TEXTILE ENGINEERING

A complete, integrated service covering every type of Textile Project
Serving the great names in Textiles for over 40 years
THE

Bobbin and Beaker

Official Student Publication
Clemson Textile School

VOL. 15 SPRING ISSUE NO 3

The Staff

J. P. CAMPBELL
Editor

C. E. GRIFFIN
Managing Editor

JOHN McCONNELL
Business Manager

EDWIN SMITH
Advertising Manager

C. E. BROWNE
Circulation Manager

 Junior Staff

H. E. JENNINGS
Assistant Business Manager

C. T. SANDERS
Assistant Advertising Manager

J. C. GLASGOW
Assistant Circulation Manager

Faculty Advisers

DR. HUGH M. BROWN
Dean, School of Textiles

C. V. WRAY
Associate Professor of Textiles

In This Issue

Graduate Research in Textile Chemistry at Clemson College 6
Clemson School of Textiles Host to American Textile Machinery Association 9
Interference Microscope and Other Microscopy
   Equipment at Clemson 11
A Brief History of Burlington Industries 13
Southeastern Cotton Ginning Research Laboratory 16
Scholarship Information 17
A Keystone to Good Management 18
Industrial Engineering in the Textile Industry 21
Outstanding Seniors 27
Where Are They Now, Class of 1942 29

CORRECTION

COVER EXPLANATION OF WINTER 1956 ISSUE: The cover for the Winter 1956 Issue of the BOBBIN & BEAKER was an enlarged reproduction of a photomicrograph which was made by Dr. A. N. J. Heyn, Professor, School of Textiles, Clemson Agricultural College. This photomicrograph was of a cross section of Orion fibers and was originally published in Dr. Heyn's book, "Fiber Microscopy", Interscience Publishers, New York, N. Y., 1954, plate VI E. THE BOBBIN & BEAKER is greatly indebted to Dr. Heyn for his kindness in having lent the photomicrograph to our publication for use on the cover. Also, THE BOBBIN & BEAKER regrets its error in having given credit to someone else.

The Cover: Cross sections of viscos rayon as seen under the interference microscope. The core, skin and cuticle are revealed in brilliant color contrast. Photomicrograph by Dr. A. N. J. Heyn, Professor, Natural and Synthetic Fibers. For further details, see the article on the interference microscope on page 11.

THE BOBBIN & BEAKER. Organized in November, 1939, by Iota Chapter of Phi Delta 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.
COMPLIMENTS OF

M. Lowenstein & Sons, Inc.

1430 Broadway
New York 18, N. Y.

GREY MILLS

Aleo Mfg. Co. Rockingham, N. C.
Covington Mills Covington, Ga.
Lane Cotton Mills New Orleans, La.
Limestone Mfg. Co. Gaffney, S. C.
Lyman Mills Lyman, S. C.
Pacific-Columbia Columbia, S. C.
Somerset Mills Roxboro, N. C.
Sofford Mills Wilmington, N. C.
Wamsutta Mills New Bedford, Mass.
Yarns* of matchless beauty, incomparable serviceability, and amazing versatility... produced in various forms including filaments, spuns, and a host of novelty effects for:

- SHEERS
- LININGS
- FABRICS of FASHION
  for apparel and home decoration

*rayon

AMERICAN BEMBERG - Main Office: 261 Fifth Avenue, New York 16, N.Y. - Lexington 2-3520 - Plant: Elizabethton, Tennessee
Graduate Research in Textile Chemistry at Clemson College

by

J. H. Langston, Professor
Textile Chemistry, Department

One of the most important aspects of any graduate program is the research which the degree candidate does to assemble material for the writing of his thesis. In the sciences a thesis is required to represent an original piece of work — original in concept, attack, or in angle of approach, but, in any case, something that has not been done (at least in the same way) before. The thesis itself may be quite short, but the information contained therein may be extremely valuable. It certainly represents a considerable amount of work and the acquisition of a type of experience which can be obtained in no other way. This experience is the fundamental basis for the thesis requirement in the graduate curricula.

The Department of Textile Chemistry at Clemson is unusual, if not unique, in having an undergraduate thesis requirement. Obviously, the investigation of a problem cannot be very extensive in the time available in the student schedule for this work, but it serves to familiarize the student who goes from undergraduate school directly into industry with the fundamentals of research procedure. It also acts as an introduction to research for those of our B.S. graduates who stay on or who later return for graduate work in the department. In no sense, however, does this undergraduate thesis compare in complexity, time, or degree of originality required with the graduate thesis.

Since the only graduate degree offered in the Clemson Textile School is the M.S. in textile chemistry, some information as to the development and scope of the graduate research program might be of general interest.

Textile chemistry is a broad field, having close ties with all branches of chemistry and physics, from which basic sciences it has developed into a separate study. Many applications to which textile chemistry is put are of a practical nature, of course, but every practical usage has a broad theoretical background. There are, therefore, two types of research problems or two types of approach—theoretical and practical. Insofar as it is practicable, our research program is keyed to both, although an attempt is made to avoid such problems as might be attacked by other departments in the college.

Problems are selected on the basis of interest, importance, general applicability, timeliness, etc. Subjects for research are suggested by industry, by the teaching staff and by the students. Students are encouraged to work on topics in line with their particular interests and experience (if any). Holders of industrial fellowships may be influenced to a greater or lesser degree in the choice of a research problem by the wishes of the sponsoring companies. This diversity of sources for research ideas is highly advantageous in furnishing breadth of coverage in the field; and industry is especially encouraged to offer suggestions as to topics reflecting its needs and interests.

An attempt is made to maintain a variety of project types in order to provide as wide coverage of the field as possible. This is sometimes difficult with a small staff and a small student group; and it obviously means spreading the research effort rather thin. An integrated program, where a number of students work on different aspects of the same problem, might produce more dramatic publication possi-
ilities, and such a philosophy of research is frequently encountered in larger institutions. From the standpoint of results accomplished there is much to recommend it; and where there is a staff and student group large enough to provide coverage of the field by this method, it is logical. Even then, however it has one drawback—a tendency to define the research area of the student so rigidly that he may miss the advantages of being able to choose his direction of attack as circumstances and developments may warrant, thus limiting his freedom of action and initiative. It is for these reasons that the program in this department is directed toward the student and the benefit that he may derive from his research efforts rather than toward the end of glorification through publications or publicity.

The breadth of activity in the field of textile chemical research at Clemson is revealed by a study of subjects undertaken during the several years in which the graduate program has been in effect. For this purpose, list of thesis titles with the authors and dates is given below along with a brief elaboration on the subject matter covered:

"Effect of Urea-Formaldehyde on the Tensile Strength of Cotton", John W. Hawkins, 1951 — A study of the relative effects of various factors in tendering cotton during urea-formaldehyde finishing treatments, resulting in suggestions as to ways of minimizing the overall effect.

