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Sulphonated quaternary base. For pure white discharges on Indigo-dyed grounds when mixed with Hydrosulfite AWC.

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Bobby Spearman

SEPTEMBER 23, 1932

APRIL 12, 1954
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THE BOBBIN AND BEAKER is a non-profit magazine organized to serve Clemson
students and the textile industry. The publishing and circulation costs are financed
solely through proceeds received for advertisements. We ask our readers to con-
sider favorably our advertisers when buying.
Several years ago it was proposed in the Clemson School of Textiles to determine if the carding operation could be improved by reversing the motion of the flats. It was found that the idea has been frequently proposed throughout the history of revolving flat cards, but for some reasons the practice seems not to have had any wide spread adoption. Possibly research unknown to the writers has shown that disadvantages outweigh the advantages of the method but in the absence of such information a study of the problem is now being undertaken at Clemson. This is a very preliminary progress report on the work begun last summer.

It seems fairly obvious that the loading of the flats while in contact with the cylinder would be quite different when run opposite to the usual direction. Also the type of material brought out on the flats should be different for the two directions. When run to the rear, unopened tufts of cotton and pieces of trash might be brought out, which in normal op-
eration must be cut up or pulled apart by the cylinder before they reach the front of the card. This is surely not the best use of cylinder clothing though it is fortunate the pieces are cut up and at least partially removed by the flats. Small areas of flat clothing, covered by such tufts, may be a cause for neps being made by the cylinder rolling cotton under them.

A study was made on the loading of card flats by cranking them off the cylinder at the rear after the card had been stopped by turning off the power with the feed gear. This makes it possible to weigh single flat strips removed one at a time. The flats were numbered from (1) to (44) from back to front starting with the first flat that has fully contacted the cylinder at the rear of the card. This was done for both directions of running the flats and the weights plotted against the distance of each flat from the rear of the card.

When the flats are run normally the load from the rear to the front is almost constant except for the two or three flats that had last entered the card at the back. This shows that each flat as it enters the card is overloaded and the cylinder soon levels it down to the constant load it will carry until it reaches the stripper at the front.

When the flats are run backward they are clean when they enter the front of the card and slowly load as they move toward the back. They become fully loaded only as they leave the cylinder but for the first two or three flats the load is higher than for normal running. However, part of the load carried out by each flat is picked up as it is leaving the cylinder so that many unopened tufts, seed particles, etc., are kept from ever being worked by the cylinder. Due to this action in reverse operation the character of the flat strip is entirely different from usual flat strips. Since properly stripping flats causes them to make less nep, it seems that the clean flats coming in from the front should catch nep off the cylinder better than when they are loaded in normal operation.

To test these points it was arranged to run the flats backward simply by uncrossing the belt that drives them and to get several flat speeds by using different pulleys. One hour runs were made by manually stripping the flats at the back. The procedure is to thoroughly strip and clean the card and run it until the flats have moved more than the distance from front to back. The nep count is then carefully taken always by the same operator and weighings made of the following items:

1. Cotton fed during run.
2. Flat strip.
5. Lickerin waste.
6. The sliver produced.

The sliver is then tested on the Shirley Analyzer to determine the percent foreign matter. The project is only begun but more than forty runs have been made and it is hoped that the data is sufficiently interesting and valid to be worthwhile presenting at this time. The results shown are all for one Woon-socket card running with normal settings and speeds. Unfortunately the data was not all on one kind of cotton staple lengths 1-1/16 and 1-3/32 respectively.

Table I shows the data taken from which several rather definite trends seem evident.

1. Reversing the flat motion gives a definite reduction in neps for lower rates of production at normal flat speeds and there is an increased reduction in neps with decreased flat speeds running in either direction.
2. Percent foreign matter left in the webb increases with lower flat speed in either direction but is not increased appreciably above normal for speeds down to one to two inches per minute.
3. As would be expected the percent flat strip rises rapidly with flat speeds in either direction but may be less than normal even for reversed motion by reducing the direction of motion.
4. There is considerable reduction in cylinder strips for any reverse flat speed over that for forward speeds.
5. Total waste decreases with flat speed for either forward or reverse running. (See Table I)
6. Reversing the direction of the flats gives less reduction in neps for higher rates of production.

In view of the above trends, assuming they will obtain under mill conditions, it seems in the manufacture of quality goods where the rate of carding is less than 10 to 12 pounds per hour, it would pay to both reverse and reduce the motion of the flats.

Though there might be a small increase in foreign matter left in the webb, this would be more than offset by the gain from a simultaneous reduction in neps, flat strip, cylinder strip and total waste. It is believed the additional foreign matter is mostly lost during later processes. In the gray yarn spun from sliver made in this manner there was no significant difference in strength, evenness or appearance. However, when the yarn is dyed a deep shade there is observed the same reduction in neps that is found in the card webb.

All of the work so far has been done with one arrangement of card settings and speeds. It seems unlikely that the best arrangement would exist on this card and it is hoped that the project advances changes in settings, lickerin speeds, etc., will show still greater improvement in carding operation.

Now to put this plan to use in the mills requires more than uncrossing the belt driving the flats. There
is a stripping problem. Two solutions for this problem have been developed at Clemson.

One is a modification of the present stripper so that it will strip the flats when running in the opposite direction. The strip is gathered on the scavenger roll as at present and the method involves nothing different in the operator’s job.

The present stripper comb is given a larger stroke by enlarging the usual operating cam. At the bottom of the stroke the stripping is carried past special blade and is caught between it and a scavenger roll which is positively driven by a ratchet and pawl.

Plans are under way to develop a scavenger roll type to operate at the rear of the card so that flats can be stripped before going over the top.

A second method of stripping the flats has been developed for a different kind of operation. When carding synthetic staple there is no reason for keeping out the flat strip and this is also the case for a number of uses for cotton when there is no objection to some additional neps.

For this purpose the stripper is placed at the rear of the card and arranged to drop the stripings back on to the ingoing lap. A stripper comb (i) is pivoted on a shaft over the licker-in housing so that it may be rocked back and forth past the flats and the scavenger comb. The stripings, as they are pushed off the scavenger comb fall in a sheet back on to the entering lap.

With these devices it is possible to have reversed flat motion either to reduce neps for a high quality product or to automatically put the stripings back in where such operation is desirable.

The present findings have raised several questions:
1. How does lower flat speed reduce neps?
2. How does reversing the motion give reduction in neps over forward running?
3. Why does reduction of neps by reverse motion decrease with higher production?
4. How does reverse running at any speed give less cylinder strip than do forward speeds:

Again it is stated this is a preliminary report and many more aspects of the problem are to be studied.

