1955

The Bobbin and Beaker Vol. 14 No. 2

Clemson University

Follow this and additional works at: https://tigerprints.clemson.edu/spec_bobbin

Materials in this collection may be protected by copyright law (Title 17, U.S. code). Use of these materials beyond the exceptions provided for in the Fair Use and Educational Use clauses of the U.S. Copyright Law may violate federal law.

For additional rights information, please contact Kirstin O’Keefe (kokeefe [at] clemson [dot] edu)

For additional information about the collections, please contact the Special Collections and Archives by phone at 864.656.3031 or via email at cuscl [at] clemson [dot] edu

Recommended Citation
https://tigerprints.clemson.edu/spec_bobbin/173

This Book is brought to you for free and open access by the Engineering, Computing and Applied Sciences, College of at TigerPrints. It has been accepted for inclusion in Bobbin and Beaker by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
Textile Engineering

Site Selection  Building Design
Power Plants    Machinery Layouts
Water Treatment  Modernization Studies
Air Conditioning Waste Disposal
Appraisals      Consultation

ROBERT AND COMPANY ASSOCIATES
Textile Engineering Division
ATLANTA

Over forty years' nationwide experience in industrial and textile development
### In This Issue

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>What the Mill Expects of a Textile Graduate</td>
<td>8</td>
</tr>
<tr>
<td>Wash-And-Wear — The New Bonanza in Cottons</td>
<td>10</td>
</tr>
<tr>
<td>Woolen Industry Comes South</td>
<td>12</td>
</tr>
<tr>
<td>Ten Points to Success</td>
<td>14</td>
</tr>
<tr>
<td>Formulas for Practical Use</td>
<td>16</td>
</tr>
<tr>
<td>How Will the Textile Industry Find College Graduates</td>
<td>19</td>
</tr>
<tr>
<td>Processing Intimate Blends of “Dacron” Polyester Fiber and Cotton</td>
<td>21</td>
</tr>
<tr>
<td>Effect of Synthetic Fibers on Ceramic Industries</td>
<td>25</td>
</tr>
<tr>
<td>Scholarship and Financial Aid</td>
<td>27</td>
</tr>
<tr>
<td>Outstanding Seniors</td>
<td>28</td>
</tr>
<tr>
<td>A Unique Fabric Idea</td>
<td>29</td>
</tr>
</tbody>
</table>

**THE COVER:** “Composition of Lines and Textures.” This composition was created through the use of cotton roving for the lines, and a broadweave drape for the texture.  
. . . Ted Pappas ’57

---

**THE BOBBIN & BEAKER.** Organized in November, 1938, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge four times during the school year by students of the Clemson College School of Textiles. All rights reserved.

Address: The Bobbin and Beaker, School of Textiles, Clemson College, Clemson, South Carolina.

**POLICY** — The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles. No article in BOBBIN & BEAKER, or any part thereof shall be reproduced in any form without permission of the editor. Requests may be forwarded to Editor, THE BOBBIN & BEAKER, School of Textiles, Clemson, South Carolina.

**THE BOBBIN & BEAKER** is a non-profit magazine organized to serve Clemson students and the textile industry. We ask our readers to consider favorably our advertisers when buying.
Developed primarily for steam setting the twist in yarns, this new controlled vacuum-pressure system has a definite place in other types of steam processing. Experimental projects now being conducted by leading woolen and worsted mills are showing such remarkable results, it may indicate the replacement of conventional steam box methods, on the basis of quality alone.

THE PROCESS — More Efficient. More Economical
- Start vacuum pump by means of push button. 22" to 25" vacuum is produced in 2 to 3 minutes. Pump stops automatically.
- Steam is injected at controlled temperature for any desired time period. Steam is expelled automatically.
- Automatic controls start pump and vacuum cycle is repeated to remove moisture from vessel.
- Pump stops and vacuum relief valve opens to restore atmospheric conditions inside vessel.

THE ADVANTAGES — Higher Quality. Bigger Profits
- Time saving. Complete process in 30 minutes or less, depending on steam injection cycle required.
- Positive shrinkage. Yarn is shrunk and twist is set uniformly from outside to spool core.

CUSTOM BUILT to customer specifications in accordance with ASME standards, Gaston County autoclaves can be designed with vessels to fit into existing systems using present pin racks and trucks.

RUGGED CONSTRUCTION, always an outstanding feature of Gaston County beam and package dyeing machines, is even more essential in vacuum vessels. Our engineering staff is eminently qualified by experience to design the best equipment for your requirements.

COMPLETELY AUTOMATIC OR MANUAL machines are available. Whether your requirements are large or small we are equipped to serve you. Please phone, write or wire for complete details.

GASTON COUNTY DYEING MACHINE CO.
Pioneers in Automatically Controlled Dyeing Machines

Gaston Co. Dyeing Machine Co.  
Terminal Bldg., 68 Hudson St.  
Hoboken, N. J., G. Lindber, Mgr.

STANLEY, NORTH CAROLINA
Fine yet strong, beautiful yet durable and the most versatile yarn in the world—

**BEMBERG**

is the basis for unlimited fabric developments—past, present, and future.

*BEMBERG®

*Aristocrat® of Rayon Yarn*

AMERICAN BEMBERG • MAIN OFFICE: 261 FIFTH AVENUE, NEW YORK 16, N.Y. • PLANT: ELIZABETHTON, TENNESSEE
What The Mill Expects
Of A Textile Graduate

H. B. Risher, Plant Manager
Excelsior Finishing Plant
Pendleton, South Carolina

Mr. Roger Milliken, President of Deering, Milliken and Company, Inc., has stated that “I am not interested in hiring a degree—I want the man.” In a general, sweeping statement, this summarizes my ideas on what is looked for when hiring a college graduate into the Textile industry. However, in order to define more clearly the goal in looking for a man, it is necessary to look at the question from three sides.

1. What is looked for in the initial interview, while the prospect is still a student?
2. What is expected when the graduate reports “on the job?”
3. What is expected of the man after he completes his training period and assumes supervisory responsibilities?

Let’s look first at the first question: WHAT IS LOOKED FOR IN THE INITIAL INTERVIEW? Much can be ascertained from these interviews, and all questioning is directed to a purpose. First, we look for poise in the man—how he talks; does he grope for words, or can he express himself adequately? He may be a brilliant student, but unless he possesses the necessary vocabulary and understanding to express himself clearly and simply, he cannot impart his ideas to his superiors nor to his subordinates. How can this man sell his ideas to his supervisor if he can’t express them in such a manner as to have them understood? How can this man explain to one of his employees how to do a job in such manner that the employee clearly understands? Ability to express oneself is as essential and important as technical “know-how” if one is to climb the ladder of success in the Textile industry.

Other traits looked for in the interview are (a) Ability and willingness to learn, as evidenced by scholastic averages. We don’t look for, nor do we expect, a genius in our supervisory positions, but we do require that the man have more than average intelligence. In most instances, the student has acquired the foundation and needs the experience. If he has proved that he has the ability to learn, we feel that we can help him learn the additional “know-how” needed. (b) A basic knowledge of business. Supervisors are charged with the responsibility of running a department. This involves the proper utilization of materials, machines, and manpower most effectively. A supervisor is, in actuality, running a “business within a business.” It is imperative, therefore, that he have some knowledge of how business operates. If an individual has acquired this basic knowledge while a student, he can more clearly understand the operations of a department and of a mill. (c) Indications of leadership in an individual, as indicated by his participation in extracurricular school activities, such as fraternities, campus organizations. Does he hold, or has he ever held, office in such organizations? Did he participate in athletics? Was he a member of the band, glee club, etc.? Is he a campus leader? The supervisor of today must be a leader. He is charged with directing the activities of people—perhaps only one person, or maybe hundreds of people. It is therefore necessary that he be able to get along well with people and be able to lead them in the direction indicated by management. (d) Initiative. We look for an individual who looks for better ways of doing things—who is dynamic, not static.

In the initial interview, many things are noticed which, when grouped together, tend to give a complete picture of the individual. In addition to the things which have already been discussed, the general appearance of an individual is important. If the importance of this first interview can be impressed upon the readers of this article, the purpose in this writing will have been accomplished. Remember: You are attempting to make the most important sale of your life at that moment—you are selling yourself and your services to a plant or an organization. It is imperative that you present your best self. But a word of caution: Do not attempt to "confound with..."
“Wisdom” an executive who is interviewing you. Be relaxed, have some intelligent questions to ask, and answer honestly and to the best of your knowledge and ability any questions asked of you.

Now let’s take a look at the second question — WHAT IS EXPECTED OF THE GRADUATE WHEN HE REPORTS “ON THE JOB?” Most mills today have a formalized training program for college graduates. This program usually covers all phases of mill operation, and if a person is to absorb properly the training offered, he must possess the ability to learn. Training generally is not of such an intensified nature as to “throw” the material at the trainee. On the contrary, it is a gradual learning process on the part of the trainee. However, it is of such a nature that it is absolutely imperative that the individual apply himself wholly to the training program. It requires effort on his part, some original thought, if you please. We do not want automatons; we want men who think, who apply themselves, and who are willing to make sacrifices to succeed. We want men who are positive thinkers. We expect trainees to make an effort to continue improving their thinking and reading. Outside study is encouraged in all phases of the business. It is preferable that the trainee live in the immediate community and participate in community activities, e.g., church, civic clubs. We feel that in order to become an integral part of the business, he must become a part of the community.

