THE JOURNAL OF THE
TEXTILE INSTITUTE

Vol. XXXV APRIL 1944 No. 4

PROCEEDINGS

Lancashire Section

SOME NOTES ON THE PROCESSING OF RAYON CRÊPES AND RAYON STAPLE FIBRE FABRICS

By the SILK MANAGEMENT and STAFF of J. CHADWICK & CO., LTD., OLDHAM.*

(Paper delivered to the Lancashire Section, 17th December, 1943)

RAYON CRÊPE FABRICS

We would emphasise that in the successful manipulation of rayon crêpes the crux of the whole process lies in the care exercised in the Grey Room and the Boiling-off Departments. Most of the faults which crop up after dyeing, and which cannot be remedied, or only at great cost in materials and labour, could be avoided if the grey goods are carefully examined by a staff who know what to look for, and if the goods are properly and skilfully handled in the boiling-off process, which follows. The ensuing dyeing and finishing should only be a natural sequence presenting few difficulties: a properly prepared fabric will more or less finish itself. Excessive work in the Finishing Department, more often than not, is only necessary to cover up the glaring deficiencies of improper methods of preparation.

Before processing any crêpes or rayon staple fabrics, a pattern is taken by the chemist, and checked against the description on the order sent by the customer. In some cases it is found the order states " acetate," then on test it is found to be viscose, and vice versa. This is an important point, because the processes are entirely different for the two fibres in that a " ptepare " for acetate is not sufficient for the viscose, and the viscose " prepare " is much too stringent for the acetate, and this viscose " prepare " would spoil the acetate rendering the cloth unmerchantable when dyed.

The following are a few brief notes on the principal points to note in the

Grey Room:

(1) On receipt of grey cloth, check condition carefully for damaged places, wet patches, etc. These should be reported to the customer immediately.

(2) All crêpes should be received on wooden pegs or cardboard tubes, and this is the general manner in which they are delivered. Very occasionally goods are received in plait form. The plait marks will almost certainly show in the finished fabric and no responsibility can be accepted for this fault—provided that the customer is notified by letter on receipt of the grey cloth.

(3) When putting goods into work, look out for hard crimps, particularly near the peg or tube, due to careless rolling by the maker. These are not eliminated by embossing and become permanent during crêpeing. If at all prevalent the maker should be notified, and if necessary, asked to come to see the goods.

(4) Maker's cleaning marks, where he has been cleaning out oil or grease stains from the loom are fatal, and invariably show up as a light coloured

*The paper was read on behalf of the authors by Mr. R. J. Smith.

patch with a different degree of lustre from the rest of the finished piece. Any maker cleaning in the grey should be advised to desist. If the mark is slight, it will probably be removed by the strong soap liquors employed in the boiling off, but if heavy and fairly numerous in the goods, it is better to put the affected pieces to dark shades, which will cover the fault.

(5) Water drop marks, picked up during weaving, will, similarly to maker's cleaning marks, show up as light coloured patches. Though never entirely covered, the best way to hide them on a badly spotted piece, is to delustre completely and dye black.

(6) Maker's faults such as fog marks in the warp (i.e. where the warp has been sullied by standing exposed on the loom for some considerable time), dirty weft, periodic heavy oil sizing, etc., are faults which can generally be found in the grey cloth by the expert, but it is better to re-examine any suspected cloths *after* preparing to determine whether these faults are still present.

(7) The checking of lengths advised by the manufacturer is also important. In most cases the discrepancies are slight, and do not amount to more than ½ to ¾ yard per lump of 90 to 100 yards, but when a delivery of grey cloth is consistently down on each lump, the cumulative effect is quite considerable.

(8) In normal times grey cloth may be kept in stock for some considerable period by the dyer, so a few words of advice on storage may not be inopportune. As some of the rayon crêpes contain a crêpe viscose weft sized with linseed oil, it should be borne in mind that this linseed oil will gradually oxidise and become harder and darker in colour with the passage of time—just as in ordinary paint. These processes are accelerated by heat and strong sunlight, so it is advisable to store in a cool place and if the grey roll is not wrapped in paper, to cover the pile of cloth with a dark wrapper.

