Introduction

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The development and design of precision engineering equipment and components call for a great deal of versatility on the part of the designer. Unlike conventional parts and machines, which can be made direct from drawings, precision engineering is often a matter of trial and error, for it often happens that the designer cannot be sure beforehand whether the equipment will conform to the given specification. Apart from having to choose from an extraordinarily wide range of materials, he has to take into account a great many incidental, but nevertheless important, factors such as: safety requirements, styling, planning, production facilities and so on. This makes his task quite difficult, so rarely is the design entirely satisfactory straight away. Only after tests have been carried out, and models constructed, will he be able to judge whether the design comes up to expectations.

So much for the task of the designer, except to mention that a further brief description of the work he has to do is given in Chapters 1 and 7. The importance of planning a design thoroughly, with due regard to technicalities, constructional merit, cost and commercial possibilities, cannot be over-emphasized.

This volume deals with fundamentals and sets out to give the designer an insight into drawing office practice, kinematics, electrical theory, optics, the auxiliary sciences and other matters that concern him directly, such as planning, cost-price calculation, quality requirements and patent rights, all of particular importance in precision engineering. Examples of practical components and precision-engineered assemblies are given in Volumes 7 to 9.

The MKSA system of units and symbols (ISO), as defined in Chapter 1, is used throughout. In the Tables and diagrams, the values are specified in such a way (with factors of 10) as to correspond to the old system.