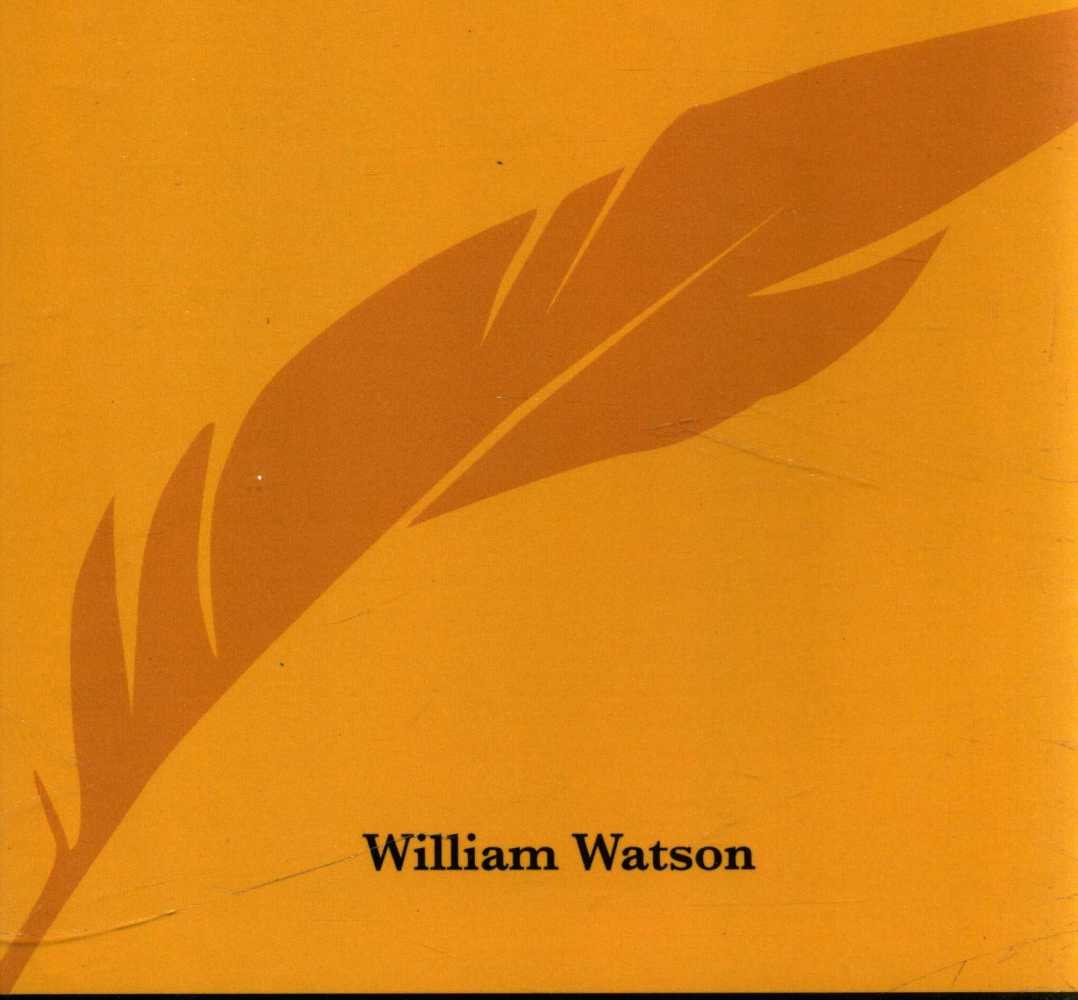
Advanced Textile Design (1913)



William Watson

ADVANCED TEXTILE DESIGN

BY

WILLIAM WATSON

SUPERINTENDENT AND LECTURER IN TEXTILE MANUFACTURE, THE ROYAL TECHNICAL COLLEGE, GLASGOW; FORMERLY HEADMASTER OF THE TEXTILE DEPARTMENTS OF THE ROYAL TECHNICAL INSTITUTE, SALFORD, AND THE TECHNICAL SCHOOL, SHIPLEY