"The Preparation of Polyhydric Alhyds and Their Application to Nylon and Orlon Fabrics"; Richard F. Jenkins, 1951—An attempt to improve or simplify the practical methods of dyeing these fibers through the use of a combined dyeing-finishing bath, which would result in the formation of a durable polyhydroxy-substituted polyester on the fiber surface and which would, in turn, be reactive to substantive dyes.

"Antistatic Agents on Orlon and Dacron", Samuel W. Boddie, 1953 — An evaluation of various types of chemical agents as anti-stats for use on these highly static-producing fibers, using a specially built static-measuring instrument.

"Incorporation of Bonding Agents in the Dyeing of Fast Colors on Cotton", Peter A. Cook, 1954—Determination of the effect of various types of commercial latices on the fastness, stability, crock-resistance, tensile strength, abrasive resistance and color value of vat and nephol dyes applied to cotton under a variety of conditions.

"The Study of Mercerization with Mechanical Pressure Applied", William L. Mathias, 1954—Investigation of the effect of mechanical pressure on increasing the strength of various cottons mercerized under a variety of conditions.

"Application of Ultrasonics to the Dyeing and Finishing of Textiles", William T. Roff, Jr., 1955—The effect of ultrasonic energy on the application of various agents—particularly pigments and resin finishes—to fibers, illustrated with interesting photomicrographs showing dispersion and distribution effects.

"Studies of the Effects of Certain Emulsified Vinyl Polymers as Textile Finishing Agents", Hugh K. Eason, 1956 — Preparation of a number of new vinyl-type latices and a study of their effects as finishing agents on various fabrics. A correlation is made between finishing effect and the presence of certain chemical groupings.

At the present time seven projects are underway in the graduate research program involving the following subjects:

1. A study of the fundamental and practical effects of a new silicone compound on cotton and wool.
3. Preparation and evaluation of a new series of modified starches for use as permanent finishes for textile applications.
4. Development of new properties in starch and cellulose through the application of a unique epoxide-type secretion.
5. Study of a unique example of the effect of light on a resin-pigment treated fabric.
6. A study of the reaction of cellulose with various vinyl compound, aimed at the development of a modified cellulose which will have variously improved properties.
7. A study of various hydrophilic finishes for hydrophilic fibers to improve the comfort factor in clothing made from synthetic fibers.

The fact that the present number of project underway equals the combined number of those of previous years may be taken as an indication of the growing interest in graduate work in textile chemistry. As the field becomes progressively more complex with the development of new fibers, new dyeing and finishing techniques — all resulting from continuing research—the importance of research training in the education department assumes greater magnitude. It is the hope of the textile chemistry department at Clemson to extend its activities in the field through further growth in the number of graduate students and the broadening of its research program with the acquisition of new instruments and facilities.
WHO HAS THE MOST RIGID DYEING REQUIREMENTS?

It is with justifiable pride that we point to the fact that GASTON COUNTY Machines are standard equipment in the laboratories of most of the leading dyestuff manufacturers as well as those of the outstanding textile mills. Machines are made to dye all sizes and types of packages as well as raw stock.

Machine capacities can be designed to dye any number or size packages required.

GASTON COUNTY
Pioneers in Automatically Controlled Dyeing Machines
Gaston County Dyeing Machine Co.
Terminal Building, 68 Hudson St.
Hoboken, N. J., G. Lindner, Mgr.

DYEING MACHINE CO.
The Rudel Machinery Co., Ltd.
614 St. James St., W., Montreal
260 Fleet St., E., Toronto

A. B. Breen
80 E. Jackson Blvd., Chicago, Ill.
STANLEY, N. C., U. S. A.
Clemson School of Textiles Host to
American Textile Machinery Association

Hugh M. Brown, Dean
School of Textiles

On February 12, Clemson College and The School of Textiles were host to the American Textile Machinery Association. More than fifty representatives from various member companies attended.

To entertain our guests there were forty representatives from the College, the Clemson College Board of Trustees and the J. E. Sirrine Textile Foundation. The program opened with a welcome by Dr. R. F. Poole and the College deans and the Textile School department heads giving short discussions of the aims and purposes of their organizations. This was followed by a discussion of the research program of the Textile School by Dr. Hugh M. Brown.

Four groups were formed for tours of the Textile School, Engineering School shops, the U.S.D.A. Southeastern Ginning Research Laboratory, U.S.D.A. Spinning Laboratory and Laboratories of A.C.M.I. This gave the machinery representatives an excellent opportunity to see our College first hand and to study our Textile School and its machinery needs. The purpose of the gathering was to further the fine spirit of cooperation between the Textile School and the machinery industry. The machinery companies have always helped the School obtain the finest machinery, sending their engineers here to work out special units for teaching purposes, and granting the School good discounts and in some cases machinery on a consignment basis.

There was opportunity throughout the day for the machinery people to meet and visit with the textile faculty and with members from the Sirrine Foundation, Board of Trustees and other College personnel.

A buffet luncheon was served followed by an illustrated address by Mr. C. S. Reed, Vice President of Duke Power Company. He gave an excellent picture of the tremendous manufacturing potential of the Piedmont area.

The gathering was addressed at a banquet in the Clemson House by Mr. James H. Hunter, President of the American Textile Machinery Association; and Mr. F. E. Grier of Greenwood, President of the American Cotton Manufacturers Institute and President of Abney Mills.
Mr. Hunter, who was introduced by Dean Hugh M. Brown of the Clemson Textile School, expressed appreciation at the opportunity to observe first hand the work Clemson College is doing in the field of textiles.

Mr. Hunter said that America's superiority in textiles could not be maintained "without the management and personnel which Clemson and other textile schools are furnishing the industry."

In speaking of progress made in the textile field, Mr. Hunter said the attitude of textile machinery critics is "unfounded and erroneous", and has been "detrimental to the machinery industry." "Textile machinery" he said, "has more than kept pace with demands of the industry."

Mr. Grier's subject was "Textiles Today and Tomorrow." He said the textile industry is on the bottom and can go only up or out. He expressed confidence that recent progress in the industry and federal import regulations will aid the industry in going up.
THE INTERFERENCE MICROSCOPE AND
OTHER NEW MICROSCOPY EQUIPMENT AND
THEIR USE IN FIBER RESEARCH AT CLEMSON

by Dr. A. N. J. Heyn, Professor
Natural & Synthetic Fibers, School of Textiles

The School of Textiles has some time ago acquired modern microscopic equipment for fiber research. The latest model research microscope is equipped with high powered lenses, accessories for polarized light, phase contrast and vertical illumination. It has built-in illumination and a modern focusing system by moving of the stage. A large photomicrographic camera is permanently attached to the trinocular body which makes it possible to switch directly over from visual observation to photomicrographic recording.