<table>
<thead>
<tr>
<th>Approx. prod. lbs./hr</th>
<th>Flat speed in./min.</th>
<th>Neps Per 100 sq. in.</th>
<th>Trash in silver</th>
<th>Percent flat strip</th>
<th>Percent cylinder strip</th>
<th>Percent total waste</th>
<th>Number of runs</th>
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<td>100 84</td>
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</table>

Showing percentages of values given by normal forward speed (4”/min.) being used as 100 percent

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EIGHT

THE BOBBIN AND BEAKER
Who Wants Shrinkproof Wool Anyway?

DR. E. A. MURRAY

Biographical Sketch

Edward A. Murray is a native of Tacoma, Washington and graduated from the University of Washington in 1938 in chemical engineering. After three years at Oregon State College as an instructor in chemical engineering, he went to The University of Texas for further graduate studies and received the Ph.D. in chemical engineering in 1946. During the war years, he was group leader in the Research Division of the National Cotton Council, in charge of a project on the application of high polymers to cotton prior to spinning. From April 1946 until October 1952, he was connected with the Deering Milliken Research Trust, and during the last four years of this period, served as Director for Chemical Research. He is now engaged in consulting in textile research and development, and is associated with the Clemson Textile Department on a part-time basis conducting research on small-scale finishing tests for cotton.

It was first recognized about a hundred years ago that the laundering shrinkage of woolen textiles can be minimized by certain treatments. It would probably be a gross exaggeration to say that more man hours have been spent on developing and promoting shrinking control methods than in producing stabilized fabrics since that time, but the efforts of the entire woolen textile industry are nonetheless reminiscent of the labor pains of the mountain in giving birth to the mouse. There are some exceptions to this generalization; quite a number of mills have been able to make a successful entry into the washable woolen field since World War II, and some of their products are outstanding. But considering the effort and money invested, the results of most attempts to manufacture washable woolens have been disappointing.

To those who have heard the anguished housewife’s cries of rage and frustration on removing from the Bendix washer the family blankets, now shrunk to crib size, there is no need to explain the desirability of washable woolens. Unless ordinary woolen articles are laundered with great care, they are likely to shrink during washing as much as 10 to 30 per cent, as indicated by Papa’s bulging eyeballs when he buttons the collar on his hunting shirt after a prolonged, and accidental, laundering with a lot of the children’s overalls. Experiences of this type are common, and explain the average housewife’s enthusiasm for washable woolens. Why then, haven’t washable woolens taken hold? There seem to be two main reasons:

1. Most of the existing commercial processes, while not prohibitively costly, impart certain undesirable qualities in addition to the desired shrinking control.

2. The control of felting shrinkage is only part of the problem. Selection of washable dyes and the control of relaxation shrinkage are at least as important, and probably as difficult as the elimination of the felting shrinkage.

Small wonder then, that for the past few years a good many mill men have been saying, in effect, “We’ll get into washable woolens when competition forces it, and probably not before. Who wants shrinkproof woolens anyway?” Since washable woolens are far from dead, it may be interesting to examine some of the deficiencies of past and present processes.

The Mechanism of Wool Shrinkage

The manner in which a fabric shrinks depends on a good many things, such as fiber composition, construction, and manner of laundering. There are two entirely different types of shrinkage encountered in laundering woolen fabrics, both of which must be considered in producing a washable woolen:

1. Relaxation shrinkage, representing a suppressed desire on the part of the fabric to return to its original form, before the stresses of finishing operations like dyeing, drying, and shearing, distorted it. Relaxation shrinkage is not peculiar to woolens alone; it is present in all fabrics which have not been specially treated to remove it. “Sanforized” cottons, for example, are fabrics in which the relaxation shrinkage has been removed by compressive shrinking. Unless they are specially treated during finishing to remove relaxation shrinkage, most fabrics will shrink up to 6 or 8 per cent in each direction the first time they are washed.

2. Felting, or Progressive Shrinkage, is a property of most of the animal fibers like wool, mohair, and rabbit fur. Fabrics which consist wholly, or in major part, of wool or other animal fibers don’t stop shrinkage after the first wash. Each time the fabric is subjected to wet mechanical action, it will shrink more—hence the term “progressive.” This shrinkage, moreover, can’t be removed by any simple mechanical process like Sanforizing nor can a felted article be returned to its original shape by stretching. Mrs. Jones can tell you all about it.

The progressive shrinkage of woolen textiles, which perhaps is not fully understood, is apparently due to the scaly surface structure of the fiber. The animal fibers are unique in this respect; the synthetics and cotton, which have smooth surfaces, do not feel. The

(continued on page 19)
Cover -- Or Face on Cloth

By W. Bratton Williams

The qualities of a woven fabric must measure up to certain standards and specifications, and one of those qualities is that the fabric must have sufficient cover.

Cover may be defined as the appearance and feel of the cloth as to smoothness and softness and with an absence of roughness and reed marks.

This quality, cover, is especially desirable in such plain woven cotton fabrics as broadcloth, print cloth, and sheetings.

In order to have cover, the warp must be made to lie straight in the fabric and the filling must be made to do the bending. If the warp yarn does most of the bending while interlacing with the filling, roughness and reed marks are certain to be the results. This is true because of the fact that the warp is a tougher yarn than the filling — contains more twist, and is coated with size from the slasher. If the warp is made to lie straight while the filling does the bending, the filling being softer than the warp — less twist and no size — will spread out and fill up the cracks. This tends to add to the fabric that necessary characteristic called cover.

There are three settings that can be varied on the loom which affect cover in the fabric. These three will be taken up separately and discussed briefly. It must be kept in mind, however, that those things that are done to add cover to the fabric have certain disadvantages in weaving because if the warp is to be forced to lie straight it must be placed under greater tension, thus adding to the possibility of increased end breakage.

The timing of the harness is the first requisite for getting proper cover. Many mills on standard fabrics such as narrow sheetings, broad cloth, 80 squares and other standard print cloths, have a rule that the harness are timed so that they are level while the crankshaft is on bottom center. (The reed will be approximately 3½ inches from the fell of the cloth). This is the earliest that the harness can be timed in relation to the pick, and this timing gives the best results as to cover. However, the strain on the warp is at a maximum with this timing because the filling is beat up in a locked shed for 3½ inches. During the beating up process, every other warp end (if it is a plain weave) is pulling upward on the pick, and every other warp end is pulling downward on the pick. This action forces the filling to do the bending, but the chafing of the filling against the warp causes a maximum of strain on the ends. At beat-up (when the reed hits the fell of the cloth), the harness are open for the next pick. This again places undue strain on the warp because the reed strikes the fell while the harness are open and the warp is drawn tighter while the shed is open for the next pick.

Many fabrics can be woven, and the desired cover can be secured, without timing the harness as early as is the conventional custom. If timing the harness at 2½ or 2 inches instead of 3½ or 3 inches gives the desired cover, then it might be advantageous because the later the timing, the less is the strain on the warp yarn. With the slightly later timing, the pick will not be forced as far through a locked shed, and the harness will not be open quite as wide for the next pick at beat-up.

