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Textile Winding Machinery
THE BOBBIN and BEAKER
Official Student Publication
Clemson Textile School

VOL. 9 FALL ISSUE, 1950 NO. 1

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The Cover

Christmas card shown on the cover was woven in the Jacquard Laboratory at Clemson College.

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School Of Textiles Begins Expansion Program

Over $300,000 In Equipment to Be Added;
New Courses to Be Offered

WALTON B. CASSIDY, TM, '51

THE School of Textiles is at the present time in the
midst of an unprecedented expansion program; over $300,000 worth of new equipment and machinery of the most modern design is being added to supplement the already rather complete and diversified arrangements and also to create new departments in answer to the varied demands of the textile industry and its correlated industries.

Various individuals and firms have been more than generous in their contributions, both in cash and in equipment—a fact which it is hoped will pay dividends for the textile industry in the form of better trained textile graduates, as well as to better prepare Clemson men for advancement in their chosen vocations.

With the cash donations made by friends of the College, the Textile School has begun an extensive buying program by which all phases of the already well-rounded educational program may be improved by the addition of a more elaborate laboratory curriculum, equipped with a complete line of modern textile machinery. Many firms have donated equipment which is itemized by departments in subsequent paragraphs. Organizations from which the new equipment is being purchased by the Textile School have granted discounts ranging up to 50 per cent. The addition of this new machinery adds up to but one thing—a greatly enlarged and improved Clemson Textile School.

Two entirely new processes of textile manufacturing will be available to Clemson Textile students in the near future—a modern worsted spinning system for the Yarn Manufacturing Department, and an up-to-date line of throwing equipment for synthetic yarns. Other improvements are being made in all of the various textile departments.

The Knitting Department, hitherto offering only a survey course as a sub-division of the Weaving and Designing Department, is being enlarged and renovated by the addition of new equipment which will place the Clemson Knitting Department on a level with similar departments in the other textile schools. The new Knitting option which was offered for the first time in the fall of 1949, has met with such surprising acclamation by textile students and the knitting industry that this department promises to become a very prominent and successful department in the Textile School. This remarkable growth can be mainly attributed to the effort and interest shown by Mr. W. O. Allen, head of the department who, in addition to working for a better Knitting Department, is in the process of publishing a new textbook on knitting.

The following list of equipment which has been consigned and donated to the Textile School has been added to the recently enlarged Knitting Laboratory.

4 Sewing Machines—Merrow Machine Co.
4 Sewing Machines—Singer Sewing Machine Co.
1 Cutter—Eastman Machine Co.
2 Loopers—Southern Textile Machine Co.
3 Loopers—Burlington Mills Corporation
1 Looper Stand—Burlington Mills Corporation
24 Boaring Forms and Steam Tables—Paramount Machine Corporation
2 H. Brinton Circular Body Machines—H. Brinton Machine Company
1 Sample Twist Warper—Cocker Machine and Foundry Co.
1 Sample Horizontal Warper Creel—Cocker Machine and Foundry Co.
1 Sample Vertical Warper Creel—Cocker Machine and Foundry Co.
Used Tricot Machine—Julius Kayser Co.

A good deal of diversified knitting equipment has also been purchased by the Textile School so as to round out an efficient modern Knitting Department. Included in this list are:

Standard Reverse Wrap Machine—Hemphill Co.
1 Cheek Test Preboarding Machine—Proctor & Schwartz
1 Knit Master Machine—Ainslie Knitting Machine Co.
2 Full Fashion Hosiery Machines—Wildman
2 Sewing Machines—Wilcox & Gibbs
4 Hosiery Machines—Scott & Williams
1 Hosiery Machine—American Holdstitch So.
1 Body Machine—Scott & Williams
The Textile Chemistry and Dyeing Department is being considerably renovated and improved upon by the addition of a large amount of modern dyeing and chemical processing machinery, selected so as to cover all phases of the dyeing and finishing processes now employed by the textile industry. The following list of equipment has been purchased by the Textile School from various firms who have allowed substantial discounts on equipment furnished by them:

- Light Calendar—J. E. Carroll & Co.
- Eppenback Home-mixer—Eppenback Inc.
- Flesso Gravity Convection Oven—Southern Scientific Co.
- 2 Dye House Trucks—Glasco Equipment Corp.
- Laboratory Printing Machine—L & W Machine Shop
- "B" Baby Vent Set—Buffalo Forge Co.
- Fade-O-Meter—Slaughter Machine Co.
- Launde O-Meter—Slaughter Machine Co.
- Crockmeter and Counter—Secretary, AATCC
- Crockmeter Cloth, 1000 text squares—Secretary, AATCC
- Color Transference Evaluation Chart—Secretary, AATCC
- Scutcher—Birch Brothers
- Bock Extractor, Model M-60—Morris Speizman Co.
- Laboratory Jig—Butterworth & Sons
- Resin Curing Unit—Industrial Heat Engineering Co.
- Single Spindle Top Dye Kettle—Riggs & Lombard
- Sample Fulling Mill and WASher including individual drive—Redney Hunt Machine
- Tenter—Williams Miller Co.
- Steamer—Curtis & Marble
- Vacuum Extractor—Curtis & Marble
- Singer—Ind. Heat Engineers
- Miscellaneous—Greenville Steel & Foundry
- Two Roll Padder—Greenville Steel & Foundry Co.
- Three Roll Padder—Greenville Steel & Foundry Co.
- One Plaier—Greenville Steel & Foundry Co.
- One Mixing Tank—Greenville Steel & Foundry Co.
- Three-box Continuous WASher—Greenville Steel & Foundry Co.
- Skaying Unit—Greenville Steel & Foundry Co.
- Two-box WASher-Saturator—Greenville Steel & Foundry Co.
- Becco J-Box—Greenville Steel & Foundry Co.

Tight WASher—Greenville Steel & Foundry Co.
Take-off Reel—Greenville Steel & Foundry Co.

The Weaving and Designing Department has been considerably improved by the addition of a quantity of new looms and other equipment found in modern weaving and preparation departments. Shown here is a list of this new equipment and the firms from which it has been purchased:

- 12 Type C-6 Automatic Bobbin Changing Looms for Cotton—Crompton & Knowles
- 1 Type C-5 Automatic Bobbin Changing Dobby Terry Loom—Crompton & Knowles
- 1 Type C-5 Automatic Bobbin Changing Terry Towel Loom with Jacquard—Crompton & Knowles
- 3 Type S-6 Automatic Bobbin Changing Looms for Synthetic Yarns—Crompton & Knowles
- 1 Type C-4 Automatic Bobbin Changing Convertible Head Motion Loom for Wool Mixtures—Crompton & Knowles
- 1 W-3 Convertible Worsted Loom—Crompton & Knowles
- 1 X-2 Draper Loom—Draper Corporation
- 1 X-D Draper Loom—Draper Corporation
- 1 X-L Draper Loom—Draper Corporation
- 1 X-P Draper Loom—Draper Corporation
- 1 6-Spindle No. 250B Nylon Sizing Machine—Universal Winding Co.
- 1 6-Spindle No. 50 Pineapple Cone WASher for Nylon—Universal Winding Co.
- 1 6-Spindle Whitin-Schweiter Automatic Filling Bobbin WASher—Whitin Machine Works
- 1 "H-W" Yarn Conditioner—The Industrial Dryer Corporation

In addition to the new equipment which has been purchased the following equipment has been donated:

- 4 X-D Draper Looms for rayon and other synthetic yarns—J. P. Stevens Co.
- Throwing Equipment for Synthetic yarns as follows—U. S. Textile Machine Co.
- 1 12-Spindle Redraw Frame
- 1 20-Spindle Model 10 Twister
- 1 40-Spindle Model 110 Uptwister
- 1 16-Spindle Face Drive Uptwister

The Yarn Manufacturing Department has been allotted funds for the purchase of equipment, other than the worsted spinning system, which is needed to modernize the Yarn Manufacturing Department in line with modernization programs now going on in the textile industry. The following equipment is in the process of being installed in the various Yarn Manufacturing Laboratories:

- 1 36-spindle Spinning Frame for Average Count of 30's, 3 1-2 Gauge—Whitin Machine Works

(Continued on Page 20)
A Brief History Of Asbestos -
A Material Woven Into a Fabric

J. W. CHRISTENBURY, TM '31

In mechanical fabrics, we are all familiar with cotton, wool, silk, rayon, nylon and orlon. With these materials in mind, I would like to call your attention to another very useful and important material, older than anything in the vegetable, animal, mineral or chemical field which has been spun and woven. It is both fibrous and crystalline, elastic and brittle, yet it can be carded and spun. This material is asbestos.

The word “Asbestos”, given to us by the Greeks, signifies unquenchable and inextinguishable. Asbestos is entirely different from any of the materials mentioned; as an illustration, a wool fiber is a shell-like formation; a cotton fiber is a flattened, twisted tube; a flax fiber is one with nodes or joints like bamboo; silk is two cylindrical tubes bound together with a natural wax. An asbestos fiber, however, is tapered from end to end, and is perfectly smooth.