The equipment is being used for the study of fibers and textile problems in continuation of previous work on fiber and textile microscopy. The polarized light and phase equipment will e.g. be used for the study of the sub-microscopic structure of fibers, by refractive index and birefringence. The equipment will also be used in the research project on damage of cotton, and extensive bacteriological studies on raw cotton are being carried out with it at present.

The most interesting new piece of equipment is an A. O. Baker interference microscope. This is a new type of microscope which has recently become available on the market. So far, only biological work has been carried out with this microscope; it has not yet been applied until now for fiber research; Intensive research has been carried out with it during the year in the Textile School. A short description of this new type microscope follows here.

The principle of the interference microscope is similar to that of the polarizing and phase microscope, in so far that in all three types of microscopes interference of light is used for obtaining information beyond that given in ordinary microscopy.

In polarizing microscopy, interference occurs between light which passes through the fiber, vibrating two perpendicular directions; in this way information can be obtained on the birefringence of the fiber.

In phase microscopy, interference occurs between the direct and diffracted beams, passing through the fiber. A phase difference is deliberately introduced between these two beams. In this way, local differences in refractive indexes are converted into differences in contrast in the image.

In Interference microscopy, interference occurs between light passing through the fiber and light passing through the medium. If the optical path through the specimen differs from that through the medium, the two beams will have different phase, so that interference will occur when they are combined in the image. In this way, information can be obtained, e.g., about refractive index, and structures of different refractive indices can be distinguished since they obtain different interference colors.

Diagram figure 1 shows how the A. O. Baker interference microscope works. A beam of plane polarized light enters the condenser and is divided by a double focus calcite lens or plate in the upper part of the condenser, into two beams (ordinary and extra ordinary beams) which are plane polarized at right angles to each other. The condenser brings one beam at a focus in the object plane; this beam transverses the specimen detail. The other beam is focused at the side of the object (in the shearing system), or underneath the object (in the double focus system) and passes through the medium at the side of the specimen or spreads all around it. If the optical path through the specimen detail differs from that through the medium, the two beams will have different phase. The separate beams are recombined by a similar calcite plate in the objective so that they follow the same path and can interfere.

This difference in phase can be measured with the customary methods used in polarizing microscopy. From this difference, the refractive index of the specimen detail can be calculated.

Under the proper conditions, areas of different refractive index and/or thickness will obtain different colors when white light is used. This makes a clear distinction of details possible, as if the preparation were stained in various colors.

Very important results were obtained with this microscope from the very first beginning of its application to fiber research in Clemson. If a fiber, for
instance, a nylon filament, mounted in water, is placed under this microscope, the path difference through the medium and the different thicknesses of the fiber will result in a series of interference fringes in longitudinal direction (figure 3). If polychromatic light is used, the fringes are multi-colored. From the number of the fringes and the diameter of the fiber, its refractive index can be calculated. A dacron fiber of the same diameter will show many more fringes because its refractive index is higher.

It was found that cross sections of rayons show the various layers of skin and core, which are so important for the fiber properties, in the most brilliant color contrast (figure 2). The laboratories of rayon industries have long tried to differentiate these layers by complicated staining techniques, which are at least indirect and cumbersome. This new method, with the Baker interference microscope, shows these details of different refractive index, not only instantaneously without any further technique, but makes it also possible to quantitatively determine the refractive index of each component layer. The primary wall in cotton is easily recognized in the same way. Fine skin layers were recognized in several synthetic fibers. A nextensive report and the results with all different fibers is being published.\(^1\)

\*Footnotes:


\(^3\) A. N. J. Heyn, Bacteriological Studies on Cotton. (To appear)

A Brief History of Burlington Industries

John Harden, Vice President
Burlington Industries, Inc., Greensboro, North Carolina

The history of Burlington Industries is an important chapter in the textile industry and a fascinating story of planning, building, producing and merchandising new products which have added to the comfort and well-being of the American public.

In 1923 some local businessmen in Burlington, North Carolina, joined Spencer Love, a young World War I veteran, in building a small cotton textile mill employing about 200 persons. As a tribute to the community in which it was founded, the Company was named “Burlington Mills.” The first plant manager was Mr. Love, who continues as chief executive of the organization in which capacity he has served for the past 34 years.

Seeing the possibilities of rayon in 1925, the management of this new enterprise began a program of expansion in order to develop fabrics from this revolutionary manufactured fiber. Working with rayon first as a decorative yarn, these textile pioneers were fascinated with this material and saw in it the answer to the age-old search for inexpensive high-quality fabrics.

The first plant to produce rayon dress goods was constructed in 1927. As the producers of rayon yarn improved their product, early problems of stiffness, shiny finish and mottled dyeing were solved. Soft, pliant, dull-finish fabrics easy to drape and tailor were developed. Rayon soon emerged from the category of a cheap bargain basement substitute for silk into a beautiful fabric in its own right and at prices attractive to the general public.

Production was expanded into the drapery and upholstery field, rayon dress crepes, acetate taffetas, novelty dress fabrics, and rayon sheers. The depression years of the early thirties failed to halt the Company’s steady growth. Closed cotton mills were purchased and modernized for rayon and new plants were built, greatly increasing production and providing employment for many idle textile workers.

With its success in industrial growth, Burlington
also established a new pattern of industrial progress by decentralization of its plants in smaller cities where both plants and employees could fully enjoy the benefits of small town and rural surroundings. Local citizens frequently joined with the Company to help finance the building or purchasing of a plant in order to start a new venture which would add its productive strength to the community.

With the physical growth of the plants went an employee relations program which never lost sight of the Company's human resources and which has maintained for it a position of leadership in constructive wage and employee benefit policies.

Manufacturing operations were gradually integrated and plants for auxiliary processing equipment were activated. A New York Company was formed to handle the merchandising of fabrics. By the close of 1936 a total of 22 plants in nine communities were producing $25,000,000 worth of goods annually. In early 1937 Burlington Mills Corporation was organized to consolidate the various previously associated companies and the stock of the new company was listed on the New York Stock Exchange.

Continuing its policy of diversification by applying man-made yarns to new uses, Burlington entered the hosiery field in 1938. With the development of better staple rayon, several spinning plants were acquired in 1940 to establish a spun rayon division. This made possible the production of a wider variety of dress and suiting materials. Two cotton spinning mills were added to meet the Company's need for cotton yarns. By 1941 there were 38 plants in three states with annual sales of $62,957,000.

Burlington at war produced more than 50 different products for Uncle Sam, including fabrics for parachutes, uniforms, tents, raincoats, airplanes, gun covers and tow targets. Mr. Love, chairman of the board, was called to Washington to head the Textile, Clothing and Leather Division of the War Production Board. A total of 4,000 employees entered the armed service, and 109 gave their lives for their country.

