMATICAL INSTRUMENTS: THEIR  
CONSTRUCTION, USES, QUALITIES,  
SELECTION, PRESERVATION, AND  
SUGGESTIONS FOR IMPROVEMENTS, WITH  
HINTS UPON DRAWING AND COLOURING**

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A Descriptive Treatise on Mathematical Instruments: Their Construction, Uses, Qualities, Selection, Preservation, and Suggestions for Improvements, with Hints Upon Drawing and Colouring by William Ford Stanley

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**WILLIAM FORD STANLEY**

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## P R E F A C E.

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OUR scientific literature has become so diffuse and universal, that we expect to find an outline of all the little mysteries of any particular art, somewhere in print. If such is not to be found, the restless inquiry that demand proclaims, will generally tempt some individual to become the teacher, however far he may fall short of perfect mastery.

Certainly, the author of the following pages, who could only spare desultory hours from active business, would not have attempted to write a description of the qualities and uses of Mathematical Drawing Instruments,—being conscious that his powers were greater with the lathe and file than in the “ways of gentle rhetoric,”—had he not felt that there was really a want of such a work, much of his time being constantly required to describe by letter instruments which, from their extensive use by some of the profession, ought to be known of at least by all : this particularly applies to such instruments as the Eidograph, Centrolinead, Computing Scale, and some others of like utility. Further, it appears so much more English to purchase complete information on any subject *if you can*, than to be

compelled to ask *small* particulars of any person in detail.

It happened that a treatise upon Mathematical Instruments really must be *written*, to be produced at all; scissors could do no more. The ignorance of the mere compiler, in this line, had become so striking as to be only ridiculous. Here is an instance. A very silly triangular compass, which consisted of three jointed arms, moveable upon a horizontal centre, was illustrated in a work upon mathematical instruments published over a hundred years since. It is not very certain whether the instrument was ever made; but the next writer who wrote upon the subject extracted the description, also the engraving, except that his engraver, accidentally no doubt, made the joint very small. The next writer who recommended the instrument left out the joint altogether, whereby it ceased to be a triangular compass, except in the faint *historical* similarity to the original. Subsequent writers unfortunately followed the *last* description, and also the *last* engraving, very much to the perplexity of the more philosophical reader.

It is not intended that the above should infer that we have no original works upon mathematical instruments. We have several—but they are of the far past. It will be attempted in the following pages to review the merits of a few of the possibly useful instruments to be found in them.

Really the best work we have is the "Geometrical and Graphical Essays" by George Adams, published in 1791. This was a rather complete work in its day. It embraced some description of all the instruments then in use. It was practical too,—written by a workman and a shopkeeper in constant intercourse with the user. There is one deficiency which the writer appears to have felt—that of his not being a draughtsman. He made, however, an excellent apology by offering very copious opinions of professional men.

Of more modern works, the only one of this class with any claim to originality is a "Treatise on the Principal Mathematical Instruments," by F. W. Sims, 1844. This is practical one way; the writer is a professional draughtsman. The work, however, is limited to instruments for the use of the land surveyor; and of these there is the omission of some of the most important.

After consideration of all that has been done, the writer of these pages determined to place before his readers only his own opinions and experiences of drawing instruments. The plan is egotistic, but it offers the reader all the writer *really knows* on the subject, with perhaps some of his fancies and ideas, described of course as improvements: these the reader must accept or reject at his pleasure.

It would have been greater satisfaction to the writer if he could have introduced more improvements which



were attributable to other labourers; it would also have appeared more graceful in a work of the times. But it happens that a very few *moderns* have given attention to the art, except as a matter of profit. The affair may be perhaps altogether educational; and thus accounted for. Our commercial system, with its extreme division of labour, so excellent in plan for the production and distribution of merchandise, seems to fail in the advancement of some scientific manufactures—and the mathematical instrument trade is one of these. Once upon a time it was the fashion for the vendor in this line to be a workman. The idea of our forefathers was that the workshop completed the necessary education of the shopkeeper—the reader can imagine how he lacked the etiquette of the counter—but *somehow* he could comprehend his customers' wants, and knew how to adapt them to his trade. For many years since, the old system, as a rule, has been abandoned, with the striking effect that the patterns of the ordinary drawing instruments from this time have remained the same. Every rule has an exception—to this there is an especially worthy one: *a very scientific workman, the late Mr. Wm. Elliot, encouraged his fellow-workmen to excel in mathematical drawing instruments, and he was the greatest honour to the trade in the past half century.*

For the plan of the work before us. The writer has made it a rule to avoid all technicalities except where

they appeared simple and expressive in themselves, hoping these pages may be as useful to the *workman* and the *shopkeeper* as they may be to the professional. He has also avoided the constant reference to the cuts by letters of the alphabet, customary in geometrical works, preferring to describe as well as he could, without these signs. Further, he has not bothered the reader with any impracticable or obsolete instruments; a few of the instruments described are imperfect, but they are the best known for the required purpose, and their demerits, as well as their merits, are pointed out. That the work may possibly be useful at any time as a reference, a Table of Contents is given in the first part of the instruments best adapted to each special purpose; at the end of the work is an Index of instruments, with their technical names.

In conclusion, in pointing out the common defects and useful qualities of instruments, as also in suggestions of improvements, the author is in some instances indebted to the observation of scientific gentlemen by whom he is employed in business; his part of the matter being frequently the proof by experiment only.

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