You can appreciate the fact that any of the fibers mentioned will automatically cling to each other so as to permit their being alone in carding and spinning with good production. You can also realize that in attempting to use a fiber like asbestos that is perfectly slick, with each fiber tapered, you have the problem of trying to hold them together. It has been found that to use asbestos on a good commercial productive basis, a mixture of from 5% to 20% of rough tangus cotton can be used as a carrier for the asbestos fibers.

Probably no one knows the exact time that asbestos was formed. However, it is the general opinion that about a million years ago, asbestos was a viscous, red-hot mass of volcanic slag. This is supposed to have cooled into a rock formation, and it was the spring water containing carbon dioxide gas which was in the fissures and crevices of this rock formation that dissolved the rock on either side of the crevice and formed the fibrous crystals we now know as asbestos.

Asbestos is the finest fiber produced by nature. No one has been able to measure the fineness of these fibers, but with the most delicate instruments available, it has been estimated to be about 28 one-millionths of an inch in diameter. It can be broken down to one molecule in size. By comparison, silk or cotton fibers are more than three times as large as asbestos fibers.

The chief components of this mineral are approximately as follows:

- Silica 41%
- Magnesia 41%
- Moisture 14%
- Iron Oxide 3%

There are also traces of lime and alumina.

Cotton is generally classed by its staple length. Asbestos is not a good fiber by length, silkiness or strength alone. It is the combination of these three properties that gives asbestos its flexibility—the proper blend for the production of good products. Asbestos is mined or quarried in a manner similar to rock or coal.

An eight percent yield from an asbestos mine is considered profitable. The raw material comes from Canada, Australia, Bolivia, China, Cyprus, India, Rhodesia, South Africa and Russia. Canada and Rhodesia are number one and two, respectively, in the production of asbestos suitable for spinning purposes. It comes to us from the mines in Canada and Rhodesia in a crude and fibrous form.

Asbestos cannot be carded directly as it comes from the mine. The raw material is placed first in what is known as a chaser mill. This consists of two rotating wheels on an axle revolving in a pan-shaped container. These wheels weigh 3,000 pounds each, measure six feet in diameter, and rotate at about 12 revolutions per minute. The wheels turning in this pan create a skidding action. Thus, the material is not crushed as in a hammer mill.

Special thanks are due Mr. J. A. Tennant and Mr. J. T. Griffis of Southern Asbestos Company. Their interest and cooperation have been of the greatest possible assistance.
The equipment used in processing asbestos is very similar to the wool system from this point. The willow, or box duster, a mixing picker and roller-top card are used. These cards are the same as used for wool with the exception of the clothing. Ring and mule spinning, twisting, winding, weaving, and braiding are among the various other processes.

There are many uses for asbestos, some of which go back to Biblical days. We are told that in 430 B.C., the Greek sculptor, Kallimachos, fitted an oil lamp with a wick of stone flax to the statue of Athena on the Acropolis. Furthermore, in the early Roman times, lamp wicks were made of what was known as "perpetual material" because they never burned out. It is said that the wicks in the lamps of the vestal virgins were made of asbestos.

Another early use by the Romans was the funeral dress of Kings. A specimen of the Roman cremation cloth is preserved in the Library of the Vatican. This was found in 1702, perfectly intact with some ashes inside, indicating that this was used for the cremation of Kings to preserve their ashes.

An interesting story is told of the use of asbestos in the form of a fabric during the reign of Charlemagne. From about 768 to 815, Charlemagne was King of the Franks, and Harun-al-Raschid was Emperor of the East. The Hoards of the East were in the act of over-running the Franks, and it appears that they greatly outnumbered them. It was Charlemagne's responsibility to devise a plan to protect his people. Therefore, he sent messengers to Harun-al-Raschid, summoning his representatives for a conference. It is related that during the conference, Charlemagne used a table cloth made of asbestos. After feasting upon the meal which had been previously prepared, he had the servants place the table cloth in the fire for cleaning. The Easteners were amazed when the table cloth was brought forth from the flame perfectly clean. Little time was taken in conference because they were sure that they were speaking with a man of magic, and no numerical superiority could overcome their superstitions about trying to fight the supernatural and magic. The war ended, and Charlemagne, the great King of the Franks, went on to bring the world out of the Dark Ages.

We also get some interesting stories from Marco Polo concerning his travels about the year 1250. He explored the Tartar Empire, which is now Siberia. He was amazed to learn that the textiles he found there resisted fire. Marco Polo had a very analytical mind, and after much questioning and search, learned how the fibers were obtained and prepared.