In 1944 foreign operations were begun, leading to investment abroad so that now Burlington has an interest in plants in Canada, Colombia, Venezuela and Mexico. The Company entered the narrow fabrics field the following year by acquiring several ribbon plants. Today it is one of the country's largest producers of ribbon.

In 1946, annual sales reached $141,544,000. This same year the Cramerton Division — producers of fine, high-style cloths — was added to the Company. This insured greater diversification in the production of all cotton and rayon blended fabrics for many end-use trades. Growth continued in 1948 with the expansion of hosiery operations through the acquisition of the May-McEwen-Kaiser Company plants and organization.

In 1950 a multi-million dollar plant improvement and machinery betterment program was begun which embraced additions and improvements to nearly all existing plants and their equipment. This same year the Company acquired a majority interest in Brighton Mills located at Shannon, Georgia, an old established spinning and weaving operation. A substantial modernization program was instituted here.


The acquisition of Peerless further broadened its base in the general textile field by placing the Company in the wool field for the first time. One of the oldest and largest single-unit woolen mill operations in the U.S., Peerless is a completely integrated organization from the purchase of raw wool to the delivery of finished goods. It operates in the automotive, blanket and apparel fields. Acquisition of Peerless was a logical step in keeping with Burlington's development of many new wool-like fibers which will be used in blends with wool in developing a well-rounded program of handling the newer man-made fibers.

In 1954, Burlington acquired controlling interest in Pacific Mills, maker of fine woolen and worsted suiting fabrics, and in the Goodall-Sanford Co., maker of fabrics for the famed Palm Beach suits and other diversified products.

During 1955, the Mooresville Mills cotton operations were acquired and an extensive program of plant improvement and machinery betterment was begun there. In September 1955, Burlington acquired controlling interest in Ely & Walker, one of the nation's leading manufacturers, converters and distributors of cotton products. The successful and experienced Ely & Walker management team under leadership of President M. Weldon Rogers continued with Burlington intact. During 1956 the company further diversified its operations through acquisition of Hess, Goldsmith & Co., a leading producer of fabrics from glass fibers; Raeford Worsted Corporation, with modern plants at Raeford, N.C., and Clarksville, Va.; and Klopmann Mills, a leading greige goods sales and manufacturing organization.

To more accurately reflect the increased diversification of manufacturing operations and products, stockholders in early 1955 had voted to change the name of the Company to Burlington Industries. Under this new corporate organization, Burlington Industries now serves as the parent company for 15 member companies: Burlington Mills, Pacific Mills, Burlington Hosiery Co., Peerless Woolen Mills, Burlington Decorative Fabrics Associates, Galey & Lord, Goodall-Sanford, Burlington Narrow Fabrics, Bur-

FOURTEEN

THE BOBBIN AND BEAKER
J. Spencer, Love, President
Burlington Industries


Since its modest beginning in Alamance County, North Carolina, Burlington Industries has become the world’s leading producer of textiles. Including foreign plants, it now has 100 modern plants in 74 communities in 13 states and four foreign countries, employs 49,000 people, and has an annual sales volume of over $600,000,000.

As contrasted with its early production, Burlington Industries now produces a great variety of quality products serving virtually every trade that uses textiles. Among those products are fabrics for women’s dresses, suits, coats, sportswear, blouses and lingerie; for full-fashioned and seamless hosiery, half-hose for men, socks for children; fabrics for men’s suiting and shirting; men’s and women’s woolen outer-wear fabrics; blankets; retail and accessory fabrics; industrial, automotive and aviation fabrics; curtain and drapery materials; narrow fabrics and ribbon, and many others.

YOU CAN COUNT ON COUNTERS

WAK*

Hank Clocks
Rotary Counters
Tenter Counters
Inspection Counters
Pick Clocks
Twister Clocks

Hosiery Counters
Pairing Counters
Yardage Counters
Slasher Counters
Sewing Counters
Special Counters

* T. M. Reg. U. S. Pat. Office

P. O. Box 3095
CHARLOTTE, N. C.

See Our Representative, or Inquire Direct

THE TEXTILE INDUSTRY
OF THE SOUTH
LOOKS TO ITS COLLEGES
FOR ITS
LEADERS OF TOMORROW

Union Bleachery
GREENVILLE, S.C.

DYEING AND FINISHING COTTON
AND SYNTHETIC PIECE GOODS

SPRING ISSUE 1957
Southeastern Cotton Ginning Research Laboratory

by
Wayne Freed, T.E., '59
Assistant Managing Editor

The United States Department of Agriculture, which is primarily a research organization, has been interested in solving the numerous and far-reaching problems in the textile industry which have come about in the last two or three decades. Several phases of the cotton industry which have been studied are production, marketing, utilization, and the manufacture of the finished product.

Ginning, which is the last step in the production phase, has undergone more changes in requirements since 1930 than had occurred in the preceding 100 years. The United States Department of Agriculture has set up, and maintains, three cotton ginning laboratories that solve the problems brought about by these changes. The laboratories are a part of the Agricultural Engineering Research Branch of the Agricultural Research Service.

The United States Cotton Ginning Research Laboratory at Clemson, South Carolina, was established in 1955 to serve the Southeastern states. This laboratory was “established to provide data for promoting better ginning equipment and techniques in the Southeastern states.”

The Clemson laboratory works in conjunction with two other ginning research laboratories. These other laboratories are located at Stoneville, Mississippi, for research in the Midsouth and at Mesilla Park, New Mexico, which serves the West and Southwest. These laboratories work primarily for the farmer’s benefit and to benefit the farmer they must consider all the essential steps until the ginning is completed.

The steps of ginning which are under research include conditioning, cleaning, extracting, ginning (separation of lint and seed), condensing, lint cleaning, packaging and baling, collection and disposal of lint and seed, and just recently, storage and handling.

Ginning has two primary functions: (1) Converting the farmer’s harvested material into salable lint and seed, (2) Returning to the farmer the best combination of lint and seed so that he might get the best profit from their sale. The research carried on by the various ginning laboratories has greatly facilitated the accomplishment of these functions.

The ginner can only preserve the inherent qualities of the cotton; he does not improve them. Proper ginning equipment and methods can preserve the good qualities in cotton brought to the ginning plant. The research laboratories have to consider such things as ginning processes, storage, conditions while ginning, and even such things as the type seed and the weather in deciding on the proper equipment and methods for their respective areas.

The laboratories perform research on farm to gin hauling and storage, drying and cleaning at the gin, separation of seed from lint and packaging. They also study the effects on fiber quality at various conditions under which it is ginned. This research has allowed a higher quality fiber to be sold and better seed for planting and commercial use.

Research Program

The planned research program of each laboratory is run in conjunction with the other research centers. At times their problems are alike, but generally they differ according to the geographical area of the center. For instance, the problems of extreme moisture and extreme insect infestation, which are present here in the Southeast, would hardly present the same problems for the laboratory which is located in the West.

