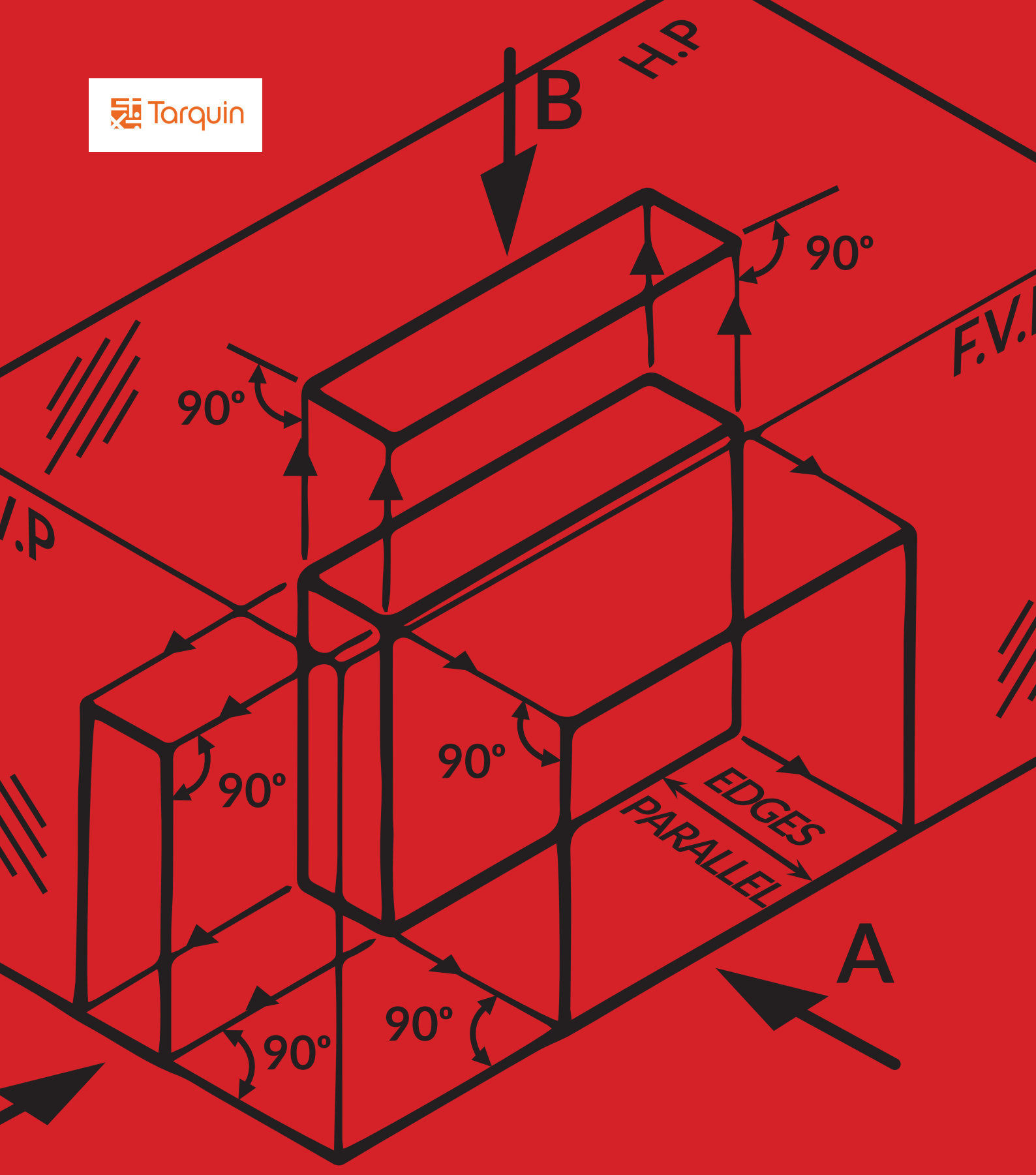

J.K. Wilkinson

WORKING WITH MODELS

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WORKING WITH MODELS
First Steps in Design

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Formerley Secondary Education, Further Education and Examiner.