There was very little mention of asbestos until about the 16th Century. Between 1710 and 1720, Peter the Great established a factory for the manufacture of asbestos from ore found in the Urals district of what is now known as Russia. The first items made were textiles, socks, gloves, handbags, etc. The enterprise failed after 50 to 60 years because of the limited demand for the products and the lack of transportation facilities.

Italy can really be regarded as the cradle of the asbestos industry. Besides the early use of asbestos by the Romans, the real beginning of the modern asbestos manufacturing industry was made there. One of the early stories of the manufacture of asbestos materials is that concerned with a certain noblewoman of Valtellina, Italy, who succeeded in having asbestos worked by weavers. Her experiments and studies brought to her the applause of scientists.

The most important discovery to the people of the Americas was made about 1860 in the Province of Quebec, Canada. It brought the source of supply of asbestos within range of a rapidly growing industry. Without this discovery, the United States would have been retarded greatly in its development of this product. The Canadian variety, while having somewhat similar mechanical properties to the material found in Italy, proved to be much easier to process. It is mined from one of the richest mining properties in Canada, which is the chief source of supply for "crude" used in the manufacturing of asbestos products in the United States.

The products so essential to our everyday life are many times overlooked, because asbestos is generally used in some unseen or little thought of place. We are inclined to take for granted certain things, such as brake lining on our automobiles, the clutch disc in our car, the insulation on the wires of our electrical appliances, the power cables on our battleships, submarines and merchant fleets. These asbestos products, plus numerous others, have made this "mineral woven into fabric" important in our daily lives.

FALL, 1950

SEVEN
ACCORDING to the management of the Abbeville Mills Corporation of Abbeville, S. C., there are few definite facts that can be adhered to in respect to machine settings used in the processing of Saran to a finished product for jobber consumption. Saran is a relatively new monofilament yarn which has entered the textile field production at the Abbeville Plant since 1944.

Saran is a copolymer of vinyldene chloride. The Saran resin is manufactured by The Dow Chemical Company and is spun into a filament by the National Plastic Products Company. The qualities of Saran make it ideally suited for use in handbags, luggage, upholstery, and automobile seat covers. It is also used in the manufacturing of window screening for many of today's modern buildings. Due to the large amount of research that has been instituted by a number of the leading manufacturers, an unlimited amount of uses for the Saran fabrics have been discovered which gives it an incomparable position in the field of plastic fabrics.

WARPING

The Saran is received in spool form from the National Plastic Products Company. The yarn is then unpacked and placed in the V-creel which has a 6000 spool capacity and run to a direct warper. Slower speeds are required in warping Saran than those utilized in the processes of cotton, wool, and other similar fibers. The capacity of a beam is usually 1600 yards with 4500-6000 ends per beam. In controlling the static electricity on the warper, the most significant factor is the regulation of the room temperature and humidity.

The quill winding is done on a Whitin-Schweiter Automatic Filling Bobbin Winder. The high tension applied in winding the filling on the bobbin and the characteristic hardness quality of the plastic causes heavy wear on the ceramic parts of the winder. When the yarn breaks and the bobbin is less than one-fourth full, the Saran is declared waste. It is desirable to have as much gradual taper as possible on the filling bobbin.

WEAVING

After the ends are drawn through the harnesses, the warps are brought into the weave room as they are needed. Crompton and Knowles W-3 looms are used by the Abbeville Plant. These looms were running at 116 picks per minute. As in the warping process, the slow speeds in weaving result in more production and better cloth. More mechanical break-downs resulting from high loom speeds increases the loss of machine hours thus reducing the amount of production. As in weaving wool, cotton, and other fibers, many troubles are experienced in the processing of Saran. Some of the most serious of these troubles are due to the sloughing-off of the filling and uneven filling cracks in the woven fabric. The sloughing-off is caused by not winding the quills tight in the initial process. This can be corrected by placing more tension on the winding mechanism, thus attaining a more compact bobbin. The uneven filling is caused by static electricity and not enough weight on the beam. This can be prevented to some extent by the use of an oil applied to the filling while it is being wound on the filling bobbin. The cracks in the fabric are identified as a spread between individual filling threads. They are a result of the beating-up and static electricity encountered by the friction and rubbing together of the filling in relation to contact with the reed. These crack defects may be eliminated by adding weights and setting let-off mechanism for smooth operation.

Excessive ballooning of the yarn in the shuttle was one of the first problems encountered in the processing of Saran. This was solved by completely lining the shuttle with a special type wool. An interesting observation found at this point was the absence of bristles in the shuttle so commonly found in shuttles weaving cotton.