The piling of rolls in criss-cross fashion to excessive heights is also to be discouraged. The portions of the roll subjected to pressure for prolonged periods show up subsequently as dark coloured patches.

Embossing

The object of this process is to obtain a more pronounced crêpe effect on the finished fabric than would be obtained by the natural contraction of the weft due to its twist in the crêpeing bath. Other advantages of embossing are that it helps to cover up "canage" due to uneven sizing, which causes uneven contraction during crêpeing and gives the finished cloth a "rained-on" appearance. It also helps to break up the cloth, making it more pliable for process, and to cover up variations in the crêpe effect due to variation in the twist of different cops of weft yarn.

The process is applied mainly to lining and suede crêpes, satin beautés, particularly 100 per cent. acetate, and low and medium quality marocains.

Points to observe—

(1) Before running goods take a paper impression of the design, and verify that the pressure is uniform across the face of the bowl. Uneven pressure causes an uneven crêpe effect and tenderness where the pressure is heavier.

(2) Ascertain by means of a pyrometer that the temperature is uniform across the face of both bowls.

(3) Avoid excessive pressures which may cause tenderness in the weft. In the case of new qualities, it is advisable to emboss 1-yard pattern, delustre, and then test the weft for strength.

(4) Crêpe within 24 hours of embossing for the best effect.

After embossing, goods have to be prepared for the crêpeing and delustring process. Some of the largest producers do many qualities on continuous machines at full width, but we do not propose to discuss these methods here. The more common method is to crêpe and delustre the pieces with the fabric rolled on itself in the form of a hank. The usual grey room proceedure is as follows:

(1) The grey is unrolled and batched up on a beaming-on machine, 5-10

lumps on a batch, all ends and throughs being sewn up. On this machine the grey length can be ascertained and checked.

(2) The batch is embossed to the required design and rebatched behind the embosser.

(3) The embossed batch passes over an inspection table, where any maker's faults can be strung. The cloth then passes to a hand- or power-driven winch approximately 84" circumference, on which it is wound. At this point the lumps of 100 yards can be cut into ends of 50 yards to facilitate processing, and are then drawn off the winch, which is collapsible, in hanks.

(4) The hanks are now ready for stringing which consists in threading fine strong twine through all the laps in the hank at the selvedge on one side of the piece. Each string is tied in a loop about 10" in length, and there are 6 or 8 equidistant loops on each piece. Two poles are then used to suspend the piece, each pole passing through half the total number of loops in the piece.

The reason for suspending each piece by loops from one selvedge, so that the weft is vertical, is to permit the free passage of liquor through the piece. If the piece was simply suspended by passing two poles through the hank weftways, so that the warp was in a vertical position, liquor would not penetrate so uniformly, and in addition the top portion of the hank would be out of the preparing liquors—causing irregular results.

Points to observe are—

(1) Too many thicknesses of fabric strung on one loop cause the cloth to bunch up tightly at this point, resulting in bad penetration and under-delustred patches near the string holes. Where there is a tendency for this to happen use double loops.

(2) *Every* lap must be strung, since if one is missed, this portion of the fabric will drop and crease up, giving rise to ugly crimps near the selvedge, which cannot be removed by any subsequent process.

(3) String *in* the selvedge and not ½" to 1" into the piece which leaves disfiguring holes in the finished cloth.

(4) Loop lengths must be uniform. Unequal lengths cause distortion of the hank in boiling-off, which cause crimps and uneven delustring.

(5) Loops must be equidistant round the perimeter of the hank. Unequal distances cause sagging of the hank which causes faults similar to (4).

It is policy to have a board with hank and string outlines marked on it. All strung pieces are slung on poles and applied to this outline. Any irregularity in length, or distance apart of loops, is immediately apparent. One girl is employed to check the work of the stringers, and all bad work is returned to the girl responsible for it.