By the same author

STEPS TO DRAUGHTSMANSHIP
TECHNICAL DRAWING COMPREHENSION EXERCISES

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PREFACE

The book has been prepared for those interested in, or studying, Design and Technology and is designed to both introduce and consolidate the link between two and three-dimensional thinking. Models figure prominently, their manufacture and use providing a substantial contribution towards achieving this end. Whilst computer aided design has been immensely powerful, this book provides templates designed to take you back to basic principles. A task or two in the "real" world will also help increase understanding of the CAD world.

Neglected basic principles are frequently the root cause of errors. It is envisaged that the nature of the book will assist in eliminating such tendencies and strengthen confidence throughout this particular field of technical study.

The emphasis is on participation, with material supplied to instruct, enlighten and stimulate. The book can be used in school or college. But its approach is to construct models with a steadily increasing level of difficulty - providing a set of personally prepared aids, which subsequently provide an essential source of help and information in design projects.

Experience gained from using this publication will hopefully provide users with a sense of achievement, encourage interest and lead to a desire to learn more.

Recommendations of the British Standards Institution set out in BS 308 Engineering Drawing practice have been strictly observed during the book's preparation.

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INFORMATION FOR TEACHERS

THE BOOK - BRIEF SUMMARY

The material is presented in one continuous SECTION, and uses models to help introduce orthographic projection, and through graded exercises creates a sound basis for future work.

DETAILS

The work relies upon accurately constructed models. New shapes are introduced at regular intervals to be immediately incorporated in the exercises. Therefore if you wish to use the book within a scheme of learning, it is advisable to work through the section systematically. Then:

- Careful planning ensures the efficient use of teaching aids, offers a gradual introduction to hidden detail and provides adequate practise with sloping and curved surfaces.

- Answers to questions which accompany the drawing exercises are frequently obtained through model inspection and investigation.

- A tray, whose surface development is produced by removing a piece 60 millimeters square from each corner of an A4 drawing sheet will be found ideal for storing the models to be made by each pupil.

- When the set exercises have been satisfactorily completed, new freestanding objects may be introduced by the pupil as subject material.

Individual exercises can also be undertaken within schemes of work that are predominantly CAD based.

Dimensions throughout the book are stated in millimeters.

INTRODUCTION

The work offers a three-dimensional approach to orthographic projection by way of personally prepared models considered in partnership with pictorial illustrations.

Basic principles of projection are initially outlined through the first angle (European) system. An introduction to the third angle (American) system of projection is also included.

Solutions to the majority of exercises may be expressed in either first or third angle projection. Both systems are approved internationally and are regarded as being of equal status.

INSTRUCTIONS

The user should work through the material on pages 6, 7 and 8, before attempting the following exercises.

Where instructions are offered that might require checking with a supervisor or teacher, these are in *italics*.

EXERCISES 1 - 88

INSTRUCTIONS

Begin each exercise by carefully positioning your models to correspond to the illustration.

Now with the help of your models, draw correctly projected orthographic views of the freestanding object illustrated in thick outline. The views, drawn to model dimensions, are to be obtained by looking at the objects in directions A, B and C to give:

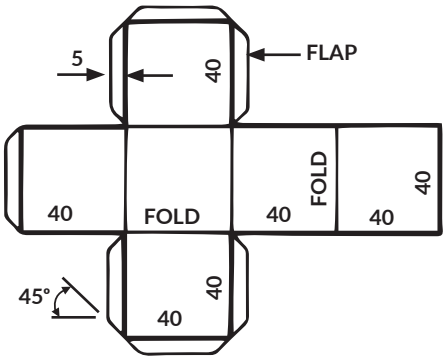
1. A front elevation in the direction of arrow A;

2. A plan in the direction of arrow B;

3. An end elevation in the direction of arrow C.

Hidden detail, in evidence from exercise 34 onwards, is to be correctly shown. Indicate the system of projection you have used.

Where it appears, * denotes the number of (correctly chosen) single models which assemble to provide the freestanding object, and applies to all exercises on the page unless otherwise stated. However, models 79 - 88 are left to your discretion.



