Preface

This book is intended for all those who like to experiment and make things work, from the schoolboy upwards. It will help them to experience the pleasure and satisfaction of making things with their own hands.

Simple instructions are given for making and putting to work models of scientific and historic significance, while suggesting their place in the advance of technical progress through the ages.

What is visualized here is not model making as ordinarily understood, for the devices described do not require for their making very much skill or craftsmanship. Thus few detailed drawings—in the engineering sense—have been included because the object in mind is to encourage a talent for experimenting and improvisation.

Given the materials and facilities, and a modicum of supervision, the schoolboy who is really interested can persuade his hands to make for him whatever he wants to make, as is often evident in the elaborate project work undertaken in some school subjects. Like primitive man, he usually has that invaluable asset—plenty of time to try things out.

If there is a school workshop, with a tradesman/technician in charge, the latter must try to suppress his innate desire for perfection and accurate workmanship when the rough models of medieval times are in question: a sapling cannot be measured in thousandths of an inch.

During the last fifteen years—1952-67, working models of all these machines of historic interest have been made to my design in our workshops in the department of Mechanical Engineering at the University of Newcastle upon Tyne. They were intended primarily to illustrate important events in the history of mechanical engineering and secondly to bring the reality of these events to first-year students attending the course. Much appeared to be learned by feeling and touching a working model that otherwise eluded them when only diagrams, slides, or cinema films were used.

These working models have been shown to schoolboys, ages twelve to eighteen, on many occasions. Various types of school have been visited, when as many models as I could conveniently pack into my car were set to work. The opportunity of operating the models for themselves always created great enthusiasm, and certainly tested the durability of the apparatus.

In 1965 the models were grouped to form the basis of the three annual Holmes Memorial Lectures at the University of Newcastle, with practical demonstrations on a suitable scale to appeal to the wider audience.

My sincere thanks are due to those members of the staff of the Department of Mechanical Engineering who have helped me in the design and construction of these models, all of which were made and tried out in the departmental workshop. I am particularly grateful to the technicians, from the chief technician downwards. They gave me their enthusiastic support during the many trials and modifications that were needed to make the constructions as simple and effective as possible.

Finally, I am much indebted to Mr Peter Elliot, Senior Technician, who made all the scale drawings in this book and contributed many useful suggestions including the use of proportional dividers by the reader for making the models in accordance with the drawings.

A.F.B.

Acknowledgments

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These References form a useful list for further reading.

Page	*Source*
12	*Report of the Smithsonian Institution*, 1894, p. 721.
13 (*bottom*)	W. L. Goodman, *A History of Woodworking Tools*. London, G. Bell & Sons Ltd., 1964.