WITH DIAGRAMS

LONGMANS, GREEN AND CO.
39 PATERNOSTER ROW, LONDON
NEW YORK, BOMBAY, AND CALCUTTA
1913

ADVANCED TEXTILE DESIGN

BY

WILLIAM WATSON

SUPERINTENDENT AND LECTURER IN TEXTILE MANUFACTURE, THE ROYAL TECHNICAL COLLEGE, GLASGOW; FORMERLY HEADMASTER OF THE TEXTILE DEPARTMENTS OF THE ROYAL TECHNICAL INSTITUTE, SALFORD, AND THE TECHNICAL SCHOOL, SHIPLEY

WITH DIAGRAMS

LONGMANS, GREEN AND CO.
39 PATERNOSTER ROW, LONDON
NEW YORK, BOMBAY, AND CALCUTTA
1913

Advanced Textile Design

William Watson

In the interest of creating a more extensive selection of rare historical book reprints, we have chosen to reproduce this title even though it may possibly have occasional imperfections such as missing and blurred pages, missing text, poor pictures, markings, dark backgrounds and other reproduction issues beyond our control. Because this work is culturally important, we have made it available as a part of our commitment to protecting, preserving and promoting the world's literature. Thank you for your understanding.

PREFACE

THE designing and colouring of cloths, which are composed of one series of warp and one series of weft threads, are exhaustively treated in the accompanying book, entitled "Textile Design and Colour, Elementary Weaves and Figured Fabrics." This book forms a continuation of the subject, and deals in an equally complete manner with compound and special cloths in which two or more series of threads are employed in one or both directions, or which are produced in special methods. There is no separate section on colour, but the principles upon which colours are applied to the various classes of cloths are described and illustrated.

Many branches of Textile Design need specialisation, and with this object in view, and as an aid to the adequate treatment of each branch, a large proportion of the matter contained in this work has been specially prepared in the form of separate serial articles which have appeared in textile journals. The chapters on double cloths, special classes of double cloths, wadded and centre-stitched double cloths and treble cloths, on lappet and swivel weaving and designing, and on plain and figured warp pile fabrics, and book-harness muslins, have been published in the *Textile Manufacturer;* the sections on extra weft and extra warp figuring, and gauze and leno fabrics in the *Textile Recorder;* while portions of the chapters on weft pile fabrics and Turkish towelling structures have appeared in *Cotton* (U.S.A.). In re-issuing the matter in book form, most of the original illustrations have been used, but new examples have been introduced and the text has been carefully revised. Further, in order to make the book a complete work on the design and structure of compound and special cloths, chapters have been added on weft and warp-backed cloths, imitation backed fabrics, and backed cloths with wadding threads; on damasks, tapestry and upholstery cloths, ingrain carpets, fancy toilet and quilt fabrics, Brussels, Wilton, Tapestry, and Axminster pile carpets, etc.

Special jacquard and harness mountings, such as sectional jacquard arrangements, pressure and split harness mountings, self-twilling, double-

cloth, twin, and pile carpet jacquards, inverted hook machines, jacquards with working comber-boards, and gauze and Madras mountings, are fully described and illustrated, as are also the special mechanisms used in weaving lappet, swivel, and Turkish towelling fabrics. The book contains 461 figures, which embody over 2,000 designs, diagrams, and representations of woven fabrics.

The writer wishes to express his indebtedness to several textile engineering firms and many friends for the willingness with which they have placed information at his disposal, and to the publishers and printers for their attention to his wishes in the preparation of the book.

W. W.

GLASGOW, *December*, 1912.