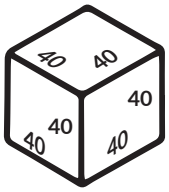
SURFACE DEVELOPMENT.
(INCLUDING FLAPS)

A SURFACE DEVELOPMENT IS THE UNFOLDING OR UNROLLING OF THE SURFACE OF A SOLID INTO A FLAT SHEET.

THIS IS THE SURFACE DEVELOPMENT OF A CUBE. IT CONSISTS OF SIX IDENTICAL SQUARE SURFACES.

INSTRUCTIONS: USING INSTRUMENTS AND IN THIN LINES, CAREFULLY MAKE A FULL SIZE COPY OF THIS SURFACE DEVELOPMENT ON A DRAWING SHEET, INCLUDE FLAPS *IF THE TEACHER AGREES.*

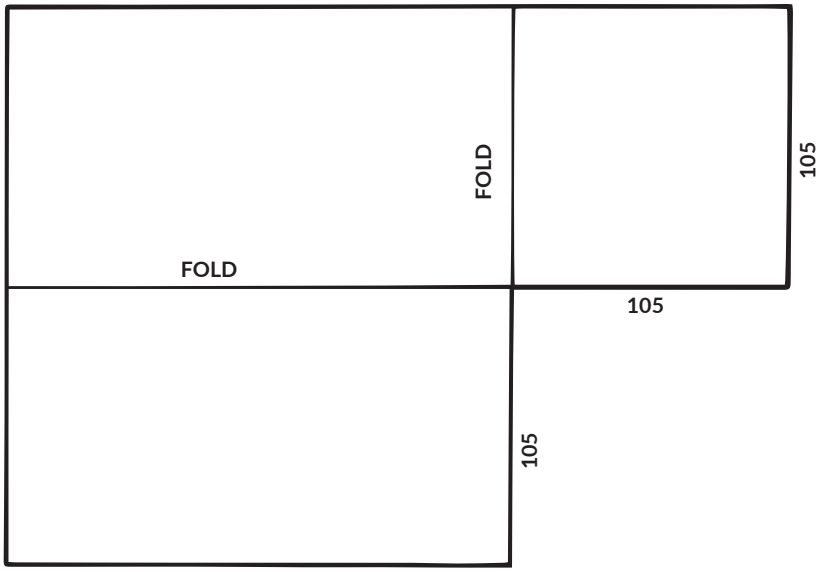
CAREFULLY CUT OUT, FOLD AND ASSEMBLE THE SURFACE DEVELOPMENT OF THE CUBE INTO A MODEL.



CUBE

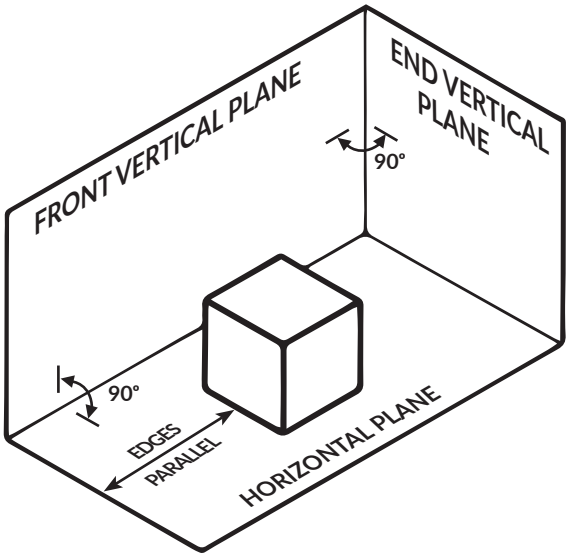
IT WILL PROVE HELPFUL TO IDENTIFY THE LENGTH OF THE EDGES, BY MARKING THEM ON THE MODEL.

INSTRUCTIONS: FROM AN A4 (210 X 297) DRAWING SHEET CUT A SQUARE CORNER TO GIVE THIS SHAPE.



INSTRUCTIONS: FOLD THE SHAPED A4 DRAWING SHEET INTO THIS POSITION TO PROVIDE A MODEL OF THE PLANES OF PROJECTION, YOU WILL NOTICE EACH PLANE HAS BEEN GIVEN A NAME.

TAKE THE MODEL OF THE CUBE AND PLACE IT ON THE HORIZONTAL PLANE LIKE THIS.



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