The trainee is expected to demonstrate initiative while working. From the first day he reports to work, each new man is encouraged to look for means of improving on an operation. Criticism from the trainee is invited.

When a trainee reports for work, he has already sold himself. Now it’s up to him to justify this decision. He is guaranteed the opportunity to learn—nothing more. It is up to the trainee to “carry the ball.”

Finally, let’s take a look at the third question which was posed at the beginning of this article: WHAT IS EXPECTED OF THE MAN AFTER HE COMPLETES HIS TRAINING PERIOD AND ASSUMES SUPERVISORY RESPONSIBILITIES? In most cases, prior to “taking over” a supervisory job, an individual has spent many months on a training program, preparing for just this day. He is presumably “ready.” He is immediately faced with problems—personal problems, machine maintenance, operation problems, waste, maintaining the proper flow of goods, to mention only a very few. He is expected to handle these problems. Help is available to him in the form of staff personnel (Personnel Department, Industrial Engineering, Maintenance Department), technical publications, and many others.

Probably the first thing which will strike the new supervisor is the fact that he no longer has a job which he runs from eight a.m. to four p.m. Rather, he will find that there are not enough hours to get all the work done. The point I’m trying to stress is this: The supervisor is being paid to manage a department. Much of his managing will be done after his employees leave for the day (organizing and planning the work, for example). He is expected to put in as many hours as will be necessary to run the job. Often he will find it necessary to pass up the party, the week-end football trip, or that fishing trip he had planned. Now, I don’t mean to imply that after you become a supervisor your routine will be “all work and no play.” To the contrary, there will be play, the type of play which comes with personal economic improvement. If a man has chosen his field of endeavor wisely, his work, in large measure, will be play. It must of necessity be so.

Have you ever noticed that leaders in business and profession are usually the men who are civic leaders also? This is no coincidence. These people have proved their ability to organize and manage, and communities, towns, and cities are like business in that they are seeking to improve. Is it not natural, then, that the man who has proved his ability be called on to direct the civic activities? Normally an organization is quite happy when one of its men is chosen to direct some civic project or club. This speaks well for the man and for the company too. This man is a live medium of public relations. His every action is a reflection, either directly or indirectly, on himself, his family, community, and job.

An organization expects a man to continue to improve himself from the standpoint of learning everything he can about his particular job, through reading of trade publications, conferences, and visits to other plants and industries.

Supervisors are expected to live up to the trust which has been given them—that of leading a group of people, of running the job in a conscientious, fair, safe manner. Conduct unbecoming a leader of our employees will not be condoned.

The mill expects of Textile graduates the same that was expected ten or twenty years ago—men who are ambitious to succeed, who are diligent workers, who are willing to learn, and who, when the opportunity presents itself, will “take the bull by the horns” and go.
WASH-and-WEAR
The New Bonanza in Cottons
By Dr. Edward A. Murray
Research Consultant, School of Textiles
Clemson, South Carolina

The ten years since the close of World War II have witnessed a remarkable transition in the finishing of cotton apparel fabrics, particularly those used for dresses and children's clothing. Once a work-horse fiber used mainly for inexpensive garments, some cotton textiles are now bringing premium prices and the market can't seem to get enough. While due in no small measure to well-aimed sales promotion campaigns, perhaps an even more significant reason for this new popularity has been the development of synthetic finishes for cotton which permit laundering with little or no ironing — the so-called "wash-and-wear" finishes.

What is a wash-and-wear finish? Basically it is a crush-resistant resin treatment. Such finishes have been applied to rayon fabrics for a long time; without them rayon would not have been able to achieve its present popularity as a low-cost summer suitting fabric. More recently, crush-resistant cottons have also become available under such trade names as "Wrinkle-Shed" and "Disciplined".

Crush resistant and wash-and-wear finishes are both based on the same type of resin treatment. The big difference is in the concentration of applied resin. Where crush-resistant treatments usually employ from 4 to 6 per cent resin on the weight of the fabric, wash-and-wear finishes require 10 to 15 per cent or even more. With such high concentrations of resin, most of the wrinkles usually found in laundered cotton articles are no longer present after drying. For best results, certain precautions should be observed in laundering; one of the most important is to avoid introducing hard creases by wringing or spin drying. It is best to let the excess water drain off of its own accord or to squeeze only very gently before hanging the garment up to dry.

The resins used in producing the new finishes are of two types — urea and melamine. Both are "thermo-setting." As supplied to the finishing plant, they are water-soluble and chemically reactive; after application to the cloth, they undergo a curing process which changes them to a permanently insoluble form within the fiber. During application, the resin molecules are small and diffuse readily into the fibers. After curing, they are much larger and the resin has become an integral part of the finished textile. This presence of resin inside the fiber considerably alters its physical properties; swelling in water is markedly reduced, stiffness is increased, and the fiber is somewhat more brittle. Because of the stiffening which accompanies curing, it is important to remove as much of the surface resin solution as possible from the cloth after impregnation. Otherwise, the final product will be extremely stiff. However desirable this attribute may be in reinforced concrete and roofing tiles, a little goes a long way in dress fabrics.
One of the major problems attending the development of satisfactory urea resins for cotton finishing has been the elimination of fiber embrittlement. The cheap urea resins used for rayon treatment are entirely unsuitable, and it has been necessary to develop entirely new, and much costlier, resins for cotton—the so-called “cyclic” ureas, of which there are now several on the market. That the present products have successfully reduced fiber embrittlement is attested by the tank car quantities being sold, and the difficulties most finishers are having in keeping up with the burgeoning demand for wash-and-wear cottons.

Application of the finishes is relatively simple, although careful control is always necessary. The fabric, following the usual finishing treatments such as singeing, desizing, bleaching and dyeing (or printing) is paddled through a resin solution of the appropriate concentration. Generally the bath also contains a variety of modifying agents, such as softeners and emulsified thermoplastic resins to give the desired hand to the finished textile. An acid catalyst, usually in the amount of about 5 to 20 per cent based on the resin solids in the bath, is added just before the padding operation. Following impregnation, the fabric is given a tight squeeze to remove as much of the surface solution as possible, and dried. The fabric then passes through a curing oven where temperatures are considerably higher than in the drying section, usually in the range of 300-600° F. The time of exposure necessary to effect proper curing varies from a few seconds at the higher temperatures to several minutes at the lower ones; speed of travel through the curing oven is regulated so as to produce a high degree of permanence in the finish with as little tendering as possible. Following curing, the fabric is ordinarily scoured to remove traces of uncured surface resin and residual catalyst. It is then ready for a final drying and such dry finishing operations, e.g., calendering, as may be necessary.

Entirely apart from their wrinkle recovery features, thermosetting resin treatments have some secondary effects on the finished cloth. Initial laundering shrinkage is markedly reduced, and it is rarely necessary to Sanforize these materials. This is of some importance to the finisher; there is a saving in yardage of from about 3 to 6 per cent which would be lost in the compressive shrinking operation.

Not all of the alterations in fabric properties produced by the resin finishes are desirable ones, however. The treatment is accompanied by substantial losses in tensile and tear strength, as large as 50 per cent of the values for untreated fabrics. Always objectionable, strength reductions of this order of magnitude are prohibitively great in light weight fabrics, and preclude production of sheer materials with wash-and-wear finishes. A new resin which would lessen these strength losses would find a ready market.

Another undesirable aspect of wash-and-wear finishes is their tendency to retain chlorine. If hypochlorite bleaches are used in the laundering of fabrics finished with thermosetting resins, their useful life is greatly reduced. The resin, probably because of its nitrogenous character, absorbs active chlorine readily, and the fabric becomes tender very rapidly thereafter. This absorption of chlorine is also accompanied by yellowing which is particularly undesirable in fancy fabrics containing a high proportion of white or pastel colors, and the yellowing is greatly aggravated by ironing.

Resin manufacturers recognize these deficiencies, and are constantly working to improve the products used in resin finishing of cottons. One resin with substantially reduced chlorine retention is on the market, and it is generally believed that the problems of strength loss and chlorine retention will ultimately be overcome.

Perhaps the greatest shortcoming of all in the wash-and-wear finishes is that few of them, in flat-woven fabrics at least, live up to their name. Attractive as the complete emancipation from the ironing board may be, not many housewives have the courage to drip-dry their frocks and wear them fresh from the clothesline. While a drip-dried dress may not have a slept-in appearance, most of them don’t look freshly ironed, either. A laboratory swatch of fabric may drip-dry with no trace of wrinkles, but the tailored garment is quite likely to be another story. If American women wore saris, everything would probably be just dandy, because the problems seem to occur only where sewing is involved; “bubbly” or puckered seams are one of the biggest headaches in present wash-and-wear garments. “Wash-and-iron lightly” is perhaps a more descriptive name than “wash-and-wear” for most of the resin finished cottons available today.