Another setting which affects cover is the height of the whip roll. Many textile plants weaving in the range of fabrics mentioned above, run their whip rolls at a customary height regardless of the particular construction being woven.

The higher the whip roll, the more strain is placed on the warp yarn (bottom) shed, and less tension on the top shed. As the whip roll is raised higher, the bottom shed is farther away from the warp line (straight line distance from the top of the whip roll to the top of the take-up roll), and the top shed lies closer to the warp line. This causes the bottom shed to be extra tight and the top shed to be correspondingly slack. The beat-up action then takes place in a locked shed—one tight and one slack. The tight shed forces the filling to bend through the slack shed. If both sheds have the same tension, they tend to "balance" each other as each end forces the filling in the opposite direction.

Many plants probably run their whiprolls higher than is necessary to get the desired cover. It is true that the higher the whip roll the better the cover, but in some cases "The Law of Diminishing Returns" may be reached. Therefore, if it is possible to lower the whip roll one or two inches and still maintain sufficient cover, strain will be relieved on the bottom shed and this may prove advantageous in less loom stoppage.

Almost all cam looms today are equipped with whip roll cams. The action and timing of this cam,
through the whip roll cam follower, gives a vibrating movement to the whip roll which affects cover on the cloth. The purpose of the whip roll cam is to raise the whip roll slightly as the reed approaches the fell of the cloth for the beat up, thus increasing the tension on the warp yarn at the instant it interlaces with the filling. This increased tension on the warp again prevents it from bending and forces the filling to do the bending.

The proper timing for the whip roll cam is as follows: With the shuttle in the left hand box, turn the crankshaft toward front center until the reed is ¾ inch from the fell of the cloth, and set the whip roll cam straight up so that the whip roll cam follower is at its highest lift. As the reed hits the fell of the cloth, the cam will be falling and the tension on the warp yarn will be slightly decreased. Some plants have a rule that requires the whip roll cam to be set straight up while the crankshaft is on exact front center. This setting adds the maximum tension to the warp in that it is held under the greatest of tension as the reed strikes the fell. This setting does not add noticeably to the cover, but may add to end breakage because of the excessive strain.

On the X2 Model looms that are being manufactured today, the whip roll cam is made less off-center. The purpose of this is to reduce the amount of vibration of the whip roll and consequently to reduce the strain on the warp yarn at beat up. Some textile plants have purchased this type cam as replacement on their E Model looms.

In conclusion: Do not time the harness earlier than is necessary to get the desired cover. Do not set the whip rolls higher than is necessary to get the desired cover, and do not time the whip roll cam to be straight up when the reed is later than ¾ inch from the fell of the cloth. Approaching the extreme in any of these settings may produce some disadvantages in that they cause unnecessary strain on the warp without any noticeable improvement upon the character of the woven fabric.

**WARP PREPARATION, FILLING PREPARATION AND WEAVING AT CLEMSON**

A. E. McKenna, Head, Weaving and Designing Dept.

Years ago emphasis in teaching warp preparation and weaving at textile schools was placed on fibers in processing cotton, wool and rayon. Now all fibers in several schools are taught under one heading and only differences in methods of handling are brought to the attention of students. Instead of rayon warp preparation, or rayon weaving, it is now warp preparation or weaving of all fibers, natural and man-made.

At Clemson, fibers are warped and slashed for a variety of fabrics for courses in loom mechanism, knitting, and fabric development. Over 90 percent of the warps used in the weave rooms are prepared on the schools equipment and 78 per cent of these are single-ply or low-twist yarns which require the application of size through the operation of the slasher. In this actual processing, students acquire knowledge and experience in the various sizing products and in handling different types of fibers. Research has been conducted for several years on size mixtures for the new spun synthetics. In the manufacture of South Carolina State flags, a high percentage of the yarn is spun in the Carding and Spinning Department; the cloth woven in the Weaving and Designing Department; and the flags cut and sewed in the Knitting Department.

Warps at present on looms in the school are made from cotton, spun rayon, filament rayon and acetate, filament nylon, wool and orlon blends, vicara, rayon and acetate blends, and Fiberglas. Approximately 79 per cent of the warps are cotton, 18 per cent filament rayon, acetate, and nylon; and the remainder spun rayon blends, and wool blends. Looms used in weaving these fibers are as follows: For cotton — E, K, X, X2, XP, Hopedale, Stafford, Fletcher, C-5, C-6, C & K Worcester Model, and C & K Providence Model; for continuous filament synthetics — XD, S-3, S-4, and S-6; for wool and spun rayon blends — XD, XP special, C-4, and W-3.

Quill winding is taught and processing accomplished on all types of fibers in one course. The course in throwing covers all continuous filament synthetic yarns and the actual processing carried out for sample weaving or knitting. In Fabric Development, instruction is not only given in the designing and weaving of all-cotton fancy fabrics but also blend suitings, and continuous filament synthetic constructions.

The manufacturers of all synthetic yarns and the many suppliers of sizing materials have very graciously supplied our every need. This applies not only to sizing materials for man-made fibers but also to starches and compounds that are used in sizing cotton.
Textile Essay Contest

Why Textile Management and Operating Personnel Should Attend the American Textile Management Exhibition in 1954

The more industrialized a society becomes, the more carefully must human effort be coordinated. The more interdependent society becomes the more communication there must be. The need for everyone to be understood by other persons is a direct outcome of this vast social interdependence which industrialization has created.

Through the ideas of men the textile industry has advanced to its present stage. These ideas or developments have been inspired by the need for them, for indeed, in the textile industry, as in the other phases of life “Necessity is the mother of invention.” During and before the colonial period, cloth was made at home, but, as the pace of life grew faster, and the housewife had more to do, spinning and weaving at home became impracticable and burdensome. Because of this need for ready made cloth and clothes, factories were built and the textile industry had its beginning.

Before today, men in the textile industry had to advance it more or less on their own. Only one man or a small group of men could decide what was good or bad for the factory. They could not collect the ideas of all the men in the industry and evaluate them, nor could they exchange views as to management and operation, as they can now, for there were no conventions or displays of everyone’s ideas. Truly this was a tremendous drawback, when it is realized that an individual man has exceedingly limited capabilities.

For the benefit of the entire textile industry the American Textile Machinery Exhibit is held in Atlantic City, New Jersey. Manufacturers pool the discoveries and resources of their laboratories. To bring new systems into being hundreds of scientists and engineers spend millions of man-hours of time. Here they pool their discoveries for the good of the industry and the public.

Progress is the American by-word. We must all recognize that we live in a dynamic society, which is characterized by change, and constant adjustment to these changes are necessary if we are to progress. The textile industry is progressing in every phase of its activity. It will do no good though to have progress if the mills do not know of it. The exhibit is the industry’s way of transferring the progress of the machine manufacturer to the machine user, of transferring the thoughts of the scientists to the mills of the producer. It is here that the mill executive can get a wealth of fresh ideas and glimpse new ways to solve old dilemmas.