Preparing Process

This consists of soaking at moderate temperatures in various liquors in order to remove the gelatine sizes from the warp, the sighting colour from the weft, and where present, to soften down the linseed oil sizes. Goods then go forward to be crêped in bright finish, semi delustred finish, or fully delustred finish as required, the desired effects being obtained by careful control of temperatures and the concentration of the soap and other liquors employed. For fully delustered finishes, phenol or cresylic acid in the presence of about 1 per cent. soap is generally employed.

Points to watch are—

(1) Delustring tanks should be of sufficient depth to allow plenty of clearance between the bottom of the hanks and the steam coils at the bottom of the tanks.

(2) Direct steam is the most economical method of bringing a tank up to temperature in the absence of pieces, but in the presence of piece goods, it is apt to disarrange the hanks causing crimps. When an open coil is used the strength of the liquor must be carefully checked. Closed steam coils are generally employed, but they must be so designed to give a regular boil over

the whole area of the vessel. Sudden eruptions of boiling liquor are dangerous to the workers, and distort the pieces in process.

(3) The hanks must be lowered into the delustring liquors in such a way that they slide into the liquor quickly and evenly. Any delay or sticking half way due to air blobs will cause a " tide-mark " in the piece.

(4) Once immersed the pieces should be lifted clear of the liquor, drained and re-immersed. This should be repeated two or three times to make certain that the liquor has penetrated the piece uniformly, and what is most important, that it is at uniform temperature throughout.

(5) Regular changing of the loops on the poles is advisable as the edges of the flat hank are exposed more than the rest of the hank to the circulating liquors. It also prevents the formation of " crows-feet " due to the hank remaining in one position too long.

(6) After the delustring process is complete care must be exercised in washing and cooling off. The acetate warp is in a semi-plastic condition due to the action of the phenol/soap solution at 100° C., and any sudden immersion in cool water will result in any folds in the cloth in hank form being congealed into deep creases which are most difficult to remove without reprocessing. Care must therefore be taken to see that cooling is gradual.

The prepared goods can then be unhanked and got ready for dyeing. Careful scrutiny of the fabric at this point will be advisable. Look out for:—

(1) *Dirty Weft.*—This generally shows as black lines in the weft about ½" to 1" in length. These frequently occur with a regular periodicity which is caused by a cop of yarn getting a blob of grease on it at one point. Nothing will remove this type of stain as the minute particles of dirt are firmly trapped in the yarn filaments.

(2) *Unremoved Linseed Oil Size.*—This may show most prominently where a new cop of yarn has been woven into the weft. The characteristic brown coloration is unmistakable, and the intensity of this coloration gradually diminishes the further away one gets from the start of the cop. This is due to the outer turns of yarn on the cop being the most affected by " weathering." As the cop is gradually unwound during weaving the fault practically disappears, only to reappear where the next defective cop commences.

Should either of the above faults be prevalent it is advisable to cut portions out of the cloth illustrating the fault. These can be retained and used as evidence in case of any dispute at a later date. In particularly bad cases, it is advisable to rough dry the pieces, and call in the manufacturer to inspect them before proceeding with the dyeing as it may be found necessary to put all the pieces to black.

The Dyeing Process

Crêpes are dyed in open winch vessels fitted with a perforated stuffing partition to prevent the pieces coming into direct contact with the live steam pipe, and to facilitate the addition of dyestuff to the liquor in such a manner that it only works through to the goods gradually.

The winch is generally elliptical in shape so that the pieces in the rope form are plaited down into the liquor. There is a greatly decreased tendency for pieces to get entangled in this form, than when coiled down at random from a circular winch.

Vessels are generally of stainless steel so that the vessel can be switched rapidly from one shade to another without excessive cleaning and boiling out. Though the initial expense is higher, the life of a stainless steel vessel is almost endless, whereas wood vessels soon wear out, and develop leaks, etc.