The research program usually follows a procedure somewhat like the following: (1) The problem is stated and the program outlined, (2) Tests are set up by specific design, (3) Results are gotten by statistical design. Field experiments are conducted rather than quality controlled experiments as they are not as deeply involved.

The cotton which is used is from selected sections. The tests are run under controlled conditions to the extent that as many variables as possible are eliminated.

After the results are checked and tabulated, they are published in newspapers and research papers for the benefit of all. New inventions are also publicized for the benefit of the cotton industry.

The facilities of the United States Cotton Ginning Laboratory at Clemson include $100,000 worth of gin machinery and a staff of three engineers, a mechanic, a secretary, a mechanics helper, and a student trainee.
Adapting SEVENTEEN Storage Measuring Determination

The facilities also include a gin sample clinic which determines the trash content of the lint and seed, the moisture content of the elements, and the fiber characteristics if the need arises.

Current projects of the Clemson research laboratory include:

1. Adapting and testing gin machinery and techniques in different locations in the cotton belt.
2. Determination of ginning characteristics as affected by new and improved varieties of cotton and new cultural practices.
3. Measuring fiber properties of cotton as affected by gin processing.
4. Determination of optimum moisture content of cotton for gin operation.
5. Storage and handling of seed cotton.

In order to carry out a satisfactory program which is beneficial to all, the government experimental laboratories cooperate with agricultural experimental stations in the various states, ginners’ organizations, trade organizations, and individuals.

The high standards of price, quality and promotion, which are primary concerns of the research laboratories, have come about by the vast research of these centers and by cooperation with other experimental agencies. It is the determination of these government research laboratories to continue to raise standards so that they might help the farmer, and ultimately benefit others along the way.

NOTICE!

SCHOLARSHIP INFORMATION

For the first time the School of Textiles has available some financial aid for entering freshmen. The Leon Lowenstein Foundation is the first organization to make available aid to freshmen through the School, though the industry has been most generous in aiding students at the junior and senior level.

Two awards of $2000 are available annually for male freshmen who enroll in the School of Textiles, to be paid equally during four years of satisfactory undergraduate study. These awards will be based on high school records, entrance examination scores, need and the judgment of the committee as to the character and possibility of future success, by the applicant. Selection will be limited to applicants whose families have an income of $10,000 or less.

Prospective students and applicants may secure further information and application forms from the Director of Student Aid. Application should be received by May 1, and the College Entrance Examination taken by May 15 to be considered for the coming school year.

It is hoped that the readers of this magazine will urge any worthy candidates to apply.
Organization Planning:
A KEYSTONE TO GOOD MANAGEMENT

By J. B. Joynt, President
Society for the Advancement of Management

There are two popular misconceptions about organization planning — one is, that it deals only with designing the structure; the other, that it only deals with selection of personnel.

A broader concept is that both structure and people are important. Organization is first a planning process by which we fix responsibility for results, delegate authority to make decisions, and establish effective working relationships between functional groups and individuals. To improve manageability of the enterprise is its primary objective. This is accomplished by integrating the skills, interests, and objective of people with the objectives of the enterprise.

Some basic considerations in organizations planning are:

1. Organization Objectives
   a. The basic plans and objectives of the corporate enterprise should be determined, and the organization structure should be adapted to carry out such plans and objectives effectively.
   b. The organization should be built around the major functions of the business. It should contribute to and also be governed by the basic work processes.
   c. The organization should be sufficiently flexible to meet new and changing conditions which may be brought from within or outside the company.
   d. The organization structure should be as simple as possible and the number of organization units be kept at a minimum.
   e. The number of levels of authority should be kept at a minimum. Each additional management level lengthens the chain of authority and responsibility and increases the time for instructions to be distributed to operating levels and for decisions to be obtained.
   f. The form of organization should permit each executive and supervisor to exercise maximum initiative within the limits of delegated authority.

   Until we determine our objectives, there is no reason to organize or to reorganize. We do not change organizational structure just to have a better looking chart. We must determine not only the objective but the real gains anticipated under the new plan.

Sometimes we take our objectives for granted. They’re traditional and accepted without question. For that reason, apart from organization, it is quite essential to review objectives. This review should apply to the company and each organizational unit within it. Such a review should be a continuing program. Many companies unfortunately do this only when a new president comes in, earnings begin to drop, or when they slip competitively. Too few regard this introspective review as a recurring part of the management job.

A director of industrial relations in a small textile plant had 12 people reporting to him. Eight were keeping records and only four doing industrial relations work. The department had added certain functions during World War II while operating on a cost-plus basis. Five years later they reviewed their objectives. Many of these functions were contributing little. Other very important things never had been considered. As a result of the review, nearly all record-keeping was eliminated, and some new programs were undertaken. This department now has but seven people; however, the foremen and department heads currently are getting real industrial relations benefits.

2. Assignment of Responsibilities — Delegation
   Objectives are accomplished through people by the assignment of responsibility and authority necessary to insure that a good job can be done. One common misconception arises from re-delegation. Accountability is not removed by delegating to a subordinate. Suppose a vice president delegates to a department head, who in turn, delegates to his subordinates. Ultimate responsibility still rests with the vice president. The following are guiding principles in assigning responsibilities:
   a. Assign responsibilities on a broad a basis as possible. One of the major causes of executive discontent is lack of challenging assignments and failure to give an individual freedom to
manage. People are looking for an opportunity to contribute.

b. Group like functions together, and keep the organization as simple as possible. Delegation begins with an attitude of mind, and we should place the decision making as close as possible to the point of action.

c. Determine what the line functions are. This applies not only to the company but to principle organizational units within.

d. Determine what staff services are necessary to support the line.

e. Establish relationships between line and staff. How will they work with each other?

3. Establishment of Proper Relationships
When determining authorities and responsibilities of organizational units, we also must consider relationships between them. Establishing of proper relationships is tied into the assignment of functions. As a general rule, line and staff relationships are most important. We should:

a. Determine what the line functions are. This applies not only to the company but to principle organizational units within.

b. Determine what staff services are necessary to support the line.

c. Establish relationships between line and staff. How will they work with each other?

d. Establish proper cross-relationships between both staff and line units to make our day-to-day working relationships as simple and direct as possible. We want to eliminate “fuzzy”, ill-defined relationships. Until we do this, we will not have a clean organizational structure.

e. We also must consider outside relationships, liaison with legal counsel, the press, banks, customers, the community, the suppliers, etc. Many difficulties arise in selecting a man to contact customers—not on direct selling—but on many things related to selling. The same applies to suppliers. We can eliminate these difficulties only when we determine the contract in each major functional area.

In summing up, organizational planning is the process of assigning responsibilities to organizational units and individuals and establishing proper relationships which will facilitate the accomplishment of objectives. When this is done, people know where they stand. Doubts, fears, and suspicions are erased, leaving the path to progress and growth less obstructed.