Whatever their shortcomings, however, these new thermosetting finishes for cotton are attracting a lot of attention in the market place, and a lot of dollars as well. Their prodigious growth over the past two or three years makes one wonder whether the next step won’t be a fabric that doesn’t need washing.
Woolen Industry Comes South

By Edwin Wilkinson
Executive Vice President
National Association of Wool Manufacturers

With the recent establishment of two wool combing plants in South Carolina, an integrated woolen and worsted industry is developing in the South.

Since the end of World War II the South has made great strides in wool manufacturing but lacked plants for preliminary processing of wool until the combing plants were set up. Previously virtually all wool tops, from which worsted yarn is spun, were shipped in from Northern combing plants, principally in New England.

The South’s greatest gain in wool manufacturing machinery has been in worsted spindles and as this growth continued it seemed certain that combing plants would be established, as they have been, to serve the worsted spinning and weaving mills.

The American system of worsted spinning, developed from the cotton system, had its beginnings in the South and today American-spun yarns are competing substantially with the traditional French system and Bradford system yarns. Much of the worsted yarn made for sale goes to the traditional French system, including very few knitters operate any spindles.

Another important development resulting from increased processing of wool is the greater importance of Southern cities as ports of entry for imported wools. Though the principal ports of entry continue to be Boston, New York and Philadelphia, Southern cities are on their way to becoming important to the wool trade.

This development was highlighted in November when Charleston, S. C., sponsored its first Wool Week as a means of pointing up its growth as a port of entry for wool. In the first year wool was handled, more than 45,000 bales, valued at about $16 million, came in through Charleston.

Charleston’s first wool cargo arrived from South Africa in April of 1954 and since then shipments have come from major wool growing nations the world over, including Argentina, New Zealand and Australia as well as South Africa.

The importance of wool to a port can be readily understood when it is realized that domestic growers normally supply less than half of the apparel wool consumed in the United States and virtually none of the carpet wool.

On a national basis the wool textile industry has been shrinking in size since the end of World War II but, at the same time, the industry has been growing in the South and that growth seems destined to continue.

Today there are close to 100 wool textile plants in eight southern states: North Carolina, South Carolina, Georgia, Virginia, Tennessee, Alabama and West Virginia. It is estimated they account for about 20 per cent of all the woolen and worsted looms in place in the United States, about 22 per cent of the worsted spinning spindles and around 12 per cent of the woolen spinning spindles. By comparison, at the end of 1949, the South had 12 per cent of the looms, 5 per cent of the worsted spindles and about the same number of woolen spindles.

The older wool manufacturing areas, New England and the Middle Atlantic States (New York, New Jersey and Pennsylvania) have suffered mill liquidations. It is estimated, however, that more than half of the nation’s wool manufacturing machinery still is located in New England.

The over-all decline in wool manufacturing in the United States is a cause for concern. Looms in place have dropped from 35,444 in 1949 to 26,878 at the beginning of this year. In the same period worsted spinning declined from 1,844,000 to an estimated 1,000,000 and woolen spinning spindles from 1,443,000 to an estimated 900,000.

A great many reasons are cited for this decline, which has taken place in the face of generally good business conditions and a growing population. Among the reasons mentioned is the trend to a lighter-weight and more informal clothing.

Still another reason may be the tendency of wool to price itself out of the market as compared with other fibers, particularly the new man-made fibers. As noted earlier, domestic growers normally produce less than half of the apparel wool consumed in this

TENLEVE
country. Thus wool is one of the few deficit agricultural commodities in this country.

Yet in spite of this fact there still is a duty of 25½ cents per pound on imported apparel wool. Obviously this is a handicap in the highly competitive textile field with mills striving to buy raw materials at the lowest possible levels.

The National Association of Wool Manufacturers believes the duty on foreign wool should be abandoned in view of the fact that domestic wool growers cannot meet our needs.

The Association, however, does favor Government aid to wool growers to the extent that wool is considered a strategic commodity needed for national defense. The Wool Act of 1954, supported by the industry, declared wool to be a strategic commodity and through incentive payments to growers seeks to increase production to about 300 million pounds a year from the present level of about 250 million pounds.

As has been pointed out many times, woolen and worsted mills can, and do, process both natural and man-made fibers and today they are consuming increasing amounts of the man-made fibers. It should be noted here that blends of wool and the new man-made fibers to a considerable degree were developed in the South though mills in all areas now are blending wool with other fibers. Wool continues, however, as the most important fiber in woolen and worsted mills.

Those interests which seek to continue, or increase, the duty on imported wool should bear in mind that a mill is not wedded to any particular fiber and that the mill will manufacture only that fiber, or combination of fibers which result in a product demanded by consumers and which can be made at a fair profit.

The spreading use of the new man-made fibers has not been confined to woolen and worsted mills alone. The entire textile industry has been and still is undergoing a revolution both as to fibers and machinery. Today we find the traditional lines of demarcation in the textile industry — cotton, wool, rayon, silk — are becoming blurred. In development are mills able to process any fiber or combination of fibers.

In common with other segments of the textile industry in the South and elsewhere, woolen and worsted manufacturers are concerned by ever increasing imports of textiles from low-wage nations. It should be remembered that in the same years during which the wool textile industry was declining, imports were rising. The imports are not the sole reason for the decline but certainly they are one of the contributing factors.

A 30-year record high for wool cloth imports was set in 1952 and surpassed in 1953. In 1954, as a result of poor market conditions here, cloth imports dropped but so did domestic production.

This year, however, is another story with imports appearing headed for an all-time record. Of particular concern has been the rapid rate of increase of both wool cloth and yarn imports from Japan which also is menacing the cotton textile industry.

The difficulty of competing with Japan, in particular, and other foreign nations as well, without an equalizing tariff of some type of import restriction can be readily understood when wage rates are cited.

In the United States, the average hourly wage of wool mill production workers is about $1.50. This compares with about 14 cents in Japan, 45 cents in England and France and 30 cents in Italy. United States tariffs on wool cloth have been cut 50 per cent or more from the rates in the 1930 Tariff Act. The duty on wool yarn has been reduced 57 to 70 per cent. The present tariffs fall far short of equalizing the vast gap in wages. Such higher production rates as may exist here cannot offset the wage differential either. The fact is that textile machinery is pretty much the same the world over and many of the mills of competing nations have been modernized with American gifts or loans.

Aside from the fact that imports displace both American mills and workers, there also is the national defense aspect. Wool textiles and textiles of virtually all kinds, for that matter, are military necessities as important as guns, planes, ships and bombs.

In view of the decline which has taken place in wool textiles there is room for doubting the ability of the industry to meet military mobilization needs. The directors of the Association view the situation so seriously they have formally brought their concern to the attention of the Quartermaster Association which serves as a liaison agency between the Government contractors.

It is understood that a military agency now is making a mobilization survey of the industry which is to be completed by the end of the year.

In the industry's view it does not make sense for the Government to permit increasing imports of wool textiles thereby weakening our defense base to say nothing of the damage inflicted on domestic mills and their employees.

In the words of the Association president, Harold J. Walter of Bachman Uxbridge Worsted Corp., which operates both Southern and Northern mills:

"We are asking that the foreign trade policy of the United States be such that the industry can work out its own problems without the overhanging threat of ever-increasing wool textile imports from low-wage foreign countries."
Ten Points To Success

By J. L. Thompson, Assistant Professor
Yarn Manufacturing Department

1. **TACTFULNESS.** Tact is much more effective than force. Harsh words only arouse opposition. There is still plenty of truth in the adage, “You can lead a horse to water, but you cannot make him drink.”

2. **FAIRNESS.** Each employee deserves the right to be heard. His grievance might possibly be the answer to a multitude of your unsolved problems.

3. **PATIENCE.** Haste still makes waste. Listen to all the facts, weigh them patiently, then make your decision.

4. **FIRMNESS.** Once the proper decision is made and a definite policy is decided upon, put the policy into force and see to it that all persons contribute to the effort of making it work.

5. **FRANKNESS.** Say what you mean; however, do not overlook the fact that frankness without tactfulness can sometimes lead to conflict.

6. **LOYALTY.** Loyalty from both employee and employer is essential to the successful operation of any business. The worst of all, however, is the supervisor who undermines loyal words with disloyal deeds.

7. **ALERTNESS.** Never let the employee be the one to inform you of the goings on in your department. Use your ears for listening.

8. **PUNCTUALITY.** You expect your employees to be on time, so practice what you preach.

9. **APPEARANCE.** An unattractive personal appearance covers one’s ability with doubt. Soup spots on your tie will probably result in red figures on your budget.

10. **SMILE.** It costs nothing but effort; its returns are bountiful.