Most of the dyebecks in use on crêpes appear to have been copied from the design used on the Continent for the dyeing of real silk crêpe-de-chine. Vessels with enormous surface areas, which radiate so much heat that there is often 15° C. difference in temperature between the front and the back are not uncommon, whilst they are frequently so shallow that pieces float on the

top of the liquor and the dyer has great difficulty in getting penetration. Economy in time and steam is effected, and better results are obtained by diminishing the width of the vessel from front to back and at the same time increasing the depth by 2′ to 2′ 6″. The goods are then forced down under the liquor due to the weight of the superimposed laps with greatly improved results.

The following are further salient points in vessel construction:—

(1) Supply adequate steam so that vessels can be brought to the boil in about 15 minutes. This enables intermediate processes such as scouring, soaping, etc., to be effected quickly.

(2) Steam pipe of such a design that there is a level boil across the full width of the vessel, and such that this state of affairs is maintained for a reasonable period.

(3) An adequate supply of washing off water and in the correct position and not over the "clack" as is so often seen. Washing off is best effected by means of spray pipes at the back of the vessel, so that there is a continuous current of cold clean water flowing from back to front of the vessel.

(4) Release valves of large enough dimensions to permit the vessel to be emptied in a few minutes.

Little can be said about the actual dyeing process. Anybody with an idea of the general characteristics of direct and acetate dyestuffs and a knowledge of accurate matching should be capable of dyeing these fabrics in a satisfactory manner, provided that cleanliness, and the proper pasting up of the acetate colours, are observed. Any tendency to rush the acetate dyestuffs on to the fabric is also to be discouraged as this will tend to give poor penetration.

A final point is the importance of a supply of clean water of not more than ½° hardness. Admittedly results can be obtained by using sulphonated fatty alcohols in place of soap, but there is always a certain amount of soap carried forward in the pieces from the boil-off and this is often sufficient in quantity to cause lime soap formation and scum stains.

THE DYEING OF VISCOSE RAYON STAPLE FABRICS

In recent years, cloths woven wholly or partly from viscose rayon staple yarn have come largely to the fore.

By introducing a proportion of acetate yarn to these cloths many attractive variations can be obtained when the cloths are dyed.

This feature is possible because of the chemical difference between viscose and acetate, the two being dyed by completely different types of dyestuff; hence one can get two colour effects in the same dyebath by using dyestuffs of each type.

The cloth is prepared and dyed on vessels similar to those used for crêpe fabrics.

Preparing

The first operation when the cloth is running smoothly round in the water is *De-sizing.*

Starch or size is used in the manufacture of the cloth to give the yarn strength to stand up to the weaving operation, but if it were left in, the resultant dyeing would be patchy and streaky. The starch is removed by introducing to the water in the dye beck a suitable amount of malt extract at a low temperature. The action of malt is slow, but nowadays rapid action malt preparations are on the market which de-size the cloth in a shorter period. After washing the cloth is scoured in a 1 per cent. solution of boiling soap for one hour.

This preparation makes the cloth *pure* and *soft,* and it is now in a fit state to be dyed.

Dyeing

The dyestuff powder is mixed with boiling water in a bucket and strained before adding to the actual dyebath. The colour is added slowly in the front

of the dye beck, known as the stuffing box, the cloth being kept constantly moving by the eliptical winch.

The dyeing is started in water heated to 100° F. When all the dye is added the temperature is raised slowly to the boil; all the time the dye is gradually going on to the cloth; the dye is exhausted reasonably well in about 1½-2½ hours, according to the depth of shade.

Light shades will dye nicely with little or no assistance, but the deeper shades require the careful addition to the dyebath of Glauber salts or common salt to exhaust the dyebath. This is an interesting phenomenon, the chemical aspects of which are outside the scope of this little lecture.

If the salt is added carelessly, streaky dyeing is the result. The salt is usually added about one hour after the commencement of the dyeing.

The operative then takes a small sample from the cloth and submits it to the "dyer" for comparison with the customer's basis pattern for shade. Additions of dyestuff are usually made until the correct shade is arrived at.