CONTENTS

CHAPTER I

Backed Cloths

CHAPTER II

Double Cloths

CHAPTER III

Special Classes of Double Cloths

CHAPTER IV

Wadded and Centre-stitched Double Cloths and Treble Cloths

CHAPTER V

Extra Weft Figuring

CHAPTER VI

Extra Warp Figuring

CHAPTER VII

Figuring with Extra Weft and Extra Warp

CHAPTER VIII

Special Jacquard and Harness Mountings and Systems of Designing

CHAPTER XV

Swivel Weaving and Designing

CHAPTER XVI

Weft Pile Fabrics

CHAPTER XVII

Turkish Towelling Fabrics

CHAPTER XVIII

Warp Pile Fabrics

CHAPTER XIX

Figured Warp Pile Fabrics

CHAPTER XX

Figured Pile Fabrics in which the Design is due to Colour

ADVANCED TEXTILE DESIGN

CHAPTER I

BACKED CLOTHS

Introduction of Extra Threads—Principles of Tying or Stitching. *Weft-Backed Cloths*—Method of Designing—Reversible Weft-backed Weaves—Methods of Weft-Backing Standard Twill and Hopsack Weaves—Warp-Face Weaves Backed with Weft—Method of Selecting Weft Ties—Special Examples of Weft-Backing. *Warp-Backed Cloths*—Method of Designing—Reversible Warp-Backed Weaves—Beaming and Drafting Warp-Backed Designs—Methods of Warp-Backing Standard Weaves—Method of Selecting Warp Ties—Special Examples of Warp-Backing—Comparative Setting of Backed Cloths. *Imitation or Pseudo-Backed Cloths*—Imitation Weft Backing—Imitation Warp Backing. *Backed Cloths with Wadding Threads*—Weft-Backed and Warp-Wadded Designs—Warp-Backed and Weft-Wadded Designs.

Introduction of Extra Threads.—The backed, double, treble, etc., principles of construction are employed for the purpose of increasing the warmth-retaining qualities of a cloth, and in order to secure greater weight and substance than can be acquired in a single structure which is equally fine on the surface. A heavy single cloth can only be made by using thick yarns, in conjunction with which it is necessary to employ only a comparatively few threads per unit space. A heavy single texture is therefore obliged to be somewhat coarse in appearance. By interweaving extra weft, or extra warp, or both extra weft and extra warp threads on the underside of a cloth, it is possible to obtain any desired weight combined with the fine surface appearance of a light single fabric.

In addition to being employed for the sole purpose of giving greater weight and substance to a cloth, extra threads are very frequently introduced for ornamental purposes only, the additional weight of the threads being of no account, while in other cases they are introduced both for weight and ornamentation. In order that comparisons may be made, three classes of cloths are represented in Fig. 1, which are illustrative of the three reasons for introducing extra threads. A shows the face and B the underside of a warp-backed trousering fabric, in which the extra threads are introduced only to give additional weight and substance ; C shows the face, and D the underside of an extra-warp figured dress texture, in which the extra threads are solely for the purpose of ornamentation ; while E and F show the two sides of a figured double-cloth reversible rug structure, in which the extra threads serve both for weight and ornamentation.

When the extra threads are inserted solely to give additional weight, the idea is to employ them in forming a back to a face fabric ; and one of the advantages of the backed, double, treble, etc., systems of construction is that the extra weight can be obtained in an economical manner, since material which is inferior to the face yarns may be used on the underside. Backed cloths are constructed on both the extra weft and the extra warp principle ; a cloth consisting in the former case of

two series of weft threads and one series of warp threads, and in the latter of two series of warp threads, and one series of weft threads. Double cloths are composed of two series both of weft and warp threads, and treble cloths of three series; while there are other structures which consist of three series of threads in one direction and two series of threads in the other direction. Cloths are not limited to three series of threads in one or both directions, but it is only in special cases that a greater number of series is employed.

Principles of Tying or Stitching.—When extra yarns are employed for weight-giving purposes, it is very important that the threads on the underside are bound to the face-texture with the proper degree of firmness, and that they are entirely invisible from the face side of the cloth. There are many features in tying or stitching which are common to the different classes of cloths, and these features are illustrated in a general way by the illustrations given in Figs. 2, 3, 4, and 5. Each flat view in the figures is shown connected by lines with a plan of the face weave of the cloth that is represented. The dotted lines in the flat views indicate the positions of warp and weft threads on the underside, while the solid black marks show the places where the back threads are raised over the face threads for tying. Corresponding positions of the ties are indicated by the black marks between the squares of the face plans. Assuming that the cloth is simply backed (with warp or weft as the case may be) the stitching marks indicate how the back threads are interwoven; but if it be assumed that both warp and weft threads are employed in forming a cloth below the face fabric the marks only show how the two cloths are united.