Frequently, a student has the misconception that to become a supervisor in one of our current-day industrial plants, all that is required is a diploma from an appropriate school signifying that he has successfully completed the required number of courses in his chosen field. It is true that a supervisor of today does need an adequate amount of technical training. In fact, *too many of us learn too little!* It is also true that we need more and more training in subjects other than the technical fields. Today’s employee is a human being and he is demanding that he be treated as such. Today’s supervisor is also a human being and he must be schooled in the ways of human relations. Experience is still the best teacher and a person must stub his toe several times before he learns to lift his foot. A first year graduate certainly does not have the experience, but with a determination to benefit from his mistakes; with a little trimming here and a little rounding out there, he could become a successful supervisor. Jean Richter once said, “Men, like bullets, go farthest when they are smoothest”.

It is hoped that through experience and through association with those persons who possess these qualities that the graduate will eventually attain the ten characteristics listed below. These ten points are by no means all that is needed to become a successful supervisor; but they, in the opinion of the writer, will give the person the necessary foundation to which the finishing touches can be added as the years of toil, sweat, and success make this foundation ever more solid.

FOURTEEN
A WALRUS, A CARPENTER AND THE ENGINEER

"THE TIME HAS COME," THE WALRUS SAID, "TO TALK OF MANY THINGS..."

Timely truths often hide behind the guise of whimsy. Lewis Carroll's walrus and his carpenter accomplice had good reason to talk of many inconsequential things... as their audience of oysters was to learn, alas, too late. We have equally good reasons to quote their opening argument.

We agree with the walrus. As engineers we believe the time has indeed come to talk to business men of many things... not of shoes, or ships, or sealing-wax, or cabbages, or kings—but of the engineer and his position in your business program... of engineering services, of costs, of time—and profits.

This will be our objective in the forthcoming series of messages—to state clearly the function of professional engineering in your business, at a time when the services of a responsible engineering organization are more than ever vital to business success.

J. E. SIRRINE COMPANY
GREENVILLE - SOUTH CAROLINA

A DEPARTMENTALIZED ENGINEERING ORGANIZATION SERVING BUSINESS, COMMERCE AND INDUSTRY
Formulas For Practical Use

The following formulas are published in hope that they will provide an easily accessible reference for the textile student. They were obtained from the 1955-56 Fact File issue of TEXTILE WORLD and are reproduced with the permission of TEXTILE WORLD.

PICKERS

Breaker

\[ \text{draft} = \frac{\text{surface speed of delivery (front calender) roll}}{\text{surface speed of feed roll}} \]

\[ \text{rpm. of calender roll} = \frac{\text{S.S. of calender roll} \times \text{dia. of feed roll}}{\text{S.S. of feed roll} \times \text{dia. of calender roll}} \]

S.S. of roll = rpm. \times \text{circumference}

\[ \text{draft} = \text{product of all driver-gear teeth} \times \text{dia. of calender roll} \]

\[ \text{rpm. calender roll} = \frac{\text{dia. feed pulley} \times \text{driver gears}}{\text{dia. clutch pulley} \times \text{driver gears}} \]

\[ \text{rpm. calender roll} = \frac{\text{dia. feed pulley} \times \text{driver gears} \times \text{rpm. beater}}{\text{dia. clutch pulley} \times \text{driver gears} \times \text{rpm. beater}} \]

S.S. of calender roll = (or inches of lap per min.) \times \text{dia. clutch pulley} \times \text{driver gears} \times \text{rpm. beater}

\[ \text{yds. of lap in 8 hrs.} = \frac{\text{S.S. calender roll} \times 480}{36} \]

\[ \text{ds. of lap in 8 hrs.} = \text{oz. lap} \times \text{yds. of lap in 8 hrs.} \]

\[ \text{production constant} = \text{oz. lap} \times \text{dia. feed pulley} \times \text{rpm. beater} \]

\[ \text{production} = \text{constant} \times \text{oz. lap} \times \text{rpm. beater} \]

Finisher

\[ \text{draft} = \frac{\text{driver gears} \times \text{dia. front calender roll} \times \text{dia. driver cone}}{\text{drive gears} \times \text{dia. feed roll} \times \text{dia. driven cone}} \]

\[ \text{draft} = \frac{\text{driver gears} \times \text{dia. calender roll}}{\text{dia. driver cone}} \]

\[ \text{driver draft (cone)} \text{ gear} = \frac{\text{driver gears} \times \text{dia. draft} \times \text{feed roll}}{\text{X dia. driven cone}} \]

\[ \text{draft} = \text{draft constant} \times \text{driver draft gear} \]

To calculate a change of draft:

\[ \text{driver draft gear needed} = \text{present driver} \times \text{present draft} \]

\[ \text{driver draft gear needed} = \text{present driven} \times \text{present draft} \]

\[ \text{driver draft gear needed} = \text{present driven} \times \text{present oz. lap delivered} \]

\[ \text{driver draft gear} = \text{draft constant} \times \text{oz. lap delivered} \]

\[ \text{driver draft gear} = \text{doubleings \times oz. lap fed} \]

\[ \text{beats per inch} = \frac{3,1416 \times \text{dia. feed roll} \times \text{rpm. feed roll}}{\text{needed beats per in.}} \]

\[ \text{feed pulley dia. needed} = \frac{\text{present beats per in.} \times \text{dia. feed pulley}}{\text{needed beats per in.}} \]

\[ \text{rpm. of beater} = \frac{3,1416 \times \text{dia. feed roll} \times \text{rpm. feed roll} \times \text{beats per in.}}{\text{blades in beater}} \]

CARDS

Draft

\[ \text{draft} = \frac{\text{product of driver gears} \times \text{dia. roller calender roll}}{\text{product of driven gears} \times \text{dia. lap roll}} \]

\[ \text{draft constant} = \frac{\text{draft} \times \text{draft change gear}}{\text{draft change gear} + \text{draft constant}} \]

\[ \text{draft} = \text{draft constant} \times \text{draft change gear} \]

To calculate a change of draft:

\[ \text{draft gear needed} = \text{present draft gear} \times \text{present draft} \]

\[ \text{draft gear needed} = \text{present draft gear} \times \text{oz. sliver delivered needed draft} \]

\[ \text{draft gear needed} = \text{present oz. sliver needed} \]

\[ \text{draft gear} = \frac{437.5 \times \text{oz. lap}}{\text{present draft gear} \times \text{present oz. lap} \times \text{gr. sliver needed}} \]

\[ \text{oz. lap to be used} \times \text{present gr. sliver} \]

Production

\[ \text{driver gears} \times \text{dia. driver cone} \times \text{driver pulley} \]

\[ \text{rpm. doffer} = \frac{\text{X dia. small lickerin pulley} \times \text{rpm. cylinder}}{\text{driven gears} \times \text{dia. lickerin drive pulley} \times \text{rpm. drive pulley}} \]

\[ \text{driver gears} = \frac{\text{X dia. driver pulley} \times \text{rpm. production pulley}}{\text{X production needed}} \]

\[ \text{oz. lap needed} = \text{X oz. lap delivered} \]

\[ \text{gr. sliver needed} \times \text{present production} \]

\[ \text{production constant} = \frac{\text{gr. sliver} \times \text{rpm. doffer}}{\text{production}} \]

\[ \text{production} = \text{production constant} \times \text{gr. sliver} \times \text{rpm. doffer} \]

DRAWING FRAME

Draft

\[ \text{draft} = \text{draft constant} \times \text{draft gear} \]

To calculate a change of draft:

\[ \text{draft gear needed} = \text{present draft gear} \times \text{present draft} \]

\[ \text{draft gear needed} = \text{present draft gear} \times \text{present gr. sliver delivered} \]

\[ \text{draft gear needed} = \text{present gr. sliver delivered} \times \text{gr. sliver to be fed} \]

If gr. sliver fed and gr. sliver delivered are both changed:

\[ \text{draft gear} \]

\[ \text{draft gear} = \frac{\text{present gr. sliver delivered} \times \text{gr. sliver delivered}}{\text{present gr. sliver to be fed} \times \text{present gr. sliver}} \]

If gr. sliver fed remains the same and gr. sliver delivered is changed:

\[ \text{draft gear needed} = \text{present gr. sliver delivered} \times \text{gr. sliver to be delivered} \]

If gr. sliver fed is changed and gr. sliver delivered remains the same:

\[ \text{draft gear needed} = \text{present gr. sliver delivered} \times \text{gr. sliver to be fed} \]

Production

\[ \text{production constant} = \frac{\text{gr. sliver delivered} \times \text{rpm. front roll}}{\text{production}} \]

\[ \text{production} = \text{production constant} \times \text{gr. sliver} \times \text{rpm. front roll} \]

\[ \text{production in 8 hrs.} = \frac{480 \times \text{rpm. front roll} \times \text{X oz. lap}}{36 \times 7,000} \]

THE BOBBIN AND BEAKER
ROVING FRAME

Draft
Slubber

\[
\text{draft} = 12 \times \text{gr. sliver fed} \times \text{bank roving delivered} \times 100
\]

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present draft}}{\text{draft needed}}
\]

If gr. sliver and bank roving are changed:

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present HR} \times \text{present gr. sliver}}{\text{HR needed} \times \text{gr. sliver needed}}
\]

If gr. sliver and bank roving remains the same:

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present HR}}{\text{HR needed}}
\]

If gr. sliver is changed but bank roving remains the same:

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present gr. sliver}}{\text{gr. sliver needed}}
\]

Twist

\[
tpi = \frac{\text{rpm of fiber} + (\text{rpm front roll} \times \text{circ. front roll})}{\text{twist constant} \times \text{tpi}}
\]

\[
\text{twist gear} = \text{tpi} \times \text{rpm constant} \approx \text{tpi}
\]

To change twist:

\[
\text{twist gear needed} = \frac{\text{present gear} \times \text{present tpi}}{\text{tpi needed}}
\]

If bank roving is changed:

\[
\text{twist gear needed} = \frac{\text{present gear} \times \sqrt{\text{present HR}}}{\text{HR needed}}
\]

Lay

\[
\text{lay constant} = \frac{\text{lays per inch}}{\text{lay gear constant} \times \text{lays per inch}}
\]

If lays per inch are to be changed:

\[
\text{lay gear needed} = \frac{\text{present gear} \times \text{present lays per inch}}{\text{lays per inch needed}}
\]

If bank roving is to be changed but the twist multiplier remains the same:

\[
\text{lay gear needed} = \frac{\text{present gear} \times \sqrt{\text{present HR}}}{\text{HR needed}}
\]

Tension

\[
\text{tension gear needed} = \frac{\text{present gear} \times \sqrt{\text{present HR}}}{\text{HR needed}}
\]

Running time

(minutes bobbin in creel will last)

\[
\text{minutes} = \frac{\text{yards of roving on bobbin} + \text{surface speed of back roll}}{\text{production per hour}}
\]

\[
\text{production per hour} = \frac{3 \times 105 \times \text{HR} \times \text{oz. on full bobbin}}{0.525 \times \text{rpm. front roll} \times \text{circ. front roll}}
\]

\[
\text{doffs in 6 hrs.} = \frac{480}{\text{mins. per doff + mins. for doffing}}
\]

lbs. in 8 hrs. = doffs in 8 hrs. \times \text{lbs. per doff}

ROVING AND YARN NUMBER

1 lb. = 7,000 grains
1 skein or lbs. = 120 yds.
1 Hank = 840 yds.
Grain = weight in lbs. of 1 Hank

\[
\text{yarn number (or HR)} = 8.33 \times \text{yds.}
\]

\[
\text{wt. (in gms.)} = \frac{8.33 \times \text{yds.}}{\text{yarn number (or HR)}}
\]

\[
\text{yds.} = 3 \times \text{wt. (in gms.)} \times \text{yarn number (or HR)}
\]

Roving or yarn on bobbins, spool, or beam

\[
\text{yarn number (or HR)} = \text{ends} \times \text{yds. in each end} \times \frac{840 \times \text{wt. (in lbs.)}}{\text{ends}}
\]

If yarn on beam, etc. = \text{ends} \times \text{yds. in each end}

\[
\text{ends on beam} = \frac{840 \times \text{wt. (in lbs.)} \times \text{yarn number (or HR)}}{\text{yds. in each end}}
\]

SPINNING FRAME

Spindle speed

\[
\text{rpm of spindle whorl} = \frac{\text{diam. of cylinder} + 1/8 \text{in.}}{\text{diam. of whorl} + 3/16 \text{in.}}
\]

\[
\text{rpm of cylinder} = \frac{\text{diam. of cylinder} + 1/16 \text{in.}}{\text{diam. of whorl} + 1/16 \text{in.}}
\]

Twist

\[
tpi = \frac{\text{rpm of spindle}}{\text{surface speed of front roll}}
\]

\[
\text{rpm. front roll} = 3 \times \text{front roll}
\]

\[
\text{tpi} = \frac{\text{driven gears} 	imes (\text{rpm. whorl} + \text{rpm. cylinder})}{\text{driver gears} \times \text{circ. front roll}}
\]

\[
\text{twist gear} = \frac{\text{driven gears} \times (\text{rpm. whorl} + \text{rpm. cylinder})}{\text{driver gears} \times \text{tpi} \times \text{circ. front roll}}
\]

\[
\text{twist constant} = \text{tpi} \times \text{twist gear}
\]

\[
\text{twist gear} = \frac{\text{twist constant} + \text{tpi}}{\text{tpi} \times \text{twist constant} + \text{tpi}}
\]

To calculate twist changes:

\[
\text{twist gear needed} = \frac{\text{present tpi} \times \text{present twist gear}}{\text{new twist gear}}
\]

\[
\text{twist gear needed} = \frac{\text{present yarn number} \times \text{present twist gear}}{\text{new yarn number needed}}
\]

Draft

\[
\text{draft} = \frac{\text{driven gears} \times \text{rpm. front roll}}{\text{driver gears} \times \text{circ. front roll}}
\]

\[
\text{draft gear} = \frac{\text{driven gears} \times \text{rpm. front roll}}{\text{driver gears} \times \text{circ. front roll}}
\]

\[
\text{draft constant} = \frac{\text{draft} \times \text{draft gear}}{\text{draft gear - draft constant} = \text{draft constant}}
\]

\[
\text{actual draft} = \frac{\text{yarn number} \times \text{doublings}}{\text{HR fed}}
\]

To calculate draft changes:

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present draft}}{\text{needed draft}}
\]

\[
\text{draft gear needed} = \frac{\text{present gear} \times \text{present yarn number} \times \text{HR}}{\text{needed draft}}
\]

\[
\text{draft gear needed} = \text{present gear} \times \text{present yarn number} \times \text{HR}
\]

\[
\text{draft gear needed} = \text{present gear} \times \text{wt. of 120 yds. of yarn to be spun}
\]

\[
\text{lay gear needed} = \frac{\text{present gear} \times \text{wt. of 120 yds. of yarn}}{\text{wt. of 120 yds. of present yarn}}
\]

Production

\[
\text{banks of yarn per spindle in 8 hrs.} = \frac{8 \times 3 \times 1416 \times \text{circ. front roll}}{\text{rpm. front roll} \times \text{draft}}
\]

LOOM

Pick gear

\[
\text{ppl} = \frac{\text{ppl}}{\text{ppl}} \times \frac{\text{surface speed of take-up roll}}{\text{S.S. take-up roll}} = \text{rpm. \times cir. take-up roll}
\]

\[
\text{ppl} = \frac{\text{ppl}}{\text{ppl}} \times \frac{\text{rpm. take-up roll \times cir. take-up roll}}{\text{rpm.}}
\]

If the loom has a pick-pawl take-up (pick gear is a driven gear):

\[
\text{ppl} = \text{driver gears} \times \text{circ. take-up roll} \times 2550 \text{ cir. take-up roll}
\]

\[
\text{pick gear} = \times \frac{\text{ppl}}{\text{ppl} \times \text{driver gears in pick-gear chain}}
\]

\[
\text{pick gear} = \times \frac{\text{pick constant \times pick gear}}{\text{pick constant \times pick gear}}
\]

If the loom has a double-worm take-up (pick gear is a driven gear):

\[
\text{production} = \frac{\text{pick gear} \times \text{ppl}}{\text{pick gear} \times \text{pick constant} + \text{ppl}}
\]

\[
\text{pick gear needed} = \frac{\text{present gear \times ppl needed}}{\text{present ppl}}
\]

WINTER 1955

SEVENTEEN
EXACTLY the same good results each time you Desize with EXSIZE-T

Carefully standardized to give the same good results at all times. Exsize-T is the most efficient . . . most economical of all desizers. Safe! Exsize-T is not a harsh chemical — but a harmless liquid enzyme concentrate. Easy to apply. Removes starch quickly . . . cheaply . . . completely.

"EXSIZE-T is the registered trademark of Pabst Brewing Company, Copr. 1955. Pabst Brewing Company, Milwaukee, Wisconsin.

WRITE FOR FREE BOOKLET
How Will The Textile Industry
Find College Graduates

Hugh M. Brown, Dean
School of Textiles

Over a period of years, since 1950 to be more specific, there has been a steady downward trend in the number of students taking textile training in colleges. This seems somewhat surprising in face of the ever increasing demand for college men with training in the textile field and all the more surprising with the almost unlimited opportunities for careers in the textile industry. Especially in the South, where textiles is the largest industry, it is surprising that industrial minded men have not chosen this field since normally there is a strong desire of southern boys to work in the South.

At the meeting of the National Council of Textile Education this problem was considered at length by representatives from the twelve textile schools of the nation. The conclusions of this group were that the diminishing interest in a career in textiles has resulted largely from the tremendous publicity campaigns that have been waged for the past several years by other industries, extolling in glamorous fashion the career possibilities in other fields of engineering such as Utilities, Chemicals, Electronics, Petroleum, Aircraft, etc. This has often placed great stress on high starting pay and though promising advancement possibilities have in most cases not given definite figures.

It is believed that if a similar campaign were made by textile organizations and associations, not only in textile magazines but in others having a much wider circulation, a greater number of high school graduates could be guided toward textiles. It is also felt that if textile concerns would make more contacts in their local communities many students might be awakened to opportunities awaiting them in their own localities. In Alabama the mills throughout the State gave Open House days for high school seniors which resulted in an increase in the number of the graduates choosing textiles.