(continued on page 16)
Upon their graduation in June, Clemson textile graduates will go into the textile world to pursue their ambitions in the field they have chosen. These new graduates are not likely to be among complete strangers, as they will probably meet old friends and classmates in any of the various textile concerns throughout the industry.

In the following paragraphs are listed a few Clemson graduates and the positions they now hold in the textile industry.

Cannon Mills Company: Malcolm B. Bishop, Jr., '50, assistant personnel director; J. Harris Cannon, '37, vice-president; Richard Clayton, '53, trainee; Farrar O. Griggs, '36; assistant purchasing agent; George William Griggs, '49, overseer of weaving; Sewell Edward Hunsuck, '48, chemist; Merton Carlyle Propst, Jr., '40, assistant laboratory director; William Beaty Thompson, '33, superintendent of finishing.

American Enka Corporation: E. M. Salley, Jr., '27, plant manager; Ross M. Stribling, '29, assistant manager, technical service; Lawrence Hart, '31, textile engineer, research department; W. W. Abbott, '42, technical supervisor, textile department; R. M. Phillipps, '47, textile engineer, research department; James M. Chapman, '49, technical assistant, spinning and finishing department; C. M. Guest, '49, technical assistant, research department; Charles Robinson, Jr., '49, assistant to technical supervisor, textile department; G. M. Devlin, engineer, '50; Richard M. Hart, '50, engineer; Grover C. Haynes, Jr., '50, engineer; T. L. Howle, '50, assistant chemist, research department; W. B. Cassidy, '51, textile engineer, technical service; C. H. Weedon, '52, assistant research chemist, research department; W. C. Compton, '53, junior textile engineer, technical service; R. R. Fowler, '53, junior textile engineer, textile laboratory; C. H. Peppers, '53, assistant to manager, microscopical laboratory.


Fieldcrest Mills, Inc.: David E. Simons, '34, superintendent of towel mill; Carlisle C. Campbell, 1913-1914, pay master; Samuel T. Anderson, 1915-1916, superintendent of bedspread mill; Clyde L. Miller, '50, development engineer; Benjamin Lee, '05, formerly Master Mechanic and Machinist, now retired under pension plan; Richard Tuttle, 1925-1926, manager of engineering, research, quality control and supply purchasing; W. R. Kiser, 1939-1940, supervisor of methods and standards; J. E. Cobb, '37, foreman of weaving department.

Cone Mills Corporation: H. Paul Bridges, '35, superintendent.
The Textile School Takes to the Air

C. H. Ferguson, '55

The faculty of the School of Textiles of Clemson College, through the courtesy of the Clemson Journal and in coordination with J. R. (Bob) Mattison, moderator of the program, “takes to the air waves” (dial 560) each Wednesday on the 12:45-1:00 program to bring you the latest news of interest in the textile world.

On March 3, Dr. H. M. Brown, Dean of the School of Textiles, delivered a talk explaining the growth and betterment of our school since World War II. One far reaching aid to the school is the Sirrine Textile Foundation of nearly a million dollars contributed during the war by South Carolina textile companies. “These funds are being used to enhance the retirement pay for members of the textile faculty, to employ extra professors who work on research, to provide funds to facilitate the visitation program, and to enlarge the student magazine, THE BOBBIN & BEAKER.” “The Foundation has also furnished equipment, books and a librarian for a fine textile library in Sirrine Hall.”

A full major course in Knitting, graduate work leading to the Masters degree in Textile Chemistry and Dyeing, research, and many other projects and developments in the School of Textiles has been greatly expanded.

The following are more important items which were pointed out in Dr. Brown’s speech:

1. A loom drive to increase the speed of looms without increasing shuttle time. It seems that production can be readily increased at least 15% without materially increasing maintenance cost.

2. A loom warp tension control has been developed that gives constant tension during the entire run down of the beam with no adjustment.

3. A Flat Bundle Tester has been developed for better measurement of cotton fiber strength. The unit is ready for the trade by one of the leading textile testing machine companies.

4. A pneumatic type warp tension control simultaneously giving equal tension on any number of looms in a group.

5. A picker lap meter suitable for permanent mounting on pickers to show instantaneous weight of lap at all times, and to show uniformity of the lap.


7. An improved device for spinning frames to insert temporary twist in the yarn between the rolls and the thread guide to reduce ends down.

8. A Tensile Testing device where in indices of strength, and strength uniformity, are obtained while the yarn is being run continuously.

9. A tension control for warper beams in a warper creel. This device is entirely mechanical and gives the same tension on every beam by means of a weight that can be computed in advance.

10. A device to indicate when an end is down on spinning frames.

11. A device for making a Leno weave impossible on present textile machines.

12. A simple device for roving frames that reduces textile manufacturing cost and improves the roving and yarn at negligible cost to the mills.

13. An improvement in carding giving less neps the product and reduced waste.


15. Studies on antistatic agents for Orlon and Dacron.

All of these developments are in operation on machines in the Textile School and have been reported at textile meetings and in trade journals. They have been seen by many interested visitors to our school and a number of them are being manufactured for the industry.

On March 10, Professor John V. Walters answered some questions that are of interest to the consumer of woven fabrics. The fish-like odor given off by raincoats on rainy days is due to a resin finish which is used as a water repellent. Manufacturers know how to eliminate these odors so any such raincoats should be sent back to the manufacturers. Professor Walters also pointed out that felt fabrics are neither woven nor knitted, but pressed into shape with the help of steam, pressure and high heat. Therefore, clothing made of felt should not be washed as ordinary garments but sent to your dry cleaner. “This includes garments with felt applique trimmings and others of such nature. For best results, take measurements of your garment and attach them to the article, it will aid the dry cleaner in his work.”

Professor W. C. Whitten pointed out that cotton is still “king fiber.” In the past few years we have come into contact with many so called miracle fibers (nylon, orlon, dacron, etc.) that we are failing to realize the importance of cotton today. “To make a comparison, let’s stop for a minute and think what
it would be like if we had never had the benefit of cotton and someone had suddenly begun to grow it in such quantities as to let us have just a taste. Think of the clamor it would cause—of all the possible uses to which you could apply this new fiber “cotton.” It is hard to imagine that cotton would not soon be called a “miracle fiber also?”

Even with all the new fibers of today, cotton is still improving its competitive position. The staple length of cotton has been increasing which serves in making stronger and better fabrics. While on the other end, improvements have been made in the finishing of cotton fibers.

Professor J. H. Marvin brought to us the many different problems which are faced in the textile industry today. “A summary of the problems would be as follows:

(1) securing the baled cotton
(2) planning and controlling the flow of stock
(3) processing the stock properly
(4) supervision of the personnel
(5) controlling the cost
(6) upkeep of equipment, buildings and machinery and handling of supplies
(7) handling of the payroll and personnel work
(8) keeping necessary records of all the mill activities”

On April 7, Mr. J. S. Graham, Assistant Professor of Research and Testing, told us what tests are performed on cotton fibers at Clemson. He pointed out that in the Textile School, we are set up to perform almost any fiber test from x-ray analysis to the simplest types of test. It is interesting to note that fineness is the fiber property most often specified in buying medium staple length cotton — however, the manufacturer who uses short or medium staple cotton in this country is not concerned with this type of fiber since all of the commercial fine-fibered cottons are long staple cottons. Most of our medium staple crop can be classed as American Upland which produces medium staple and medium fineness unless immature.