If we have done a good job of organization planning, we will have assigned authority and responsibility on as broad a basis as possible to every employee, and create a climate in which each individual will be able to make his maximum contribution to the success of the enterprise.
This report on Ideal High Speed Ball Bearing Drawing* was made by one of America's finest independent testing laboratories.

For speed... and for high quality drawing sliver... write for full information today.

<table>
<thead>
<tr>
<th>CARD SLIVER</th>
<th>24.5% (2.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 FT. /MIN.</td>
<td>17.1% (1.7) (average of 8 cons)</td>
</tr>
<tr>
<td>120 FT. /MIN.</td>
<td>15.0% (1.9) (average of 12 cans)</td>
</tr>
<tr>
<td>39.1% (1.3) (average of 12 bobbins)</td>
<td></td>
</tr>
<tr>
<td>30.4/1 (0.8) 103% (2.7) 69.0 lbs. (3.5) BF = 2098 (average of 12 bobbins)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BREAKER</th>
<th>DRAWING</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 FT. /MIN.</td>
<td>17.2% (1.1) (average of 8 cons)</td>
</tr>
<tr>
<td>240 FT. /MIN.</td>
<td>16.8% (1.6) (average of 12 cans)</td>
</tr>
<tr>
<td>41.2% (1.8) (average of 12 bobbins)</td>
<td></td>
</tr>
<tr>
<td>30.5/1 (0.7) 104% (2.0) 66.0 lbs. (2.8) BF = 2013 (average of 12 bobbins)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FINISHER DRAWING</th>
</tr>
</thead>
<tbody>
<tr>
<td>360 FT. /MIN.</td>
</tr>
<tr>
<td>360 FT. /MIN.</td>
</tr>
<tr>
<td>42.0% (2.9) (average of 12 bobbins)</td>
</tr>
<tr>
<td>30.3/1 (0.6) 107% (3.1) 68.0 lbs. (2.6) BF = 2060 (average of 12 bobbins)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 FT. /MIN.</td>
</tr>
<tr>
<td>450 FT. /MIN.</td>
</tr>
<tr>
<td>45.6% (2.2) (average of 12 bobbins)</td>
</tr>
<tr>
<td>30.3/1 (0.8) 107% (2.6) 66.0 lbs. (3.7) BF = 2000 (average of 12 bobbins)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.4% (1.7) (average of 8 cans)</td>
</tr>
<tr>
<td>42.0% (1.8) (average of 12 cans)</td>
</tr>
<tr>
<td>43.0% (2.0) (average of 12 bobbins)</td>
</tr>
<tr>
<td>30.3/1 (0.6) 107% (3.1) 68.0 lbs. (2.6) BF = 2060 (average of 12 bobbins)</td>
</tr>
</tbody>
</table>


Ideal Industries, Inc. Bessemer City, N. C.
INDUSTRIAL ENGINEERING
IN THE
TEXTILE INDUSTRY

By C. E. Anderson
First Editor of the Bobbin & Beaker

During the past two decades there has been developed a new science in industry which has been appropriately named Industrial Engineering. The Textile Industry has been one of the last major industries to incorporate these principles in manufacturing. In my opinion this is primarily due to the fact that initially industrial engineering principles more readily lent themselves to the highly repetitive bench jobs such as found in machine shops and assembly lines. As a matter of fact, practically all texts on the subject use the heavy industries as a basis for study. This is not intended to convey the idea that industrial engineering has no place in the textile industry because as we all know within the past fifteen years the experience has been to the contrary. Practically all textile plants today use some form of industrial engineering controls to aid in manufacturing.

It is not the intent of this article to discuss the details of setting up industrial engineering practices in a textile plant. But rather to discuss the overall benefits derived from the use of these principles. At this point it is well to define industrial engineering. In the broad sense it is the study of man and machine to develop the best methods of operation of both to achieve the greatest return on investment. Some may argue that the lowest over-all cost is the goal, and in many instances the greatest return on investment may be achieved by the lowest cost; however, this is not necessarily true.

From management’s point of view, industrial engineering provides the tools for more accurate controls of costs and production. Reports can be more reliable and a measurement of all costs can be compared with an engineered standard. Decisions for the purchase of new equipment or the modification of existing equipment can be made with confidence. In the past, many plants have justified new machinery on the basis of labor savings much of which could have been made on existing equipment if the work assignments had been measured. With today’s high cost of new machinery it is not only desirable but imperative that complete studies be made to show justification of the purchase.

It has occurred to me that textile machinery manufacturers would be wise to have an industrial engineer on their staff for the sole purpose of determining if newly designed equipment would show a satisfactory return to the purchaser. This is a field in which only the surface has been scratched. Such a service would be invaluable to the purchaser and particularly to the smaller plant which may not have a full time industrial engineering staff. In the past, too much textile machinery has been designed to improve only one or two phases of the operation whereby, with a slight modification, other phases could have been improved. In other words, new machinery must have as a goal the same goal as Industrial Engineering, greater return on investment.

How about line supervision; what are their reactions to engineered standards and measured work assignments? For the most part, line supervision is skeptical of measured work assignments. This is normal because all of us are skeptical of things we do not understand. For this reason it is most important that all levels of supervision be given at least a 10-12 hour familiarization course in Industrial Engineering. This will greatly aid the standards man who will be
working with supervision in the plant. The line supervisor will not be completely sold, however, until a measured work assignment has been installed in his department and working satisfactorily.

The line supervisor must learn to look upon the Industrial Engineering Department as an additional tool to aid him in doing a better manufacturing job. In no instances should any of the responsibility be taken from the Department Head. In fact the ideal situation arises when the supervisor enlists the help of the Industrial Engineer to help solve his problems. Industrial Engineering must be used as a crutch for weak supervision. In the final analysis the line supervisor must think of the program as his program and can never either actively or passively give the impression that he is not in agreement with the program 100%.

We have discussed both higher management and line supervision's reaction and benefits from an Industrial Engineering Program. Obviously, we must look at the employee's reactions because he is the one directly affected. We all know it is most difficult to change man's habits of work that have been deeply imbedded over long periods of time. This can be done very successfully, however, and as far as I am concerned the key is being completely honest. Many times we have greatly under-estimated the intelligence of our employees. Therefore, we have only told them part of the story and bred distrust because the balance will be learned from wrong sources or fabricated in their minds. I cannot over-emphasize the point that the employee must be told every detail that will affect his work assignment.

After an employee is thoroughly familiar with engineered work assignments he will realize the benefits of such a program. He will come to appreciate the fact that his assignment is measured with the same yardstick as every other employee in the plant. Also, while incentive pay is applicable, he will appreciate the sound basis upon which the incentive was derived, and that he is being paid on the basis of effort and skill he expends. The very fact that assignments are derived from engineering principles and not from opinions is a wonderful plus factor for selling the employee.