When the dyer is satisfied that the colour has penetrated and levelled well and that the shade is correct, the cloth is rinsed and "run off" into a waggon.

The waggon of cloth is then run into a perforated drum machine (the hydro-extractor), which can revolve at a high speed and throw the water off by centrifugal force.

The damp cloth is then opened out from the rope form to open width and dried by passage through a hot air drying machine.

It is then passed on to the finisher.

DISCUSSION

L. Morris: I have a piece of a new type rayon fabric which I have dyed to-day and it is now ready for finishing The cloth has a 100 per cent. rayon staple fibre weft spun on the woollen system and a 3½ s cotton warp. Do you think that it will raise satisfactorily?

R. J. Smith: Yes, it should raise satisfactorily but first try it pure, and if a softener is needed to enhance handle, use sparingly for some softeners used to excess do not help raising.

L. Morris: If I am successful in raising it, how will it wash?

R. J. Smith: It will wash satisfactorily but drying after washing is perhaps more important. If dried on an air-lay type drier or other hot air machine as opposed to cans, the pile will be preserved, but if can dried or subsequently given a heavy Hoffmann press finish, the finish will be lost. Rayon fibre has not yet obtained the same resiliency as wool and the trouble with your fabric will arise, not in washing, but in drying.

A Member: With regard to raising cloths woven from viscose staple fibre yarns, does it assist raising if the yarn is spun from fibre of mixed staple?

R. J. Smith: I have never seen any details of experimental work on raising such cloths. It is an interesting speculation as to whether a fibre could not be made to "fit" into the raising process. It is obvious that something more than mere surface properties are needed for satisfactory raising but what governs successful raising, I am afraid I cannot say and very little has apparently been published on the subject. Cleanliness and absence of size or any material likely to interfere with the free movement of the fibres, are essential. Uneven staple or rather mixed staple might help, but what would probably be more helpful would be a study of fibre length related to count, twist and weave in a range of raised cloths.

J. Greenwood: Can the speaker tell us if a crêpe which has been pre-crêped (embossed) will keep its pebble effect as long as one that depends entirely for effect upon the crêpe given by hard twisted yarns?

R. J. Smith: I have been assured that there are two advantages of pre-crêpeing: one, the cloth retains its characteristics longer than where strains were all released in the wet crêpeing process and two, undoubtedly greater uniformity and a superior surface effect. I must admit that I have heard the opposite claimed, but still know more people who pre-crêpe than who enter direct into the crêpe bath.

A Member : The lecturer in the early part of the paper refers to pre-crêpeing and afterwards carefully examines the cloth for strength. Surely damage would be visible if it were serious enough to bother about? Grit or maladjustment of the bowls can be serious.

R. J. Smith : Embossing or pre-crêpeing is a highly skilled job and unless carefully watched and adequately supervised can be a somewhat risky process. In one works I know, their best man is in charge of the operation and they consider this advisable. Some form of examination after embossing is essential, and whether or not the control detailed in the paper is followed, the charge-hand in control of the pre-crêpeing section should be provided with a means of closely inspecting processed fabric for bruising or partial cutting of the yarns. Excessive bruising results in weak fabrics.

Faulty adjustment of the bowls (unlevelness, running out of fit) can be dangerously serious and grit may be disastrous.

Mr. Greenwood may care to comment upon pre-crêpeing Bemberg goods.

J. Greenwood : Cuprammonium rayon does pre-crêpe very well and whilst some goods are pre-crêped, others are processed in the normal way.

Mr. Lomax : I have noted that Mr. Pickering when speaking of dyeing, appears to give this process a long time for completion. Would there be any disadvantage if the fabric were run through say a 0·1 per cent caustic soda solution and dried without rinsing. Would not the caustic soda help penetration and speed up dyeing?