Professor A. E. McKenna pointed out the types of fibers and fabrics being processed at the Clemson Textile School. “At present we are weaving or knitting cotton, viscose, acetate, nylon, fiberglass, wool, vicara, and blends of these fibers with about 50% of our equipment on cotton.” In woven cotton fabrics or fabrics made from man-made fibers, we are weaving awning duck, osnaburg, print cloth, sheeting, twill, sateen, gingham, woven tuck, bedspreads, drapery, terry toweling, dress goods, blanket material, and many others. “In our garment making manufacture course, students are cutting out and sewing T-shirts for men and children, underwear and women’s tricot lingerie.”

SUMMER ISSUE, 1954
Several Types of Fibers Are Used
In the Knitting Department

THOMAS D. EFLAND.
Weaving and Designing Department

Recently the knitting department has been working with a wide range of fibers in the knitting of hosiery and other fabrics. Usually the entire range of fibers suitable for knit fabrics are employed in the normal schedule of instruction in the knitting laboratories. By giving the students an opportunity to work with a number of fibers he gains some experience in the proper techniques of handling the yarns and in evaluating the characteristics and properties of fabric made from them.

Currently the stretch sock is the most popular item in the hosiery trade. The knitting department has followed the development of this type of hosiery very closely and has knit hosiery from elasticized nylon yarn. Several processes have been developed for imparting elasticity to a continuous filament nylon yarn by physical means. The most common method is to highly twist the yarn, heat set it, then back out the twist. The process is patented by the Heberlein Corporation and is licensed to a number of commission throwsters. Several other companies have recently announced processes for elasticizing nylon yarn but have not released information on the processes to date.

Hosiery produced from elasticized yarn is characterized by unusual elasticity which allows one sock to be made fitting a complete range of foot sizes. The processing of the yarn imparts to the fabric a warm soft hand and a pleasing appearance considerably different from that found in fabric knit from regular nylon.

During recent months, the knitting department has used a number of yarns produced by the yarn department. A yarn produced from Vicara, viscose and acetate was knit into both Komet Rib and plain knit hosiery. A wool nylon blend was used in several types of hosiery and recently a spun acetate yarn was employed on our jacquard sweater machine.

A number of patterned and plain fabrics have been knit on the sample tricot machine. Some of the most interesting of these resulted from various combinations of spun dyed acetate used with white acetate and with nylon. A sample of fabric with very low elasticity was produced with a 75 denier Orlon face and a 70 denier nylon back. The experimental purpose of the fabric was to combine high tenacity nylon for strength with Orlon on the surface to prevent weather degradation.

Recently the knit wear laboratory is setting up a pattern for all wool sweaters. The fabric will be produced on a Jaquard Links & Links machine and the garments sewed in the sewing laboratory.

With yarns obtained from commercial sources fabrics have been made from Orlon, nylon Dacron, Dyneel, Acrilan, viscose, acetate, Vicara, wool, cotton and blends of various fibers in the list. Some of the fabrics produced from the above fibers were later used in the Dye department in research work.

ESSAY CONTEST
(continued from page 12)

We know that the productivity of labor has risen greatly over the years. Some experts maintain that it is difficult to increase the production efficiency of the worker. Does this higher productivity mean that the worker has become more skilled, or that he works harder? It is mainly due to the greater managerial "know-how" and better machinery. A rearrangement of the mill, the use of more power, or new machinery installation may make it possible for a worker to double his output with less skill and less physical or mental effort than was required before.

At the exhibit mill management and personnel can learn of the new methods of production and improved machinery which is coming into the field. They can learn the new methods which are employed in the field which make for better working conditions that are essential with the higher class of labor now in the textile field. If the worker is to achieve a higher standard of living, he must have the opportunity to work under the most efficient working conditions. With these better working conditions comes less waste, better quality and more production from the operators. It is well known that people work more efficiently in more pleasant surroundings.

The modern textile industry is becoming so competitive that to stay in business and make a profit it is essential that the mill be able to put out the best quality, with the highest production, with the least...
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possible cost. Textile men of today should recognize this valuable opportunity to exchange ideas open to them and take full advantage of it, for the textile industry in the United States is in danger of having its competitors in other countries undersell and outproduce them. To be able to compete with these countries we must improve our facilities. Their advantage lies in the cheapness of labor, but we must make up the difference in efficiency and better machines. Research in textiles is advancing in leaps and bounds and to get this better quality, larger production, and lower cost the mill must keep up with all the new inventions and thoughts.

Mr. Manning Mallory, Manager of Cheraw Cotton Mill, says, "Although you can read the same things in textile magazines, the exhibit is of immense help especially to the foreman level. It gives in a dramatic way, at one time and in one place, all the improvements in the textile industry. The exhibit in Atlantic City is larger, more complete, and better attended than the show in Greenville, S. C., and is an important aid of those attending are in all seriousness to learn just what is happening."

One can see that this exhibit has almost become a necessity to the industry, to keep pace with the demands of the consumer for quality at low price.

SUMMER ISSUE, 1954
Ramie in Florida

by

Davis T. Moorhead, T.M. '54

I'd like to tell a little about the wonder fiber Ramie, and its possible future in the economy of Florida. Florida, it has been proven, with its rich soil that the moisture can readily be controlled in, together with the semi-tropical climate, make it the best place in the United States to grow Ramie. It has enormous possibilities, and one day soon, when just one major problem is solved, it will make for an entire new industry in the Southern-most state.

During my stay in Mount Dora, near Zellwood, Florida during the Christmas holidays, I had the opportunity to spend some time with Mr. G. J. Hayslip, president of the now liquidated Ramie Products Corporation. He is recognized as one of the leading authorities on Ramie in the United States.

We will divide our discussion into several parts, leading off with agriculture. Ramie grows best in a fertile, moist, but well-drained soil, the type found in the vast peat areas (muck) surrounding Zellwood. The plantings of Ramie are usually made in May, June, July or August, there, the real summer months. It is planted in rows four feet wide with a distance of two feet between plants at a depth of 2½ to 3 inches. It can be raised from seed or root stock, but the root produces a less uniform plant and takes longer, so root stock is usually chosen. During its first year Ramie is cultivated regularly, to enable it to develop over the weeds, which it kills itself when it gets started. In this first year of development, it is cut back two or three times, leaving the stalks in the field for fertilizer. It grows in stalks, reedy-like in appearance with the leaves forming a bundle at the top. Ramie belongs to the hemp family and more than sixteen varieties are known. Bohemia nivea is the only satisfactory source of ramie. The plant attains a height of from six and a half to seven feet, but some grow up to eight feet, depending on the conditions. A cross section of a ramie stalk shows a pithy center surrounded by a woody layer. This layer is in turn surrounded by the inner bark, which consists of the fibers embedded in gums and pectins.