We must never forget that after the assignment is installed on a sound basis, we cannot expect any further effort on the part of the operator. In other words, he has a standard work assignment at normal pace and to increase his output per hour we must eliminate some of his present duties either by method changes, running qualities of the product, new machinery, or a combination of all three. Herein lies
the value of Industrial Engineering in justifying new machinery or modification of existing machines.

The Industrial Engineering Department is an excellent training ground for future supervisors. It provides a pool of men who have been exposed to most phases of the over-all operation, with an additional appreciation of industrial engineering principles. College trainees find this line of progression extremely beneficial in that they can work on assigned projects which give them excellent training plus giving management a better chance to evaluate their progress. In addition there are many who want to follow industrial engineering as a lifetime vocation in which there are ever growing opportunities.

I realize the many other phases of Industrial Engineering that have not been discussed in this article; however, it would require volumes to cover each phase in detail. I have only covered those points I consider extremely important and after all, they are mainly just good common sense.

We must, however, remember that although Industrial Engineering is a wonderful new tool to improve manufacturing costs and quality, it does not replace good supervision for which no substitute has ever been found.
COMPLIMENTS OF

Abbott Machine Company
Incorporated

Wilton, New Hampshire

Southern Office: Greenville, S. C.
Manufacturers of Textile Winding Machinery
SOUTHERN LOOM-REED MANUFACTURING COMPANY
INCORPORATED

PHONE 4786 GAFFNEY, S. C.

Pitch Band REAL REEDS All Metal
Drawing-In Combs
Expansion Combs
For Slashers, Warpers, and Beamers
New and Repaired
Drop Wire, Transfer, Separator and
Heddle Rods—All Sizes
Harness Hooks, Leader and Card Wires
Canvas Quill Bags :: Lap Picker Hooks

World-wide trust in machinery from Morris Speizman has been earned through dependable service.
Top mills know from experience that precision production machinery—both new and rebuilt—from this firm produces finest quality merchandise at greatest possible speed and lowest possible production costs.
This is why hosiery men all over the world depend on machinery from Morris Speizman.

MORRIS SPEIZMAN
508 West Fifth Street Charlotte, N. C.

Builders of the Best

Smith, Drum & Co.

TEXTILE DYEING and FINISHING MACHINERY

Southern Sales Representatives:

PARROTT & BALLENTINE
510 South Carolina National Bank Building
GREENVILLE, SOUTH CAROLINA
Elevators that fly!

AMERICAN MONORAIL transports cars between 2 mills-stops at ground and upper level stations.

The equivalent of several elevator loads of material can be transported from building to building and from floor to floor by this modern materials handling system. Erected entirely out of doors, the MonoRail operates overhead, safely above railroad and all other traffic, and takes up no space at all inside the mills.

Loads transported consist of warp beams, boxes of filling quills, roving, trucks of drawing sliver and cloth. Approximately 132,000 lbs. from stations at each mill are transported during an 8-hour shift.

All operations can be controlled from the cab which is equipped with heaters, electric fans, windshield wipers, a gong and spotlights for night operation.
Outstanding Seniors - -

Harold R. Hutto, a textile engineering major, is from Rock Hill, S. C. Harold is a veteran, having served for four years with the Navy as an aviation storekeeper.

He was a member of the Central Dance Association during his junior year and is Vice-President this year. He has had honors this semester. Harold is married and has worked for two years at Rock Hill Printing and Finishing Company. His hobbies include golf and tennis.

Harold plans to enter the technical service branch of the textile field when he graduates.

Edwin T. Smith is a textile manufacturing major from Startex, S. C. While at Clemson, Edwin has been a member of Phi Psi during his junior and senior years, and is advertising manager of THE BOBBIN & BEAKER. He received honors during his sophomore year and first semester this year.

While he was in high school, he worked for one and a half years in the cloth room of Startex Mill. Edwin has worked in the cost and standards departments for three summers.

Edwin plans to enter the production end of textiles upon graduation.

Burts Bonner Pratt, Jr., a textile manufacturing major, is from Liberty, S. C. Burts served four years with the Navy. While at Clemson, he has been a member of Phi Psi during his junior and senior years. His hobby is model airplanes.

Burts has worked one summer at Woodside Mills in Liberty. He plans to enter the production field upon graduation.
VATROLITE® — Use this powerful concentrated reducing agent for brighter vat dyed colors on cotton, linen and rayon... for faster, cleaner stripping results on silk, cotton and rayon.

DISCOLITE® — A concentrated reducing agent, highly stable at high temperatures, outstanding for discharge and vat color printing. Employed successfully wherever the reducing agent must dry into the fabric and retain its reducing power.

PAROLITE® — A dust-free white crystalline reducing agent. Soluble, colorless, excellent for stripping wool piece goods and rags, shaddy, acetate or nylon fabric.

DISPERSALL — Effective retorder for dyeing vat colors, dispersing and leveling qualities, for dyeing naphthol and vat colors, useful in wool and acetate dyeing. Valuable auxiliary in stripping vat colors, naphthols.

CASTROLITE® — A highly sulphonated castor oil used as a staple penetrant for dyeing or kier boiling in leading textile mills. Still used extensively in finishing.

NEOZYME® — Concentrated low temperature desizing enzyme. Removes starch and gelatine. Excellent for eliminating thickeners from printed goods at low temperatures.

NEOWET — Permits effective wetting at all temperatures — particularly useful with enzymatic desizing agents. No reaction to soft or hard water. Not affected by dilute acids or alkalis. Non-ionic. Not suitable for use in peroxide baths.

VELVORAY® — A blend of sulphonated vegetable oils and selected fats for a superior, non-foaming finishing oil. High in combined SO₃ and stability. Excellent for compressive shrinking, will not smoke off at high temperatures.

NEOZYME® HT — Concentrated high temperature desizing enzyme. Removes both starch and gelatine. Suitable for continuous pad-stream method. Remarkable stability at very high temperatures.

NEOWET X — Effective wetting agent at all temperatures from cold to boiling. Does not inhibit enzyme action in desizing bath. Good for use with resin finishes, and hydrogen peroxide bleaching liquors. Good rewetting properties. Anionic.

P.S. . . . A centrally located plant... strategically placed warehouses...and Royce's own fleet of trucks... mean fast, dependable delivery—always!

VELVO SOFTENER #25 — Economical creamy white paste softener derived from highly sulphonated tallow. Gives softness and body without stiffness or affecting whites.

NEOZYME® L & NEOZYME Special — Liquid desizing enzymes in two degrees of concentration. Remarkable stability at very high temperatures.