The looms in operation at the Abbeville Mills were running with electric stop motions for the warp and center-fork stop motions for the filling. Good results have been realized from this arrangement. The selvage ends are usually rayon or cotton. Saran selvage will slip when placed in the clamps on the tenter frames therefore reducing the amount of tension or stretch on the width of the fabric as it is being finished. Very little slippage is evident if cotton or rayon selvage is used.

Air conditions in the weave room were controlled at 72.5% relative humidity and 85 degrees F. temperature. However, the Abbeville Mills would like to operate at a slightly higher temperature. Due to several prevailing circumstances, this was (Continued on Page 19)
Clemson Textile School Reaches A New High
In Comparision With Other Textile Schools

WALTON B. CASSIDY, '51

At the present time the Clemson School of Textiles is the largest such school in the point of student enrollment having a student body of 681, comprised of students from all sections of the United States and some foreign countries. However, the bulk of the Textile School enrollment comes from the Carolinas and Georgia, the center of the textile industry in the United States.

Clemson students meet classes in a large, modern, four-story building which is a distinctive part of the beautiful Clemson campus. This building houses a highly diversified range of textile machinery and other necessary equipment pertinent to textile education—machinery and equipment which is used from day to day in the courses taught in the Textile School. Besides furnishing a home for the textile students and facilities for furthering their education along textile lines, this spacious building houses the research laboratories for the Cotton Branch of the Production and Marketing Administration, United States Department of Agriculture, and the regional offices of the American Cotton Manufacturer's Institute, Inc.—two organizations which have been instrumental in furthering progress in the textile industries.

Modern up-to-date textile equipment is found in the numerous textile laboratories; for example, new high speed looms and long draft spinning for both natural and synthetic yarns, Jacquard and dobby looms, the latest in combers and card room machinery, a complete knitting department, a selected line of equipment for the synthetic throwing process, modern dyeing and finishing equipment, and an efficient testing laboratory. At the present time much new equipment is being added which will further enhance the well-rounded curriculum in the four textile courses offered here at Clemson.

Another important contributing factor to the prominence of Clemson among the other textile schools is the size and quality of its faculty. The Textile School boasts a faculty of thirty-two men well versed in various elements of the textile industry. It is believed that this is the largest full time textile school faculty which is engaged exclusively in the teaching of textile subjects. In the light of academic background and practical experience in the textile industry, the Clemson faculty ranks as one of the finest among the textile schools. Included on Clemson’s School of Textiles faculty are five Ph. D’s and ten men with Master’s Degrees as well as many professors who have held prominent positions such as superintendent, oversees, or consultant in various fields of the textile industry. Also four men are now on leave of absence working toward higher degrees—two towards a Doctor’s Degree and two towards a Master's Degree. All of these factors tend to give the Clemson Textile School a well-rounded faculty capable of teaching a highly diversified range of courses designed to give the textile student—some knowledge of all phases of textile production and processing.

The School of Textiles is taking an active part in an unprecedented expansion program now in full swing here at Clemson. Educational facilities are being constantly enlarged and improved to help meet the textile industry’s demand for competent textile graduates. Steadily and surely the Clemson Textile School is forging to the foremost ranks in textile education. This fact is shown by the ever increasing number of Clemson graduates who are occupying top positions in the textile industry. Already, in the minds of many textile men, Clemson has become a synonym for the best in textile education. May we ever hold intact such good will and continue to produce to the satisfaction of these men.
Dr. Pearson Does Research At Clemson
W. H. WALKER, '52

Many of you have noticed a new personality around the textile building and have wondered who she is. This distinguished lady, connected with the Bureau of Plant Industry, is Miss Norma L. Pearson, Ph. D.

Dr. Pearson is a research specialist on neps and it is her interest in their structures that has brought her to Clemson. Nep are small knots of fibers. They are not present in the freshly opened cotton boll, but are produced as a result of manipulation. They are found in the products of all the machines to which the lint is subjected from ginned lint to yarn. They appear in the yarn as unsightly specks which frequently do not dye properly. If present in large numbers, they lower the quality of the yarn considerably.

In general, there are two phases to the nep problem. One is the biological phase. Cottons of different varieties and cottons from different localities differ in their nep-forming potentialities. These differences are due primarily to differences in the fiber length, degree of secondary wall development, frequently called maturity, and to differences in the perimeter or cross-sectional area. In general, long fibers tend to nep more than short ones, thin-walled fibers more than thick-walled fibers, and fibers of small perimeter more than those of large perimeters. Length, perimeter, and wall-thickness characteristics are heritable, but also may be modified by the environment in which a cotton is grown.