Some of the fibers are as short as two inches, but others may measure up to twenty inches in length. The average length is usually six to eight inches, however sleathing or covering the plant stalk on the outside is a thin green bark that becomes lower as the plant matures. Contained in this outer bark is a rich deposit of tannic acid, which is said to be the reason for its remarkable freedom from the common insect pests.

As stated before, ramie being a perennial plant, it will require almost no cultivation after the first year. Once you have planted it, it will come up year after year. The life length can be counted up to seven years, with other authorities claiming from twenty to thirty years. The planted root stock will sprout in about two weeks and attain about thirty inches in two months. After this first year of developing the growth is much shorter. The first crop is harvested in May, the second in July and the third crop in September, with about sixty days between cuttings. In the sixty days it grows the six and a half to seven feet stated. You get a heavier yield in these cuttings, because the frost covers the plants and forces them to rest during the winter months. The plant is cut with a modified mowing machine, made by International Harvester and bundled up like wheat stalks. The later the cuttings, the greater height attained under the growing conditions. Five or six cuttings could be made but three have proven most satisfactory. A cutting under reasonably good conditions can be expected to yield from 400-500 pounds of fiber an acre, or 1200 to 1500 pounds an acre for the year. An acre of land of Ramie yields about forty-five tons of green material a year, the amount of fiber is about 15 percent of this.

After harvesting, the Ramie is taken into the central plant by tractor and trailer to be decorticated (this means crushing the stalk and removing the fibrous outer bark for further processing). In Florida, the plants are sprayed with a process much the same as is used to deleaf cotton when it is picked by a mechanical picker, to remove the leaves and thus relieve the decorticating process of some of its bark. The Waldo Decorticator was formerly used but now it has been proven unsatisfactory because of the expense involved. The bundles from the field are placed on a conveyor, cut loose and spread out in a relatively thin layer. Then it is run into the blocks
to be decorticated, the butt or bottom end first, and then the tops. Water is being sprayed on it all the time to wash over the pithy center and the woody part of the outside. It is then run through dyers and baled up. In Clewiston is a plant that staples the Ramie for use in the cotton and worsted systems. Now here is the only real problem that has not been solved. A satisfactory, but inexpensive decortication process. As stated before, the Waldo Machine is too expensive. Mr. Charles Short of Clermont, Florida has a machine completed, but is doing more work on it. A Mr. Godtel in Mount Dora is developing a decorticator that shows much promise.

Right now there are no appreciable Ramie plantings in the Zellwood District, but the holdings at Clewiston are going right ahead. The Sea Island Cotton Mills of New Orleans are blending Ramie with cotton to produce more wonderful materials. The main thing about Ramie is the fact that it will not mildew and knot like so many natural fibers. It has very high strength, but the knotting strength is low due to its very high crystallinity.

A wonderful future can be made for Ramie in Florida. The reason that the holdings in ramie have decreased is the fact that there has been poor management, and not enough capital to put it over on the scale that is necessary. Muck lands and the climate there are a natural. When it is developed probably they will grow it, decorticate and degum it and weave it into cloth right there in Florida.

WHO WANTS SHRINKPROOF WOOL?

(continued from page 9)

animal fibers are covered with tiny overlapping scales, not unlike those of a fish, with the sharp end pointing toward the fiber tip. If your fingers are sensitive enough, it is possible to feel these scales by pulling a coarse wool fiber between the thumb and finger. Pulled by the root end, the fiber seems to slide more readily between the fingers than when pulled by the tip end. This directional difference in surface friction, known as the “Differential Friction Effect,” is responsible for the tendency of the fiber to travel, when flexed, in the direction of its root end. There are undoubtedly a number of important properties of the animal fibers which also play a part in felting shrinkage, but this seems to be the main one.

Shrinkage Control Methods

If the felting tendency of woolens is due mainly to the scale structure then it should be possible to minimize, or eliminate, the progressive shrinkage of wool by getting rid of the differential frictional effect. This can be accomplished by:

1. Removal of the sharp edges of the scale, making them essentially round.
2. Filling up the space under the sharp edges of the scale, producing the same effect as the removal of the sharp edges, but by an additive, rather than a subtractive process.

Removal Processes

With sufficient patience, fibers could probably be made non-felting by sandpapering them. This is not as far fetched as it seems; at least one inventor thought enough of the idea to patent it, claiming that the felting of woolen textiles can be reduced by working them with abrasive materials such as sand and powdered glass. Since the process was never commercialized, it seems safe to assume that the fabrics might be worn out by the treatment.

Another interesting process is related to meat tenderizing. It has been known for a long time that certain enzymes will digest proteins, such as meat and wool. One such enzyme is papain, the active ingredient in most of the meat tenderizer products which have been appearing on the market recently. Under the proper conditions, papain will dissolve the sharp edges of the scales and give excellent control of felting shrinkage, and this process was patented in Great Britain nearly 20 years ago. It is difficult to control the action of the enzyme, however, in such a way as to localize the damage at the fiber surfaces, and that portion of the enzyme solution which gets inside the fiber will work just like Adolph’s Meat Tenderizer, considerably reducing the strength and durability of the fiber. Who wants to wear a sweater so tender you can cut it with a fork?
LUREX

The mushrooming use of metallic yarns in both fashion apparel and home furnishings, and the endless number of outstanding new designs they command, were impressively demonstrated recently at a showing of fabrics woven with Lurex non-tarnishing metallic yarns in the Atlanta-Biltmore Hotel.

The textile creativeness of the South’s leading weaving mills was amply illustrated in the coordinated exhibit panels, and by a number of modeled apparel items from the tables of New York fashion designers.

Local mills and manufacturers represented included Jordan Mills, Deering Milliken, Chicopee Mills, Albert J. Bartson, Finchale Fabrics, Cohama and Spinning Wheel Carpet Company.

Lurex, developed by The Dobeckmun Company of Cleveland, Ohio, can now be found adding a lustrous glow to everything from high-fashion fabric to rugged, yet glamorous, automobile upholstery, as the displays by the noted interior designer, Tom Lee, dramatically proved. The fine, supple yarn shows itself an adaptable companion to all fibers, natural or man-made.

The Lurex colors, ranging from gold and silver through the subtle porcelain tones and the newest multicolor yarns, are styled by Dorothy Liebes, noted colorist and textile designer, and consultant to The Dobeckmun Company. The diversity of the color story was brought to life in a dramatic fashion show which climaxmed the important exhibit.