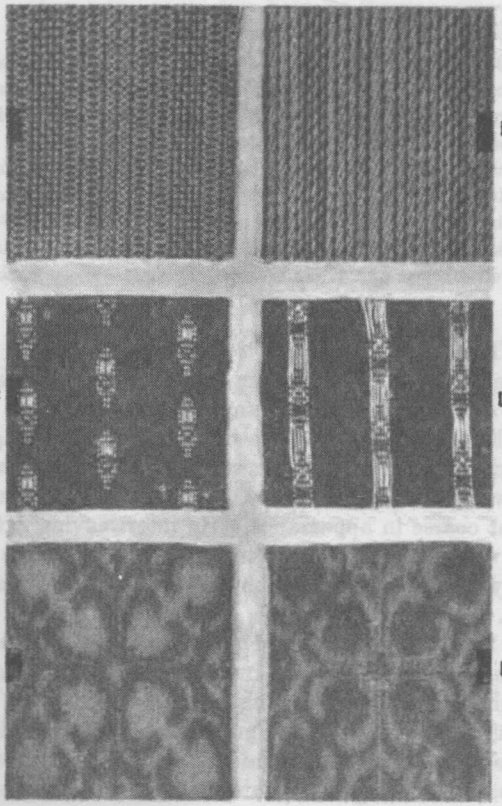


Fig. 1.

In order to avoid the formation of marks or indentations in the face of a cloth, the threads on the underside should float over the threads of the face fabric between corresponding floats in the face weave. It is therefore necessary to carefully select suitable positions for the stitches or ties in the face weave, and for this reason the face weave that is employed largely determines the arrangement of the ties that is most applicable. The basis on which the face weave is constructed should be

ascertained, as from this the best order of distributing the ties can, in most cases, be judged. The following orders of distribution are in general use :—(*a*) Twill order, used for twill face weaves. (*b*) Sateen order, used for weaves based upon sateens, and also for the loose binding of twill weaves. (*c*) Plain or alternate order, used in binding certain weaves very firmly. (*d*) Irregular order, used for irregular weaves.

A in Fig. 2 represents a twill order of stitching a 2-and-2 twill face cloth with

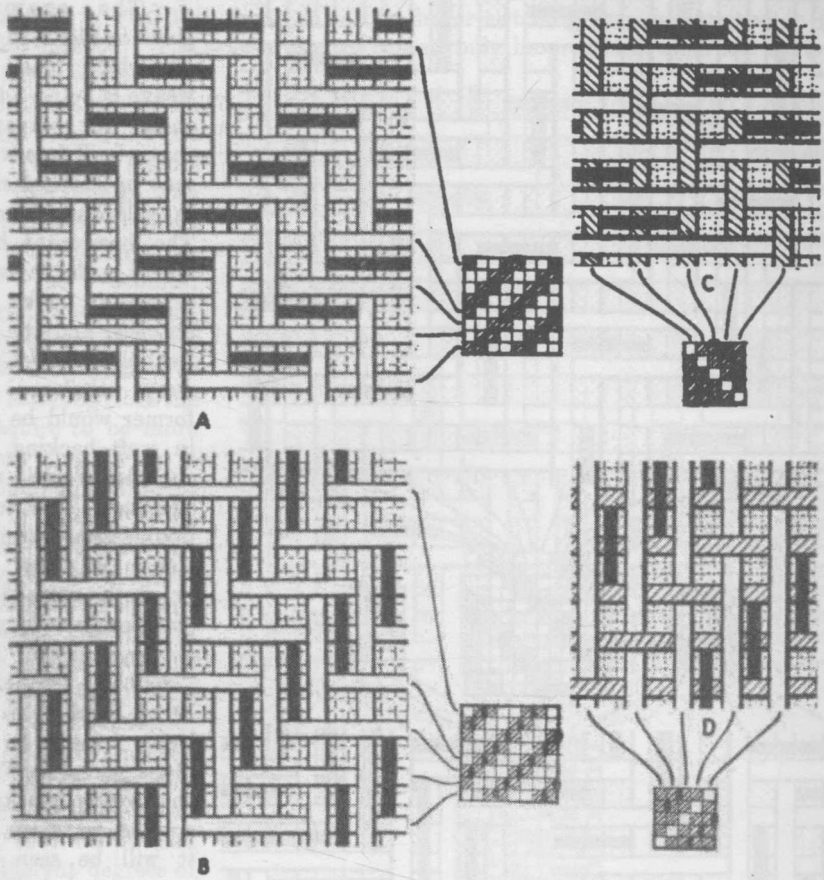


Fig. 2.