The second phase of the nep problem is the mechanical one, concerned with how and why the machines acting upon the cotton fibers cause the small troublesome tangles.

What might be considered a third phase is the interaction of the biological and mechanical phases, that is, the differences in reactions of cottons possessing different fiber characteristics to the various processes to which they are subjected.

The problem of nep formation is consequently a source of worry to persons concerned with all phases of cotton production and manufacturing from the cotton breeder on.

Dr. Pearson is a botanist and primarily interested in the biological phases, but feels that to obtain a complete understanding of the nep problem, the biological phase cannot be separated from the mechanical ones. That is the primary reason why she has been transferred to Clemson.

Dean Brown of the Textile School is very interested in the nep problem and all its ramifications. Dr. Pearson and her superiors in Washington felt that his advice and interest would be of great value to her in her research on nepes, particularly his advice regarding the problems of techniques and of instruments designed either to measure fiber properties or to eliminate some of the labor or personal errors involved in so much of the study of cotton fiber properties.

At Clemson, she will have a better opportunity than she has had heretofore to study the reactions of cottons with specific fiber properties to the spinning process. Each year there is spun in the "Federal Spinning Laboratory" a group of cottons for the Division of Cotton of the Bureau of Plant Industry. These cottons are specially selected for variable characteristics and for places or conditions of growth, and will provide ideal material for nep studies.

Location here will afford an opportunity to carry on various other related lines of investigation which are possibly only in a textile laboratory with facilities such as are offered here at Clemson. One such line of investigation is a study of the cotton seeds which do not mature. These structures are called motes. They represent not only a loss of yield but are a source of nep-like, unsightly fragments in yarn and are a source also of the thin-walled nep-forming fibers.

Some study has already been made on motes, but (Continued on Page 15)
Testing With The Uster Evenness Tester

GEORGE A. MOBLEY, '52

One of the many instruments and machines recently acquired by the Textile School is a Uster Evenness Tester. This instrument, which tests silver, roving, or yarn for uniformity, promises to be a great help in quality control and trouble shooting in textile mills.

The tester, manufactured by Zellweger, Ltd., of Switzerland, employs an altogether new technique for yarn testing. Most testers built up to recent times have been based on compressing the strand of fibers between rollers, or on some similar mechanical principle. The Uster Evenness Tester uses an electronic device for detection of variations in the cross-section of the strand.

Technically, the instrument consists of a high frequency oscillator, with its frequency controlled in part by the capacity between two plates in a measuring slot through which the yarn or silver is passed. Since the material to be tested is an insulator, it possesses dielectric properties, and variations in its cross-section will change the capacity between the two plates. This varies the frequency of the oscillator, and the change can be measured and related directly to the cross-section of the yarn.

The tester has a large range of application, and can be used on silvers up to 80 grains per yard, and on yarn as fine as 150's. This is a great improvement over the purely mechanical testers, which can be used only on silver, roving and the coarser counts of yarn.

Working in conjunction with the tester is a recorder, which makes a permanent and accurate record of the percentage variation in cross-section of the strand. The recorder tape can be fed at rates of 1, 2, or 4 inches per minute, which is synchronized with 1, 2, 4, or 8 yards per minute of material tested. This gives clear, legible lines which can be readily interpreted. The periodic repetition of nonuniformities in a given bobbin of yarn or can of silver, in conjunction with various roll speeds throughout the previous manufacturing processes, can be used to detect the cause of the variation.

An attachment for the Evenness Tester, which was also acquired, is an Integrator which measures the average irregularities in the strand. The Integrator is connected into the instrument between the tester and the recorder in such a manner that it has no individual power connections. It averages the deviations of the curve on the recorder tape, and at any time will give the "mean linear deviation" for the last two and one-half minutes. In this way, a short, large increase in diameter, such as a slub in the yarn, would bear considerably less weight in the average than a small increase of long duration. Since the Integrator is fully automatic, it eliminates the laborious operation of averaging the irregularities by statistical methods. Also, because it takes small variations into consideration, its results should be very accurate.

With proper use, the Evenness Tester, combined with the Recorder and Integrator, should prove to be a valuable asset to quality control departments as well as maintenance men.

BOBBIN AND BEAKER

AATCC News

The Student Chapter of the American Association of Textile Chemists and Colorists held its first meeting of the 1950-1951 session on September 26, and elected the following to serve as officers for this year:

Chairman B. G. Estes
Vice-Chairman W. B. Robertson
Secretary C. B. Morris
Treasurer M. G. Michaels

At this first meeting the second Tuesday night of

(Continued on Page 21)
The knitting industry had its beginning in the year 1839, with the invention of the knitting machine by William Lee. Though knitting had an early beginning, it has been in the last fifty years that the industry has made its most significant gains in the fields of production and quality control. Lee’s invention was a flat machine with one thread of yarn. In 1783 another Englishman, Crane, improved Lee’s invention by devising a way to add a guide and thread to every needle. This improved machine was the forerunner of the warp knitting machine of today.