Royce CHEMICAL COMPANY • CARLTON HILL, NEW JERSEY

Manufacturers of Chemicals for the Textile Industry
Where Are They Now?  (Class of '42)

Name  Position  Address
Abbott, Wallace;  Technical Supervisor, American  Enka; 320 E. Third North St., Morristown, Tenn.
Baker, W. H. W., Jr.;  Salesman, Baker's;  Chester, S. C.
Barnette, W. A., Jr.;  President, Greenwood Packing  Plant;  Box 512, Greenwood, S. C.
Barton, James H.;  Vice-Pres., Barton Grocery Company;  405 Wholesale Row, Anderson, S. C.
Berry, Robert S., Jr.;  Sup't., Chicopee Manufacturing  Company;  Cornelia, Georgia
Bussey, W. W.;  Salesman, Antara Chemicals;  4510  Stillbrook, Bellaire, Texas
Carpenter, C. T., Jr.;  International Correspondence  School Rep.;  P.O. Box 742, Kings Mountain, N. C.
Cash, F. Grady, Jr.;  Industrial Engineer, Woodside  Mills;  20 Meadow Street, Lyman, S. C.
Cheatham, Robert L., Jr;  Plant Manager, U. S. Rubber  Company;  303 W. Edinborough Ave., Rae-
ford, N. C.
Crow, Smith, Jr.;  Erlanger Mills, Inc. (Ass't. Sup't.);  Lexington, N. C.
Garfinkle, Nathan;  Owner, Charleston Mattress Com-
pany;  346 Spring St., Charleston, S. C.
Gilmore, W. C.;  Designer, Abbeville Mills;  7 Hill-
crest Drive, Abbeville, S. C.
Godfrey, James H.;  Ass't. Sup't., F. W. Poe Manu-
facturing Co.; Greenville, S. C.
Gregory, A. H.;  Div. Eng., Dan River Mills, Rt 2, Box  125, Danville, Virginia
Haddon, Frank J.;  Production Sup't., Pacolet Mfg.  Company;  Box 675, Gainesville, Georgia
Hawkins, W. C.;  Principal, Lancaster High School;  Lancaster, S. C.
Hegler, Theron C.;  Ass't. Manager, Kershaw Plant,  Spring Mills; North Ashe St., Kershaw, S. C.
Hubbard, J. C., Jr.;  Assoc. Prof. of Design, Clemson  College;  Clemson, S. C.
Henry, W. J., M.D.;  Private Medical Practice; Box  758, Fort Mill, S. C.
Jackson, Nelson III; Vice-Pres., Jackson & Jackson;  Box 36, Tryon, N. C.
Jameson, Lake H.;  Assoc. Prof. of Textiles, Clemson  College;  Box 347, Clemson, S. C.
Johnston, A. E., Jr.;  Plant Manager, Ashworth Bros.,  Inc.; Box 5035, St. B. Greenville, S. C.
Jones, Robert H.;  Sup't., Hatch Mill;  205 Fernwood  Dr., Rutherfordton, N. C.
Jordan, L. R.;  Owner, Jordan Drug Stores;  1400  Hampton Blvd., Columbia, S. C.
Kay, Charles W.;  Textile Engineer, McPherson Engi-
eering; Greenville, S. C.
Lachicotte, Cdr., A. S., Jr.;  Petroleum Installations  Planning Officer, U. S. Navy, APO 285, (Madrid,  Spain), New York, N. Y.
LaRoche, Evans A.; Assoc. Prof. of Textiles, Clemson  College;  Box 1289, Clemson, S. C.
Ligon, W. H. S.;  Partner, Barnett Oil Company;  2315  Gervais St., Columbia, S. C.
Mauldin, James A.;  Ass't. Sup't., Excelsior Mills No.  2;  Clemson, S. C.
Richardson, J. L.;  Ass't. Prof., of Textiles, Clemson  College;  Clemson, S. C.
Sturgis, Harry L.;  Ass't. Secretary, Peerless Spinning  Corp.;  Box 261, Lowell, N. C.
Thompson, J. L.;  Ass't. Prof. of Textiles, Clemson  College;  Clemson, S. C.
Timmons, Charles T.;  Sales Engineer, Gulf Oil Cor-
poration;  53 E. Tallulah Drive, Greenville, S. C.
Williams, Gordon E.;  Chief Industrial Engineer, Jud-
son Mills;  P.O. Box 2000, Greenville, S. C.
Zeigler, A. E.;  Partner, Mechanics Contracting Com-
pany;  1325 Main St., Columbia, S. C.

Carolina Reeds

“Made their way by the way they’re made”

Carolina Loom Reed Company

Manufacturers of Loom Reeds, Warper and Slasher Combs

GREENSBORO, N. C.
Index to Advertisers

Abbott Machine Company ........................................ 24
American Bemberg Corporation ........................................ 5
American MonoRail Company ........................................ 26
Carolina Loom Reed Company ........................................ 29
Gaston County Dyeing Machine Company ....................... 8
Greensboro Loom Reed Company .................................... 17
Ideal Industries ....................................................... 20
Lockwood Greene Engineers .......................................... 23
Loper, Ralph E. ........................................................... 10
Lowenstein, M. ............................................................ 4
Robert & Company Associates ........................................ 2
Royce Chemical Company ............................................. 28
Sirrine Company, J. E. .................................................. 31
Smith, Drum & Company .............................................. 25
Sonoco Products Company ............................................. 22
Southern Loom Reed Company ....................................... 25
Speizman Company, Morris ........................................... 25
Steel Heddle Manufacturing Company ......................... 23
Union Bleachery .......................................................... 15
WAK Industries .......................................................... 15
Woodside Mills ........................................................... 19
Whitin Machine Works ................................................ 32
Amerotron Corporation ............................................... 10
PROCESS CONTROL

Quality in quantity through accurate process control is another of the benefits you should expect from the services of a firm of Professional Engineers.

THE AMERICAN THREAD COMPANY, SEVIER, NORTH CAROLINA

J. E. SIRRINE COMPANY
GREENVILLE • SOUTH CAROLINA

Engineers for 34 years...
A DEPARTMENTALIZED ENGINEERING ORGANIZATION SERVING BUSINESS, COMMERCE AND INDUSTRY
125 YEARS
of
PRESERVING AND IDEA—
AND AN IDEAL!

THE IDEA
"To provide the Textile Industry with the best in Goods and Services." This has been our motivating force since 1831 — one hundred twenty-five years ago.

THE IDEAL
The preservation of this idea will continue to be our Ideal — as WHITIN moves forward with the vital and progressive Textile Industry.

WHITIN
Manufacturers of all Machinery for All Major Fibers: Opening, Picking, Carding, Combing, Drawing, Roving, Spinning, Twisting, Winding, and for many other processes.

WHITIN MACHINE WORKS
Whitinsville, Massachusetts
Charlotte, N. C. Dexter, Me.
Greensboro, N. C. Spartanburg, S. C.