R. J. Smith : Whilst not a dyer, it does not seem that 2½ hrs. is a long time for completion of dyeing with direct cotton dyestuffs allowing for shade-matching and securing adequate penetration. Mr. Pickering is no doubt dealing with quality goods and high class work. I do not think the idea of drying caustic soda on to the fabrics would be helpful and certainly would not aid the production of an attractive handle and finish.

A Member : I know Mr. Pickering is a dyer to whom quality is the first aim and he is undoubtedly considering quality when he refers to a 2½ hr. dyeing process. In dyeing viscose staple fibre cloth, particularly where finishing is carried out in the same bath, drying in caustic soda makes it harsh and brittle. In the post-war period (and there are signs of it already) these cloths will be vat dyed. It is wrong to spend useful time dyeing good cloths with colours lacking fastness. Questions of shrinkage are also assuming importance and will do so more and more in the post-war period. Present shrinkage processes are far from satisfactory, some goods which shrink up to 8 per cent. in processing having been found to extend to their original length on re-processing. Shirts have in some cases washed bigger after mechanical shrinking though there is now a scheme on foot to secure natural shrinking and avoid over-shrinkage. What shrinkage do you think should be regarded as "fully shrunk"?

R. J. Smith : The question of shrinkage is a very vexed one and is receiving a deal of attention at present. No answer can be given to the question put by the last speaker. Each fabric must be shrunk to its own individual demands and there can never be laid down a figure for shrinkage. The question of extension on washing shrunk cloths is a vexed one. I am assured by expert shrinkers that by experience and attention, overshrinkage and its attendant evils can be avoided.

Until, however, we can attack the whole problem at its root the difficulty will never be truly overcome. Chemical treatment which will "fix" the fabrics and make them truly dimensionally stable, is the only real solution. To this end, the whole process must be related to cloth structure, starting with the spinner of the yarns and ending with the finisher who must not be expected to produce a wider and longer fabric than the weaver wove. By chemical means, it will be possible to "set" the fabric to previously determined dimensions.

A Member : With regard to compressive mechanical shrinkage, the process is controlled by actual wash testing and every cloth is tested before processing. If correctly processed, extension is not found. However, in laundering, fabrics are stretched in ironing and finishing operations. The whole problem is of course tied up with the question of fibres swelling when wetted. Without swelling neither crêpeing nor shrinking would take place.

R. J. Smith : I quite agree, and several people have had the same idea as to the fundamentals of non-shrink finishing and it now remains to be seen by whom and how this prevention of swelling with its attendant evils is to be achieved.

A Member : Reverting to the question of stain removal from rayon cloths, when oil stains have been removed a metallic stain may be left which is not removable and which shows through on pastel shades. Reference is also made to the question of de-sizing rayon staple fibre cloths by malting. That assumes the size to be starch, and whilst before the war starch was used, there seem to-day to be in use gum or similar sizes. These are not easily removed and any suggestions for dealing with them will be useful.

R. J. Smith : For gum size removal hot water and time are the best agents, for the process is akin to that of removing gelatine. The process cannot be hastened and time is the essence of success for many gums do not respond readily to speedy processing.

In some plants light weight slub and plain " spuns " similar to our present " utilities " have often been prepared in open width. The process involves treatment in a hot caustic soda liquor followed finally by " slack " drying. This gives a very lofty handle and a cloth ready for further processing. Nothing has been said so far of the influence of crease-resist processing upon rayon fabric development. A widely held view is that this process has made viscose rayon staple fibre fabrics a practical proposition and a view which is rapidly gaining ground is that the future development of these cloths depends upon the evolution of new and even better durable finishes such as suede-like handle, dimensional stability, added warmth of touch, reduced tendency to wet, and in fact, any finish which will tend to give a wool-like handle and properties.

