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AN INTRODUCTION TO
APPLIED MECHANICS
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BY

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With numerous illustrations and numerical examples

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PREFACE

MANY engineering and architectural teachers have found that applied mechanics is not an easy subject to teach, and most students have discovered that it is a difficult subject to understand. In searching for the reason for this unfortunate state of affairs, the author came to the conclusion that the treatment of the older form of text-book was too much that of applied mathematics—a kind of exercise-ground for algebraic manipulation—and that many of the more modern books that have attempted to remedy this weakness have given too much engineering application of the principles of mechanics without sufficient explanation of those principles.

The aim of the present book is to present the elementary principles of mechanics in accurate though clear terms and to show the application of those principles to the simpler problems arising in engineering and architectural applications. The general treatment is based more upon graphical conceptions than upon purely mathematical analysis because experience shows that the mind of the engineering student reasons more clearly from diagrams than from symbols.

A number of simple experiments have been given, principally those which require the simplest form of apparatus. It is not suggested that the experiments given are all that are desirable in a laboratory course, but it is believed that sufficient have been given to make the principles clear. It may be pointed out here that there is some danger in attempting to learn principles merely by experiments with simple (and usually inaccurate)
PREFACE

apparatus. Before the student can hope to obtain valuable results from experiments, he must learn to make accurate readings of his instruments and to make corrections for the errors that may arise. Some authorities seem to suggest that experiment is of much greater importance to engineers than reasoning, but it should be borne in mind that training is required for good experimental work as well as for anything else, and in the author’s opinion many engineering students who attempt to gather a knowledge of mechanical principles from experiment have not had sufficient preliminary training in experimental method. If our reasoning is based upon experimental laws and not upon dogmatic mathematical conceptions we shall probably make greater progress in elementary work by using experiment as an illustration of the results of our reasoning than by attempting to deduce the principles from the results of our experiments.

The great value of training in experimental work—and thorough training is essential—lies in the direction of research work which comes when we have understood the principles based upon the earlier researches of others.

It is hoped that this book will be found of value as a class-book in the junior classes of Engineering Colleges and in Public Schools that have an engineering side.

The author wishes to express his gratitude to Mr J. B. Peace, M.A., of Emmanuel College, Cambridge, for much valuable criticism and assistance with the proofs, and to the publishers for the great help that they have given in the preparation of the diagrams.

E. S. A.

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