backing weft, and B with backing warp. In each case the backing threads are stitched with the face threads between corresponding floats in the face weave—*e.g.*, in A, each backing weft stitch is indicated between face-weft floats, and in B, each backing warp stitch between face-warp floats. In the plan which corresponds with diagram A, the shaded marks represent the face-weft floats, while the black marks between the squares show where the backing picks float over the face ends, and coincide with the stitches shown in the flat view. The shaded squares, in the plan that corresponds with B, represent warp up, while the black marks between the squares, which coincide with the stitches shown in the flat view.

indicate where the backing ends float over the face picks. Similarly, C in Fig. 2 represents a 4 weft-and-1 warp twill face cloth, the ends of which are stitched in twill order by the backing picks; while D shows a 4 warp-and-1 weft twill in which the backing ends are raised in twill order over the face picks.

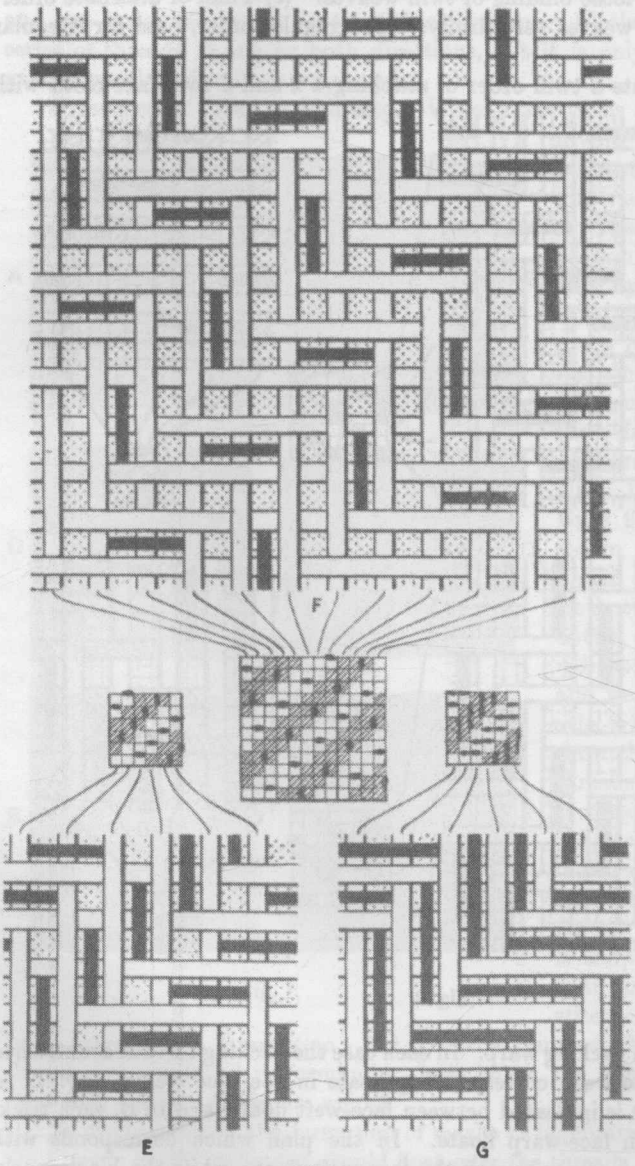


Fig. 3.

The examples given in Fig. 3, in each of which the face weave is 3-and-3 twill, show by comparison that a twill face weave may be stitched either in twill or sateen order. The horizontal black marks in the flat-views represent back weft stitches, and the vertical black marks, back warp stitches. The former would be used in weft backing, and the latter in warp backing; but in a double-cloth structure either of the two, or both methods in combination may be employed, the term "double - stitching" being applied in the latter case. In the plans given in Fig. 3 the weave marks represent warp up, and it will be seen that a warp tie is indicated between two marks, and a weft tie between two blanks. The twill order of stitching, shown at E, coincides with one repeat of the face twill weave, but the sateen order requires the face twill to be extended to two repeats in each direction, as shown at F. Such an extension is necessary, in the 1 face, 1 back arrangement, when the face twill repeats on an even number of threads, whereas