The wool and cotton industries have many points in common, there are of course many divergent points too, but as the present tendency grows for more wool to be processed by cotton and rayon processors, and for more cotton and rayon to be handled by the wool trade, so shall we get a community of interests and new minds and experience brought to bear on what have become old familiar problems. As the number of synthetic, man-made, fibres increases (and increase it will) so will this general growth or exchange of knowledge become of enhanced value and to the general benefit of the whole industry. Not only will the number of synthetic fibres increase, but also the type of fibre will be " fitted " to the fabric for which it is ultimately intended, and if all this endeavour is going into the production of the fibres themselves, how much more important does it become that the finish applied shall be worthy of the fibre upon which it is grafted? The day of the durable finish has dawned, the day of the old starch and tallow finish lacking resistance even to mild washing, has gone. As quality consciousness grows, the whole of the textile industry from fibre producer to finisher will have to regard quality as the premier feature of each stage of manufacture and, in the long run, the industry as a whole will reap the reward which only quality productions can bring.

Midlands Section

THE INFLUENCE OF KNITTING CONDITIONS ON WOOLLEN FINISHING PROCESSES

On Wednesday, March 8th, Mr. W. A. Dutton, of the Wool Industries Research Association, delivered a lecture on the above subject to a very well attended joint meeting of the Midlands Section and the Society of Dyers and Colourists at the Leicester College of Art and Technology; Mr. W. A. Edwards presiding.

The lecturer dealt mainly with some of the aggravating problems with which Finishers have to contend in the processing of knitted woollen fabrics, the difficulties being brought about by variations in the actual structure of the fabric. Additional complications are introduced by the fact that large numbers of knitting machines of different gauges and employing different counts of yarn are to-day being used to produce garments of standard weights. Thus slack and tight fabrics were being knitted for the same style garment.

Figures quoted by Mr. Dutton showed that as the knitting stiffness or courses per inch decreased the area shrinkage during washing increased, an example being that a fabric with 21·8 courses per inch has a shrinkage of 25 per cent., but another fabric made on the same machine and from the same yarn but with 16·7 c.p.i. has a shrinkage of 43 per cent. in area. A series of figures were quoted outlining the variations within the products of one knitter, and the variations from knitter to knitter.

To conform with certain specifications a shrinkage limit of $7\frac{1}{2}$ per cent. is allowed, but Mr. Dutton explained how it is possible for a badly knitted fabric to lose as much as 13 per cent. in length, but increase in width by 6 per cent. and thus fall within the permitted limit.

The lecturer dealt with the various strains imparted during knitting, and showed how these were released during wet processing. In summarising his remarks Mr. Dutton said that it was very desirable that there should be the closest collaboration between knitter and finisher, but at the same time he expressed an understanding of the knitter's problems.

On the motion of Dr. Trotman, Mr. Dutton was warmly thanked for his most interesting talk and for the enormous amount of time and trouble he must have spent in accumulating all the facts and figures which he presented to an appreciative audience.

General Items

Institute Diplomas

Elections to Fellowhip and Associateship have been completed as follows since the appearance of the previous list (February issue of the Journal).

FELLOWSHIP

GEOFFREY LOASBY, B.Sc., F.I.C.,
Research and Production Manager, British Nylon Spinners Ltd., Coventry.

ARTHUR LUMBY KEIGHLEY, M.Sc.,
Dyeing and Finishing Manager, Kelsall & Kemp Ltd., Rochdale.

ERIC HARDING JONES, A.Inst.P.,
Research Physicist, Weaving Department, British Cotton Industry Research Association, Manchester.

ROBERT WIGHTON MONCRIEFF, B.Sc.,
Superintendent of Textile Research, British Celanese Ltd., Derby.

ASSOCIATESHIP

WILLIAM LENG,
Assistant Designer, Messrs. John Murgatroyd & Son Ltd., Halifax.

Institute Membership

The following applicants were elected to membership at a recent meeting of Council :—

Ordinary

George Bagrie Angus, 12 Fraser Road, Calverley, Leeds (Chief Chemist, John Crossley & Sons, Dean Clough Mills, Halifax).

Harold Ashworth, 20 Brunel Street, Burnley (Director and Secretary, George Walmsley & Sons Ltd., Peel Mill, Burnley).