In 1791, power-driven machines were developed. Among the many other inventions contributing to the growth of knitting during this period was Cotton’s Patent, the forerunner of the full-fashioned hosiery machine.

All the machines up until 1836 were employed in the manufacture of narrow-width fabrics. In that year the first fifty-four-inch machine was made. This hand-driven machine could produce ten courses a minute, and with the addition of power, production was increased to 100 courses per minute.

Since England lead the world in the invention and manufacture of machines and machine-made goods, she jealously guarded her secrets by imposing heavy duties upon anyone caught exporting machinery. Due to these heavy penalties, the first knitting machines used in this country were the few machines that could be smuggled into the United States. But soon after the entrance of a small number of machines in the early part of the nineteenth century, the knitting industry started to flourish by leaps and bounds.

**Full Fashioned Knitting**

The year nineteen hundred saw cotton stockings being knitted on 33 gauge machines—the ultimate in fineness and sheerness at that time. The average production of these “sixteen foot leggers” was nine dozen pairs a day and the average profit to the mill was fifty cents a dozen pair. Remember, this was without all the extras we find in the merchandising of consumer articles today. The stockings were boxed in plain boxes, one dozen pair to a box.

Up until World War I, most of the knitting machines and spare parts were being manufactured in England and imported into this country. The outbreak of hostilities in 1914 created a need for the manufacture of knitting machines here in the United States. With the new demand, the forces of America can mass production met the needs of the knitting industry and improved upon its technology. From the time of World War I to the present, knitting has made more progress than in any other similar period of history. One of the significant improvements in the past thirty years has been the increase from 33 gauge to the predominant 51 gauge of today. Other improvements include the drum type automatic course counter, the duo-narrowing machine, the lockstitch attachment which furnishes the means of producing the attractive picot edge in the welt of the stocking, and other devices permitting higher quality and greater production of hosiery.

**Circular Hosiery Knitting**

The early circular knitting machines lacked the automatic features that are found on the present...
day models. These machines were built with stationary needles and rotating cams and were hand powered. Since the rotating cam ring was not perfectly balanced, it tended to vibrate at high speeds. Another limiting factor was the tendency of yarns to twist when more than one yarn was fed to the machine. This made plating impossible, except with the use of a rotating yarn table, which in itself had its inherent faults.

As time progressed, more and more improvements were added to the circular knitting machine. In 1911 it was possible to knit a French welt with a selvage edge on a two-speed ribber. By 1926, the split foot machine was developed. Now it is possible to knit the high heel and sole independent of the instep with two separate yarns. With the passage of time, the number of needles in the machines steadily climbed, until now we have machines with 400 needles.

The interval between the wars also saw progress in the pattern knitting possibilities of the half-hose machine. This included attachments for horizontal stripping, reverse pleting, and clock patterns by the introduction of extra warp. Other improvements, such as the development of a half hose machine that would knit both top and leg of the hose, was a boon to the men's hosiery industry. Today we find that almost every operation on the half hose machine is performed automatically, and the machines need almost no operative attention compared to the machines in use at the turn of the century.

Body Knitting Equipment

There has been very little change in the basic design of the body knitting machine. Most of the improvements have been inventions to eliminate labor and cost. The operation of the machine has been also improved during the years. The first body knitting machines were plain jersey machines, which produced jersey tubes from 7 to 24 inches in diameter. The yarn was fed from bottle bobbins, and the stop motions were greatly improved with the extensive use of the electrical stop motion. Formerly we had the ultimate of 12 feeds in a 24 inch diameter, today we knit with 24 feeds in a 24 inch diameter; one feed per inch. The yarn is now taken from cones instead of bottle bobbins, eliminating the cost of rewinding. Altogether, the body knit machine has been improved tremendously through the years; not as much in basic design as in perfection of original machine which will give the manufacturer more production and a better grade of goods at a lower cost.

Knitting Progress at Clemson

September of 1949 saw the installation of a new major in knitting, and since that time several new courses have been added to the curriculum. The knitting laboratory has been enlarged. New machines have been purchased by the school and have been installed. Upon receipt of a few more machines this department will be able to give almost complete theoretical and practical instruction to the student.