It seems there is little doubt that if the high school students and their parents would take a careful look from a long term viewpoint, that they would find opportunities in textiles excelling those in most other industries. The textile industry having so many segments has a tremendous number of administrative and executive positions and a recent study by "Fortune Magazine" showed that on salaries of top management in the several industries, textiles was practically the leader of the list and that the average age of the textile executive was younger than that for other industries. It was also brought out by one of the largest textiles companies in the nation that though in some cases the starting pay in textiles is not as high as in other engineering fields, that the salaries of the average college graduate in textiles in three to five years caught up with those paid in other engineering fields and, thereafter, reached considerably higher levels than in any other industry.

At a meeting of the National Council of Education a year ago, Mr. Roger Milliken, President of the Deering Milliken Company, stated that the competitive nature of the textile industry creates enormous opportunities in the textile industry which are not so great for Utility, Railroad or other types of industry where competition is not as keen.

Mr. Robert O. Arnold, President of the Covington Mill, Covington, Georgia states, "Except for a few men who have gone to top jobs with utility companies, the textile graduates I know are doing far better than those of any other branch of engineering." Mr. Leon Lowenstein, President of M. Lowenstein & Sons, a firm which has yearly sales of $250,000,000 stated, "Today, houses like my own are looking for the calibre of young men who will eventually fill top jobs, and a Class A textile school education is definitely an asset. Most of the top flight men with our firm are all graduates of textile schools. If you were to ask them if they had a chance to start their careers over again, they would tell you that they would do the same thing again."

At Clemson a study was made of the earnings in 1953 for the former graduates of our School of Textiles. These figures are shown in Table I. It is felt that these figures show higher earnings at any time
beyond five years from graduation than are had for the various engineering groups in other fields. All in all it seems the high school graduates are not giving sufficient consideration to the career possibilities in the textile industry and this raises the question of what can be done about it. The Textile School at Clemson is putting on a more extensive campaign on high school days and through the high school principals to acquaint the students with the opportunities available, but it is felt that campaigns conducted by textile organizations and associations would be much more effective than pleas from our school. It is the textile companies that will employ the graduates and their statements would carry far more weight if the need is stressed by them. If they would give some publicity similar to that being used in other engineering fields and place some of it in non-textile magazines which are read by a far wider group than read the textile journals, it seems possibly a larger percentage of the high school graduates could be interested in textiles.

In the long view there should be a bright future for textiles. It is estimated that by 1975 the population of the nation will have increased by 45 million people. This will furnish a steady increase in the market for textiles of all sorts, wearing apparel, home fabrics, automobile and airplane fabrics as well as an increase in industrial fabrics used in the additional manufacturing that will be required to supply the various goods for the increased population.

The increased automatons and electronic control being used in the textile industry will demand an ever growing need for men with college training. The research being devoted to textiles is growing by leaps and bounds and will furnish innumerable opportunities for trained men. The big problem is to bring the true story to the attention of potential students showing that over the years textile graduates will probably fare better than most any other group.

The alumni receiving this magazine can do much to bring the message to the youth of their several communities. Unless the boys are encouraged to make a more careful comparison of career possibilities in textiles with those in other fields, the textile industry will be the loser by not obtaining sufficient trained graduates and the students themselves in all too many cases will also be the loser by being lured into less favorably industries by high powered publicity.

The textile schools are all running behind capacity that has been so amply provided in a large measure by the industry itself. There is no lack of faith on the part of the industry in the textile schools, else the large amount of direct aid would not have been forthcoming. The problem is to instill in the high school graduates a corresponding faith in the textile industry. If the efforts of the school to bring this about are enhanced both by the alumni and the textile organizations, it is believed textile graduates will be forthcoming and probably in no other way will sufficient students choose textiles in face of the strong publicity being given other fields.

<table>
<thead>
<tr>
<th>Earnings in 1953 of Textile Graduates From 1901 through 1940</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Less than $4,000</td>
</tr>
<tr>
<td>$4,001 — $5,000</td>
</tr>
<tr>
<td>$5,001 — $6,000</td>
</tr>
<tr>
<td>$6,001 — $8,000</td>
</tr>
<tr>
<td>$8,001 — $10,000</td>
</tr>
<tr>
<td>$10,001 — $15,000</td>
</tr>
<tr>
<td>$15,001 — $20,000</td>
</tr>
<tr>
<td>$20,001 — $30,000</td>
</tr>
<tr>
<td>Over $30,000</td>
</tr>
</tbody>
</table>

---

We want your business!

REEDS FOR THE WEAVING OF ALL FABRICS

INDUSTRIAL HARD CHROMIUM PLATING

GREENSBORO | Industrial Platers, Inc. | Loom Reed Company, Inc.

THE BOBBIN AND BEAKER
Processing Intimate Blends of 
“Dacron” Polyester Fiber and Cotton

(continued from October Issue)

W. Deane Belcher
Supervisor, Intimate Apparel Merchandising
Textile Fibers Department
E. I. du Pont de Nemours & Co.

Dyeing

Union and cross-dyeings of blends of “Dacron” and cotton can be readily made using disperse dyes on the “Dacron” and either vat or direct dyes on the cotton. Since well penetrated dyeings on “Dacron” have outstanding wet fastness properties, the use of vat dyes on the cotton gives a completely washable fabric. This combination is highly recommended although somewhat expensive. The use of direct dyes enables the dryer to use a one-bath technique that is more economical. If the direct dyes are after-treated, the fastness properties are adequate for many end-use requirements.

Vat Dyes on Cotton—Two-Bath Method

The “Dacron” polyester fiber should be dyed first. Dyeing the cotton cleans the “Dacron” very effectively. It also avoids the shade change that occurs with certain vat dyes when they are exposed to prolonged boiling in carrier baths. Detailed procedures are as follows:

The method most widely used in dyeing fabrics of spun “Dacron” is in a conventional covered beck using “Dowicide” (1) A as the carrier. The amount of carrier to be used will depend on the depth of shade, bath volume ratio, and percentage of “Dacron” polyester fiber in the blend. A good rule to follow for blends is to use 1.5 grams per liter of “Dowicide” A plus the following percentages based on the weight of “Dacron” only:

- Light Shades, 10% “Dowicide” A
- Medium Shades, 15% “Dowicide” A
- Heavy Shades, 20% “Dowicide” A

The dye bath should be set at 120°F. and 0.5 per cent “Avitone” (2) T softener added. “Dowicide” A flakes should be dissolved in plenty of hot water (160-180°F.) together with 0.2 grams per liter caustic soda, 0.1 grams per liter ammonia (ammonium hydroxide), 0.5 per cent “Avitone” T softener. After slow straining into the dyebath, the solution should be circulated 15 minutes while raising the temperature to 120°F. A well diluted solution of acetic acid should be added slowly to the dye bath, using 1.0 pound of glacial acetic acid for every 30 pounds of “Dowicide” A. The pH should be between 5 and 6, adjusted to this level if necessary. Di-ammonium phosphate is often used in place of acetic acid since the pH in this system is self-regulating. The bath should be circulated for 15 minutes. The disperse dyes are pasted with one per cent of “Avitone” (2) T softener and hot water added, without exposing the dyes to live steam injection. After adding the dyes to the bath, the dyebath temperature is raised to the boil over 45 minutes and the fabric dyed at the boil for at least one hour before sampling and not for less than two hours total. If adds are necessary, the dye bath should be cooled to 180°F. before adding the disperse dye. After cooling the dyebath with an overflow rinse, the bath is dropped, followed by scouring with “Duponol” RA surface active agent and caustic soda for 20 minutes at 180°F. If the cotton is to be vat dyed later, the scour can be omitted.

Another method of dyeing “Dacron” polyester fiber is in a pressure system at 250°F. without a carrier. The use of 2.0 grams per liter methyl lactate or 2.0 per cent acetic acid (glacial) to insure dye stabilization is recommended. This method is much more economical and give shades of greater clarity and fastness. Fabric can be dyed at 250°F. in a Barotex or at 235°F. in a beam dyeing machine. Many package dyeing machines have been equipped to handle the pressures and temperatures required to dye yarn at 250°F.

(1) Registered trade-mark of E. I. du Pont de Nemours & Co. (Inc.)
(2) Registered trade-mark of E. I. du Pont de Nemours & Co. (Inc.)

WINTER 1955
A list of disperse dyes recommended for use on "Dacron" that gives shades of excellent fastness is given below:

"Latyl" Yellow LY
"Celanthren" (†) Fast Yellow GL Conc. 300%
"Acetamine" (†) Fast Yellow 4RL
"Latyl" Orange R
"Celanthren" Cerise B
"Latyl" Red B
"Latyl" Violet 2R
"Latyl" Violet BN
Latyl" Blue FL
"Latyl" Brilliant Blue 2G
"Latyl" Brilliant Blue BG

For cotton, the vat dye is preferably applied from a reduced bath and is reoxidized by conventional methods in a jig or beck. The continuous pad-steam method also gives excellent results although it is commonly used on fairly large yardages. If the cotton is dyed last, a thorough soaping should follow oxidation.