Fashion

Among the fashion fabrics displayed was the famed “Cloth of Gold” from the textile house Simon, Healey and Goldstein. The fabric is woven of 1/100” gold Lurex with sheer nylon and was shown in a gown by Philip Hulitar, the fluid lines emphasizing the supple quality of Lurex. Other fabrics shown were Fuller Fabric’s “Alamo,” blue and chartreuse cotton blended with Persian blue Lurex, for a fascinating iridescent effect, and Worumbo’s worsted men’s suiting, a grey plaid woven with Lurex. A fabric with special significance for Spring fashion was a nylon and Lurex “horsehair” designed for petticoats and millinery—a loose weave of white nylon and sapphire blue Lurex.

Peggy Ives hand woven designs, woven in the famous designer’s Ogunquit, Maine, studio, were represented by a blend of shocking pink Lurex and wool of the same color, shown in a striking cocktail skirt by Vera Maxwell, and a black and white check fabric, sparkling with Lurex, tailored by Craig into a man’s waistcoat.

Many fashion accessories for both men and women, made from Peggy Ives metal-shot woolens, were shown on the accessory panel. Among them were men’s ties, cuff links, women’s handbags and scarves.

Other fashion highlights were Herbert Meyer’s cotton fancies, particularly attractive blends of cotton and Lurex—dramatic and Oriental in mood. In one fabric, this house blends red cotton and porcelain pink Lurex to achieve an unusually lovely effect. The beauty of the fabric was emphasized by skillful treatment in a Carolyn Schnurer play suit and jacket.

The daintiness of the new porcelain colors was shown to beautiful advantage in a rich satin-backed fabric, striped with glowing porcelain pink Lurex, from Catoir. The same fabric had an entirely different effect in a black silk with sapphire Lurex, from the same house.

Recently Lurex has been found making a discreet appearance in men’s wear. Handsome evidence of the new fashion was an evening jacket from Craig Tailors, using Peggy Ives charcoal wool and silver Lurex. Other examples were jaunty vests by Craig, using a black and white check from the same weaver, and her blend of red wool and gold Lurex. Even men’s suiting carries a restrained touch of silver or gold glitter, as the Worumbo grey plaid worsted and the Mooresville menswear fabrics illustrated.

Climax of the show was the animation of the complete Lurex story, thus far, combined in one glittering fashion show, done with the light touch. The non-tarnishing properties of Lurex were firmly established by an odorous comparison with a lace dress from the Tarnished Twenties, a museum piece fresh out of black tissue paper, and the new glittering fashions woven with Lurex.

Home Furnishings

The muted appeal of porcelain Lurex was shown by Dorothy Liebes’ striking “Sampler” called “Birthday Party.” Here the combination of all six of the porcelain toned Lurex yarns demonstrates the delicate adaptability of the group. Her “Black Strie,” a companion “Sampler,” told the new multi-color dramatically.

In a collection of Boris Kroll fabrics, some of them from the new Caribbean collection of upholstery and drapery fabrics just introduced, this designed makes use of Lurex yarns to give the effect of sun glancing off the sparkling surfaces of the Caribbean Sea, or to add muted brilliance to his tropical blue-green, warm yellow and pink weaves.
Important groups of furniture upholstered in these Kroll fabrics, such as Baker’s “New World Group,” John Widdicomb’s “Mid-Century Modern,” some new Dunbar designs by Edward J. Wormley, and some Jens Risom pieces are eloquent examples of how a deft use of Lurex adds handsome tonal quality to a weave.

A new casement cloth, “Bonny” by Shulman-Abrash, shows Persian blue and jet Lurex delicately traced through a gossamer sheer plaid design.

Some of the applications of Lurex in the home furnishings field were beautifully shown in a series of display panels. How Lurex threads its way in the field of linens and domestics was well depicted in a group of table linens and guest towels. Felix Tau send’s handsome “Festival” cloth using Lurex in a Celanese rayon damask weave and some textured mats from Leacock pointed up a skillful use of the metallic yarn. Again in this category, a striking new pattern from “Garden State Prints” showed silver Lurex giving a delicate highlight to a table cloth striped in confetti colors.

From Pentland Associates were some delightful guest towels and a luncheon set, both good examples of Lurex in its embroidery application.

Anne Seton’s lingerie case and scuffs again illustrated the metallic thread as an important accent in the novelty designs in accessories.

An entirely different use of Lurex was noted in the Chromespun shower curtain from Joseph A. Kaplan, while “Drama,” a fine wool broaddoom, in beige, black, neutral and gold from Spinning Wheel Mills, available through F. Schumacher and Co., showed Lurex as a good companion yarn and fashion accent in the floor covering category.

Contract

Another expression of the use of Lurex in decorative fabrics was illustrated in the field of contract work. This was dramatized by two schemes, one, that of the newly decorated Sky Room, atop Miami’s Columbus Hotel which William Pahlmann has done, and the other, the Dorothy Liebes fabrics for the S. S. United States, the great new superliner.

Mr. Pahlmann chose for the draperies a screen print designed by Howard Pederson. It is a bold architectural motif in shades of citron, brown and turquoise on Godall’s “Silverne” cloth, a fabric silver-shot with Lurex. For the upholstery fabric, Mr. Pahlmann used Godall’s “Gripsholm” cloth in tones of yellow with gold Lurex.

For the upholstery fabrics and draperies of the “United States,” Mrs. Liebes used two jewel-toned Lurex metallics, emerald green and sapphire blue, blending in colors of the sea. Other jewel-toned Lurex was used in the great curtain Mrs. Liebes designed for the ship’s theatre, and in the dramatic and famous Liebes blinds in the same sea-tone colors.

One of the highlights of the contract exhibit was a group of 100% saran fabrics combined with Lurex. Called “Chic-spun,” this revolutionary new industrial fabric has a monofilament saran warp with spun saran fill and porcelain white, red, or silver Lurex. Manufactured by the Lumit Division of the Chicopee Mills, the fabric is in wide demand for institutional type interiors in particular. Due to its saran and Lurex weave, it is easily washed right on the furniture, and can take disinfectant spraying necessary in hospital installations.

Automotive

One of the newest groups to be added to the Lurex picture is a collection of automotive fabrics for both upholstery and seat covers. Highlighting this group were two fabrics from Godall, used by Lincoln and Studebaker respectively.

General

Since its introduction in 1940, Lurex has been improved as to color fastness of the yarn and continually made finer and more supple. But even more newsworthy are the advancements in color styling. Multi-colored yarn is a goal of Dobekmun has long striven for and only recently attained. As many as five colors can now be printed on a single yarn—and the color combinations are limitless.

Several examples were shown both in fashion fabrics and upholstery and drapery cloths.

The enthusiasm which the porcelain colors have been received since last Fall has found its outlet in some of the most intriguing designs shown at the Manor House. These chalky, opaque colors are soft and muted, adding shimmer rather than glitter to fabrics — an undertone rather than an overtone of color.