Thomas Barr, B.Sc., Ph.D., A.I.C.; I.C.I. Ltd., Dyestuffs Division, Blackley, Manchester (Chemist).

James Burton, Messrs. McConnell & Co. Ltd., Ancoats, Manchester (Doubling Manager).

C. D. Bury, Messrs. John Bury & Co. Ltd., Union Mill, Accrington (Textile Manufacturer).

Frank Conyers, 313 Croxted Road, Herne Hill, London, S.E.24 (Technical Editor, National Trade Press Ltd., Drury House, Russell Street, London, W.C.2).

Henry Cox, 23 Berners Street, London, W.1 (Producer and Designer).

Clifford H. Goldsmith, 680 West 204th Street, New York City, N.Y., U.S.A. (U.S. Army).

Robert Richard Scott Hay, N.R.D., Woollen Mills, Langholm, Dumfriesshire (Woollen Manufacturer).

G. N. K. Iyer, Prabhat View, Dadar, Bombay 14, India (Assistant Commissioner, Government of India, Dept. of Industries and Civil Supplies, Fort Bombay, India).

Richard T. Kropf, Belding Heminway Corticelli, 119 West 40th Street, New York 18, N.Y., U.S.A. (Director of Research).

F. W. Lake, 63 Worton Way, Isleworth, Middlesex (Works Chemist, Associated Dyers and Cleaners, 239 The Vale, Acton, W.3).

John Beck McDowell, Edenderry Spinning Co. Ltd., Crumlin Road, Belfast, N. Ireland (at present in H.M. Forces).

Frederick Stanley Milner, 40 Queniborough Road, Leicester (Works Manager, Wolsey Ltd., Bruin Street, Leicester).

Miss Evelyn Portnoy, N.R.D., 24 Moor Lane, Kersal, Salford 7 (Textile Design Teacher, School of Art, Salford).

Leslie Pownall, 105 Cedars Avenue, Coventry, Warwickshire (Textile Technician, British Nylon Spinners, Lockhurst Lane, Coventry).

George Priestley, M.A., Textile Department, The University, Leeds (University Lecturer).

Cecil James Ratcliffe, 19 Irene Place, Blackburn (Technical Inspection of Textiles, Directorate of Aeronautical Inspection).

John Austen Ridge, " Inglewood," Stoughton Drive South, Leicester (Hosiery Manufacturer, Britannia Street, Leicester).

Reginald Geoffrey Surman, 104 Newgate Street, London, E.C.1 (Manufacturer's Agent and Company Director).

Junior

Ernest Spiegel, M.Sc., 14 Newton Park View, Leeds, 7 (Student, Leeds University).

Terence Ivor Waterson, 33 Bedale Road, Sherwood, Nottingham (Assistant, Yarn and Textile Testing Bureau, University College, Nottingham).

NOTICES: INSTITUTE MEETINGS

Wednesday, 24th May — *Manchester and other Centres.* Examination in General Textile Technology for the Institute's Associateship Diploma.

LANCASHIRE SECTION

Friday, 12th May — *Manchester.* 1.0 p.m. Lunch-time meeting at the Institute's premises. Subject to be announced later.

Saturday, 20th May — *Leigh.* 1.30 p.m. Lancashire Section visit to Bedford New Mill, Leigh. (Branch of Courtaulds Ltd.)

MIDLANDS SECTION

Saturday, 20th May — *Derby.* 10.0 a.m. to 6.0 p.m. daily. Members are invited to attend an Exhibition of Historical Textiles to be held under the auspices of the Derby Textile Society. The Exhibition will be open from 20th May to 10th June, and held at the Museum and Art Gallery, Derby.

LONDON SECTION

Tuesday, 2nd May — *London.* Informal Discussion on " Present Trends and Possibilities in the Processing of Textiles " to be opened by H. à Brassard, at the offices of the Rayon and Silk Association (Inc.), 229-231 High Holborn, London, W.C.1. The meeting will commence at 5.0 p.m.