Direct Dyes on Cotton—One-Bath Method

In the application of direct and disperse dyes to fabrics blended of "Dacron" polyester staple and cotton by a one-bath process, "Dowicide" A is again the preferred carrier. The detailed dyeing procedure for the blend follows exactly the process outlined above, but with the following additions and changes:

The direct dye is dissolved and added separately from the disperse dyes but at the same temperature.

Dyeing of the "Dacron" polyester fiber is carried out between pH 7.0 and 7.5 instead of 5.5 since direct dyes are adversely affected by a low pH. Sodium dihydrogen phosphate (NaH2PO4) is preferred for neutralizing the alkaline "Dowicide" A.

No salt is added for the direct dyes until the shade is matched on the "Dacron."

The finished dyeing is scoured for 15 minutes at 120° F. with 0.5 grams per liter of Product BCO(‡) textile processing agent. The addition of salt to the scouring bath may be required in a number of instances to hold the shade on the cotton.

An aftertreatment of the direct dyes is recommended to improve wetfastness.

Developed Dyes on Cotton

Very good results have been obtained by applying developed dyes ("Pontamine"(†) Diazo dyes) to the cotton and disperse dyes to the "Dacron" simultaneously. After dyeing the "Dacron" at the boil, the

(†) Registered trade-mark of E. I. du Pont de Nemours & Co. (Inc.)
(‡) Product of E. I. du Pont de Nemours & Co., Inc.
cotton color is developed by the normal cold diazotization. This technique gives much better wetfastness than regular direct dyes although the all-round fastness is not quite as good as with vat dyes.

**FINISHING**

**Wire or Bristle Brushing**

The resistance to pilling of certain spun fabrics has been improved by including a brushing operation in the finishing. The brushing removes some loose fibers and raises others, which are later removed by shearing and/or singeing. Several types of equipment have been used for this process, including nappers, despeckers, sanders and bristle brushes. In addition, the modified tiger has been found useful in experiments by the Du Pont Company. Caution should be used on the lightweight, open construction fabrics to prevent such steps from mechanically degrading the fabric. The brushing or napping equipment in the individual mill should be tested with each fabric to determine the proper settings for the desired results.

**Heat-Setting**

Heat-setting is necessary for fabrics blended of “Dacron” polyester fiber and cotton to obtain thermal dimensional stability as well as improved resistance to pilling. Heat-setting at 380°F. for 45 second exposure is preferred on a pin or clip tenter. The best resistance to pilling has been obtained when shrinkage is allowed in both the warp and filling. Three to seven per cent allowances have been effective. Other heat-setting equipment, such as hot roll and hot air—hot roll, has been found to give equivalent results to the tenter frame.

**Brushing and Shearing**

This operation has proved advantageous especially where a bristle or wire brushing has been included in the finishing of the fabric. Long fibers raised by brushing melt to form a polymer bead on the surface of the fabric when it is singed. These polymer beads will impart a harsh, sandy hand to the fabric. Shearing will crop the long fibers and minimize the formation of these beads. Brushing at this stage merely helps to stand the fibers up for the shearer blades and does not do much to remove loose fibers from the fabric.

**Singeing**

Singeing is probably the most important single finishing operation that is used to reduce pilling. A deep, thorough, evenly applied singe, preferably by two flame exposure (face and back), is often necessary to get good resistance to pilling. Since every singer is different, standard operating conditions cannot be suggested. Each finisher should experiment with his equipment until optimum flame settings and linear speeds have been determined for each fabric style.

**WINTER 1955**
It has been found that low, even flames and good control of the distance from the flame to fabric are necessary for good results. The lowest linear speeds that will clear the fabric of surface fuzz without fusing or degrading the fiber should be used.

**Compressive Shrinkage**

A compressive shrinkage operation, such as for “Sanforized”\(^1\) fabrics, is necessary to make the cotton component dimensionally stable to washing. This treatment has no adverse effect on “Dacron” polyester fiber.

**Sequence**

The order in which each of the above operations is performed may be varied to fit the needs of each individual fabric. However, the best sequence of operations is as follows:

<table>
<thead>
<tr>
<th>Procedure I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desize</td>
</tr>
<tr>
<td>Scour</td>
</tr>
<tr>
<td>Mercerize</td>
</tr>
<tr>
<td>Bleach</td>
</tr>
<tr>
<td>Dye</td>
</tr>
</tbody>
</table>

... Wire or bristle brush ... Heat-set ... Brush and shear ... Singe ... Scour ... Compressive shrink

This sequence would be followed for a fabric having inherently poor resistance to pilling. If the fabric were to be finished white, bleaching could be done after singeing in place of the scour. If the greige goods are clean, it may be possible to brush, heat-set and singe in the greige, followed with wet processing. To prevent shading and loss of dye-receptivity this procedure should be avoided. In this case, all heat treatments should follow dyeing, but here too, close attention is required in the selection of dyes and heat-setting conditions to avoid dye sublimation.

If the greige fabric is relatively free of stains and dirt, and has good inherent resistance to pilling all of the above mentioned steps may not be necessary. In this case, a procedure such as the following may be acceptable:

<table>
<thead>
<tr>
<th>Procedure II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat-set</td>
</tr>
<tr>
<td>Scour</td>
</tr>
<tr>
<td>Bleach</td>
</tr>
<tr>
<td>Desize</td>
</tr>
</tbody>
</table>

... Compressive shrink ... It is important that heat-setting precede singeing to prevent uneven setting and shrinkage of the fabric. The need for cleanliness of the greige goods is emphasized if this sequence is used, otherwise stains will be set in the goods which may prove very difficult to remove. Procedure II should be considered the minimum treatment that is necessary for fabrics blended of “Dacron” polyester staple and cotton.

\(^1\) Trade-mark of Cluett, Peabody and Co.
Effect of Synthetic Fibers on Ceramic Industries

By Larry Bell, Cr. En., '56

Just as the automobile changed the field of transportation, so man-made or synthetic fibers have completely revamped the field of textiles. New machines, new techniques, and new and inter-related industries have resulted from this great discovery. Usually the textile and ceramic industries appear to be far apart, but the truth of the matter is that millions of dollars a year are accredited to the textile divisions of various ceramic industries. The outstanding industries are that of glass fibers and thread-guides.

Fiber glass is one of the newest synthetic fibers. Its first appearance in the form of yarn in the 1930's was the climax of countless attempts to commercially make a truly flexible fiber of glass. The initial step toward the establishment of the glass textile industry as it is today was taken in 1931. At this time research was begun in the field of glass in many fibrous forms—one of which was the textile fiber. By 1938 development had progressed to that point where production of the fibers in commercial quantities at competitive cost was realized.

The basic properties and various physical and chemical characteristics of fiber glass yarns are as distinctive as those of cotton, wool, asbestos, and rayon, and like those other fibers, motivated modifications and additions to existing textile nomenclature and terminology.

The manufacture of fiber glass yarns is delicate and rather unique. Two processes represent the techniques for almost all fiber glass yarns. These processes are the continuous filament and staple fiber. In the continuous filament and staple fiber processes the diameter of the fiber is accurately controlled by regulating the viscosity of the molten glass through temperature control, by the size of the orifices through which the glass flows by regulating the rate of speed at which the fibers are drawn.

The continuous filament process provides truly continuous filament of indefinite length having an exceptional brilliance and continuity. The fibers are formed by mechanical attenuation. Molten glass flows through temperature resistant metal alloy feeders having small orifices. As the fine streams of molten glass emerges from these holes, they are gathered together, run over a pad where sizing is picked up and then carried to a high speed winder. Because the winder revolves at a much faster rate than the stream flow from the melting chamber, the tension attenuates the glass while it is still molten and thus draws out filaments that are a mere fraction of the diameter of the orifices. The winder draws out the continuous filaments at rates above two miles a minute.

After being drawn into a forming tube, the continuous filaments are subsequently processed into glass fiber yarns and cards through conventional twisting and plying operations on standard textile machinery.

The staple fiber process forms a fiber having long-staple characteristics. It uses jets of compressed air to attenuate or draw out the molten glass into fine fibers. The molten glass flows through orifices in temperature-resistant metal alloy feeders at the base of each furnace. The impact of the compressed air literally yanks the thin stream of molten glass into fine fibers varying in length from 8 to 15 inches. The fibers are driven down onto a revolving drum on which they form a thin veil resembling a cobweb.

In their most instantaneous descent to the drum, the fibers pass through a spray of lubricant and a drying flame. This web of fibers is then gathered from the drum into a sliver that is lightly drafted in the ensuing winding operation so that the majority of the fibers be parallel with the length of the sliver. These soft slivers can be further reduced in diameter, if desired, and then twisted and piled into yarns of various sizes using textile machinery and processes similar to those employed for long staple materials.
A variety of textile products manufactured of glass fiber yarns are designed for a multitude of specific end uses. Manufacturers of electrical equipment and wire and cable were the first major users of fiber-glass textile products. Resistance to moisture, rot, chemicals and high temperatures combined with a high strength-low bulk ratio result in a high demand for fiber glass textile products for a carrying medium and reinforcement for impregnants used for insulation in electrical equipment. Fiber glass yarns and scrim have provided the paper industry with the ideal reinforcement for paper and tapes. Demand has increased sharply for all-glass marquisette curtains, screen print draperies, and casement cloths. There are hundreds of other uses for this product which are not enlightened by the scope of this article.