The original gold and silver Lurex yarns, still the most widely used, were followed by the introduction of brilliant “jewel” colors, opening new design possibilities. Jet black, bronze and gunmetal colors were the next development, bringing to the Lurex color palette a dramatic sophistication that gave it still wider scope.

With these continuous color developments, under the guidance of Lurex consultant Dorothy Liebes, designer interest has grown steadily and drawn Lurex into every aspect of fabric design.
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SUMMER ISSUE, 1954
J. E. SIRRINE COMPANY

Engineers

Greenville, South Carolina

"The Fleet Line"

of

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CHARLOTTE, N. C. DANIELSON, CONN.

SHRINKPROOF WOOL

(continued from page 19)

Quite a number of processes which utilize the oxidizing action of such chemical compounds as sodium hypochlorite to destroy the sharp scale edges have met with a fair degree of commercial success within the past 10 years. That chlorine and other oxidizing agents can be used to eliminate wool felting has been known for about a hundred years, but not until relatively recently were such processes used commercially.

Properly conducted, the chlorination of wool gives excellent stabilization with a minimum of damage. Present wet processes all depend on a careful control of chemical concentrations, temperature, and time of exposure, and despite the necessity for close control, they do not offer unusual difficulties in the plant. Several million yards of chlorinated woolen fabrics have been purchased by the Department of the Army since the end of World War II: the Government indeed, has probably been the best customer for washable woolen items to date.

Chlorination is probably the least expensive of all stabilization processes. Exclusive of patent royalties, the cost of processing, including chemicals, should not exceed five cents per pound of wool. Processes used in the United States today are of both the continuous (Harriset and Scholerize), and batch types (Sanforlan and Scholerize).

Despite their low cost and relatively easy application, chlorination processes are deficient in certain respects:

1. The wool, however carefully it is treated, suffers some loss in weight and is somewhat damaged.
2. The natural water repellency of the wool is reduced. Chlorinated woolens are more readily wetted than comparable untreated fabrics, and this is usually undesirable.
3. Chlorinated wool usually feels harsher than untreated wool.
4. It is difficult to treat heavy fabrics such as blankets uniformly. By the time that fibers inside the fabric are adequately treated, those on the surfaces are likely to be considerably damaged.

Yet another removal process, involving treatment with caustic soda in such solvents as alcohol and naphtha, has been patented by the Tootal-Broadhurst-Lee Company of England. Wool is readily attacked by caustic soda, and the shortcomings of this type of treatment are similar to deficiencies of chlorination. So far as is known, the caustic treatment has not been employed commercially in this country.

Additive Processes

Patent literature on the subject of additive wool shrinkage control processes reveals a considerable array of materials which may be used for filling in
the valleys beneath the scales to eliminate the differential frictional effect. Most are classed as resins, and while many have been studied, only the melamine resins have been used in substantial volume for wool stabilization. Resins of this type are sold under the trade names “Lanaset” and “Resloom.”

As supplied, the melamine resin is normally a clear solution in water, containing from 65 to 80 per cent solids. In the original process, this concentrated resin was diluted to the appropriate concentration (usually 10 to 15 per cent solids) with water, a catalyst was added, and the solution was applied to the fabric by padding. The wet, resin-impregnated, fabric was then dried and heated to relatively high temperature, usually in the neighborhood of 300° Fahrenheit, for a few minutes. At the high temperature, the catalyzed resin becomes hard and permanently insoluble. It will then withstand repeated launderings without removal from the wool and, when properly applied, controls shrinkage quite well.

More recently, this process has been largely supplanted by a new, and better one, known as the “acid colloid” treatment. The same starting resin is used, but in the acid colloid treatment, the resin is partially cured before it is applied to the fabric. The acid colloid is prepared by treating the resin, before applying it to the cloth, with acetic or glycolic acids. The resin changes, after aging for several hours, from a true solution to a partially polymerized colloidal dispersion of submicroscopic resin particles. This dispersion, when applied to the fabric as before, cures at lower temperatures, and less resin is required to achieve good fabric stability. A considerable yardage of both consumer and military fabrics has been treated by both of the melamine resin processes.

It would probably be somewhat simpler to list the resins which have not been recommended for wool shrinkage control, rather than those which have. Most of the additive treatments, other than the melamine-formaldehyde resins, are applied to the wool either as water emulsions or solvent solutions of the fully polymerized resin. Such treatments do not normally require heat curing, and their application involves simple padding with a resin dispersion of the appropriate concentration, followed by drying. Some of the emulsion treatments involve an exhaustion of resin onto the fiber surfaces, and require that the padded fabric be allowed to stand in the wet state for several hours to develop the necessary washfastness. Following exhaustion, the fabric may be rinsed and neutralized before drying.

The new Australian SI-RO-FIX process achieves shrinkage control by the application of a chemically-modified nylon to the wool from an alcohol solution. Excellent shrinkage control has been reported, and the process is now being evaluated by a number of mills in this country. The disadvantages of solvent treatments in finishing plants are well known, and will probably be an obstacle to the widespread acceptance of this process.

While they do not generally damage the wool, additive treatments also have their drawbacks. The most serious of these is probably the tendency of the treated fabrics to feel stiff. Due to incomplete removal of the resin solution from between the fibers during padding, some fibers become bonded together during drying. This stiffening, which can be minimized by using a heavy squeeze pressure in padding, is quite undesirable and very difficult to eliminate entirely. Softeners are occasionally helpful in restoring some of the original hand, but they are not very fast to laundering. The emulsion treatments generally give a better hand than either the melamine or solvent solution resins, but the fabric can hardly be overemphasized, and accounts in no small measure for the lack of widespread consumer acceptance.

Color Problems

The control of felting shrinkage is but one of the problems which must be overcome in producing washable woolens. Of almost equal importance is the question of selecting dyestuffs which will have the desired brightness of shade and the necessary washfastness. Wool dyes of the conventional acid type are not well suited for the dyeing of fabrics which are to be laundered repeatedly. With few exceptions, they bleed badly on laundering.

Two classes of wool dyes have much better washfastness than the acid dyes; these are the chrome and metallized colors. Although considerable progress has been made in developing washfast dyes of these classes for wool, it is not yet possible to obtain a full range of bright shades and the color range in washable woolens is at present much more limited than it is in non-washable lines. This situation is steadily improving, but dyestuff selection for washable woolens will probably be a major problem for some time to come.

If woolen fabrics are to be supplied in a washable condition to the garment manufacturers, it is of course, necessary to reduce relaxation shrinkage to a minimum before cutting or sewing. Today, no method comparable to the sanforizing process is available for removal of relaxation shrinkage from woolens and the best results, usually obtained by over-feed drying, are by no means so good as those obtained in the sanforizing of cotton materials. Because of the looser construction of woolens, it is most unlikely that shrinkage tolerances can ever be reduced as low as those of cotton. Reduction of relaxation shrinkage to a minimum is, nevertheless, a must for washable woolens.

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