Thread Guides

Synthetic fibers are far more abrasive than the natural fibers such as cotton and wool, which composed the greater part of textile activity prior to the discovery of rayon. In addition, many synthetic yarns are processed in smaller deniers at high speeds and tensions. This has greatly accelerated the wear in guides.

The first guides used in producing rayon were probably selected on the basis of acid resistance, with abrasion resistance a close second. Metals were generally discarded due to the ease with which acids attacked them. Agate and synthetic sapphire met the basic requirements but were extremely expensive and limited in supply. Both of these materials were handicapped because the various designs and sizes had to be machined from the hard bulk, raw material. Designs were necessarily kept simple and for the most part confined to rods, which did not always make efficient handling or economical processing.

Glass and glazed porcelain have been used in a great many functions satisfactorily, but for the most part do not have sufficient wear resistance. The thin glazed surfaces of porcelain speedily break down under the abrasive action of the yarn. Filament breaks, plus the continual inspection for worn guides, plus the expense in constantly replacing these guides tends to make them uneconomical for general use. Another problem to be considered is the amount of static electricity caused by increased frictions at high speeds.

Through research, a suitable ceramic guide was produced. These guides can be made to almost any shape since it can be dye pressed, extruded, casted or machined in the unfired state. The final product has a hardness of 8 on Moh's Scale. It is homogeneous, easily polished and resists all acids except fluorine compounds. The accuracy to which it can be made makes possible closer control of yarn processing, and quite often allows increased speeds.
Scholarships and Financial Aid

By William C. Whitten
Assistant Professor of Textiles
Chairman, Student Awards Committee

Blackmon-Uhler Corporation
Burlington Industries, Incorporated
Celanese Corporation of American
Dow-Corning Corporation
Interchemical Corporation
Keever Starch Corporation
Owens-Corning Fiberglas Corporation

These awards amount to more than $5000 annually. In addition, probably even more scholarships are awarded by companies, usually to students in the city in which the company is located, than by the Textile School itself. The college has nothing to do with these grants, and those in need of help should make inquiries as to their availability.

In that regard, a word of advice; don't hesitate to apply for financial help if you feel you can qualify. Don't be modest or bashful about it. Someone is going to get the grant and you never know the qualifications of the other men. Yours may be the best. Sometimes we almost have to beg for applicants. Come forward and apply.

In addition to outright grants, there are a number of loan funds both by the college and by industries of the state. Of course, these have to be repaid, but at little or no interest.

Also the college has a few jobs which are filled by student help. The Director of Student Aid should be contacted concerning this. He also can locate outside jobs at times for some.

And finally, I would recommend to prospective students that they seriously consider the financial aid that can be acquired by participation in the ROTC program. It is no small change, and is outlined in the college catalog.

If a student is a good student, I don't believe that the faculty and administration will fail to find some way for him to overcome financial difficulties in order to remain in college.
Outstanding Seniors

Mack Gerald ("Rock") Fleming, a textile manufacturing student from Anderson, South Carolina, holds the rank of 1st Lieutenant in the Armor Division of the ROTC. He attended summer camp at Fort Knox, Kentucky, where he was recognized as a Distinguished Military Student.

Rock is a member of the Block "C" Club, N.T.M.S. and Phi Psi. He is head manager of the football team this year. He received high honors during his sophomore, junior and senior years.

Rock is attending Clemson on a four-year scholarship given by Abney Mills of Anderson, South Carolina. After two years in the Army, he plans to enter the dyeing and finishing or production departments of Abney Mills.

Thomas Edward Boyce, a textile engineering major, hails from Joanna, South Carolina. In order to learn more about textiles, he has worked at Joanna Cotton Mills during the last four summers. He has worked in the laboratory, spinning room and spooler room.

Tom is a member of Phi Psi, Phi Eta Sigma, Phi Kappa Phi and S.A.E. He served as secretary of Phi Psi during his junior year and is currently serving as president of that fraternity.

Thomas won a Keever Starch Scholarship his sophomore year and an Inter-Chemical Scholarship for his junior and senior year. Upon graduation in June, he hopes to continue his studies at the Institute of Textile Technology.
"A Unique Fabric Idea"

By Mrs. Ellison Smyth McKissick
Wife of the Chairman of the Board of Directors
Alice Manufacturing Co., Easley, S. C.

At the Annual Meeting of the South Carolina Textile Manufacturers Association held at Sea Island in May of last year, the wives and daughters of members modeled dresses of material processed in South Carolina mills.

Several months prior to the meeting a letter was sent to every lady who would be present at the banquet, asking her if she would wear on that occasion a dress made of material from a plant with which her family was connected. The only requirement was in regard to the basic material used. She could trim it as she pleased; no restrictions as to lace, frills, furbelows or buttons. It could be made by a French designer, her favorite slip cover seamstress, or by herself. But the basic material must come from a South Carolina mill in which a member of her family was interested.

In the letter she was informed that prizes would be given for the "Gayest", "The Most Beautiful", "The Dreamiest", "The Most Scintillating", "The Leastest With the Mostest", "The Most Sophisticated", "The Most Original", "The Most Exotic", "The Most Glamorous", "The Nicest to Come Home to", "The Darndest", "The Prettiest", "The Trickiest", and "The Most Versatile". In other words, they were to use their own imagination and ingenuity. Well—they did all that and more. Eighty-three of the fair sex came ready to vie with each other and also to charm the men-folk with beautiful, amusing and original costumes.

An element of surprise entered into the evening when a few of the men appeared in suits made of material of their own making.

The ladies made their first appearance on the patio. The soft, balmy air of a summer’s night with a bright moon shining through the oaks bearded with moss, and off in the distance, the faint chant of the darkies’ Spirituals added a touch of glamour and made a beautiful setting for an enchanting evening.

A very lovely young lady wearing a period gown of white broadcloth trimmed with cotton scroll lace won the prize for "The Most Beautiful". The sensational dress of the style show was made of diaper cloth from Kendall Cotton Mills, trimmed in blue polka dots, with safety pins used as fastenings for my lady’s shoes, a large blue ostrich feather in her hair and a matching fan in her hand completed the bizarre costume entitled her to "The Darndest" prize.

The prize for "The Most Exotic" was won by an attractive young matron, whose dress was made of Fiber glass.

A costume of striking originality was created of Belrug materials with parasol to match. The first prize went to one who made, with her own hands, a dress using materials from twenty-five South Carolina mills. The prize for "The Prettiest" was a dress made of 80-square print cloth from Alice Manufacturing Company.

The few described here are but a mere sample of the near hundred attractive and outstanding costumes worn that night. The style show served to point up the fact that it is unnecessary for us to import foreign fabrics, for beautiful and unusual creations can be achieved with materials made in South Carolina.

MODERN MACHINERY

. . . . the nation’s largest warehouse stocks of new and rebuilt equipment for HOSIERY, OUTERWEAR and UNDERWEAR MILLS, and DYEING and FINISHING PLANTS.

MORRIS SPEIZMAN COMPANY, INC.
408-514 West Fifth St., Charlotte 1, N. C.
Index to Advertisers

American Monorail Company ........................................ 5
American Bemberg ..................................................... 26
Amerotron Corporation .................................................. 28
Gaston County Dyeing Machine Company .................. 4
Greensboro Loom Reed Company .............................. 20
Lockwood-Greene Engineers ...................................... 22
L. C. Martin Drug Company ...................................... 24
Pabst Brewing Company ............................................ 18
Proctor and Schwartz ................................................ 18
Robert & Company Associates .................................. 2
Rock Hill Printing and Finishing Company ............... 31
Royce Chemical Company ......................................... 31
J. E. Sirrine Company ................................................ 15
B. Snowiss Fur Company ........................................... 22
Sonoco Products Company ......................................... 23
Morris Speizman Company ........................................ 29
Terrell Machine Company ......................................... 32
Union Bleachery ...................................................... 28
Jacques Wolfe Company ............................................ 6
American MonoRail automatic cleaning equipment is engineered to meet specific cleaning problems. There is a special cleaner for ceilings, frames, underframes, looms—each designed to do the specific job required.

American MonoRail cleaning equipment is built for long-time, low-maintenance cost operation. Get in touch with your nearby American MonoRail engineer for all your cleaning problems, or write to us for the name of your nearest representative.
EVOLUTION OF BOBBIN CLEANING AND HANDLING

FROM CRUDE, EXPENSIVE AND HAZARDOUS METHODS to the MOST EFFICIENT UP-TO-DATE METHODS

Terrell's equipment brings new economy, speed and safety to today's complex bobbin cleaning and handling problems. Have a Terrell engineer explain the over-all time and money-saving advantages of a modern bobbin cleaning and handling system, engineered to fit YOUR needs exactly.