The fields of knitting to be probed by the Clemson student are full-fashioned hose, men's and boys hose, knit underwear construction and fabrication, knit outwear, tricot fabrics, sidega fabrics, and the cutting and sewing of any type of goods. From the above it can be seen that this department will soon be able to produce any knitted article from men's "T" shirts to women's blouses. This type of course involves a great number of separate textile industries and therefore the knitting student has the advantage of being placed in a variety of fields.

While the number of students taking this course is necessarily limited because of the need for much individual instruction, the new major has been well received by the students and is at the present time as large as it can possibly be. It is hoped that Clemson's knitting option will be of real benefit to the industry, the textile school, and to the state of South Carolina.

Credit: Professor W. O. Allen, Clemson Textile School.

Textile World July 1948
Knitter May 1590

ASTE News

TO START off the semester, the A. S. T. E. has selected eight new members. They are: P. M. Pitts, Clinton; P. N. Harvey, Clover; M. E. Price, Ninety-Six; R. F. Satterfield, Lymon; W. G. Holmes, Charlotte, N. C.; R. J. Kay, Trenton, N. J.; W. E. Carpenter, Graniteville; J. H. Scott, Honea Path. This brings the membership up to approximately 30 members.

The last club meeting was held on Nov. 28th. Mr. A. E. McKenna made a very interesting talk on warping and slashing. Reports were heard on our recent clean-up drive and then the meeting was adjourned for refreshments.

Officers for this year are: President, H. F. Magill, Concord, N. C.; Vice President, H. P. Worth, Greenville, S. C.; Secretary, J. D. Skerratt, Cranford, N. J.; Treasurer, G. Gage, Clemson, S. C.
Instructors Added To Textile Staff

SAM M. WILLIS
Instructor in Weaving and Designing

Mr. Willis is one of three new professors who were recent graduates of the Clemson class of 1950. Mr. Willis is originally from Greenwood, South Carolina, but is now making his home at Walhalla. He completed his high school career at Greenville High School at Greenville in 1945. After spending two years as a student at Clemson, he entered the Army and served eighteen months as a doggie with the Fourth Infantry Division stationed at Ford Ord, California. Mr. Willis re-entered Clemson in February, 1946 and graduated in August, 1950 with a B. S. Degree in Textile Manufacturing.

W. C. WHITTEN, JR.
Assistant Professor of Weaving and Designing

A native of Walhalla, S. C., and a graduate of Walhalla High School, Mr. Whitten is another former Clemson professor who has returned to the Textile School faculty after a leave of absence spent in working on his Master's Degrees. During World War II, Mr. Whitten served in the U. S. Army for two and one-half years as a member of the 104th Infantry Division. After receiving his discharge, Mr. Whitten entered Clemson and received his B. S. Degree in Textile Engineering in the class of 1947. While at Clemson, he was a member of Phi Psi Fraternity and the Block C Club. Upon graduation, Mr. Whitten accepted a position on the Textile School faculty and taught for two years at the end of which time he entered Georgia Tech. He attended Georgia Tech for eighteen months and received his M. S. Degree in September, 1950. Mr. Whitten is married and is now living in the Clemson Homes.

EDWIN D. JONES

A member of the class of 1950, Mr. Jones is the youngest member of the Textile School faculty at the present time. He is a native of Greer, South Carolina, and graduated from Greer High School of that city in 1946. Mr. Jones entered Clemson in the fall of 1946 and just recently received his B. S. Degree in Textile Manufacturing with the August group of 1950 graduates. While at Clemson, Mr. Jones was a member of the R. O. T. C. and received, along with his diploma, a commission as a reserve officer in the Quartermaster Corps of the U. S. Army.

W. L. WYLIE
Instructor in Yarn Manufacturing

Mr. Wylie is a recent Clemson graduate who has entered the teaching profession as a member of the Textile School faculty. Mr. Wylie hails from Winnsboro, South Carolina, where he received his high school diploma at Mt. Zion Institute in 1943. After serving in the U. S. Navy for thirty-two months, he was discharged with a rating of A. A. M. 5-c. Mr. Wylie entered Clemson in 1946 and received his B.S. Degree in Textile Engineering in August, 1950. While at Clemson he was a member of the American Society of Textile Engineers. Mr. Wylie is married and at present is living at 156 Milky Way, Clemson.

FOURTEEN
J. C. HUBBARD  
Assistant Professor of Weaving and Designing

Mr. Hubbard, who has returned to the Clemson faculty after a year's leave of absence, is not a new professor to many of the older students, but for the benefit of the newer students, he has been included as one of the new professors.

He is a native of Lancaster and Columbia, South Carolina. After graduating from Oak Ridge Military Institute in 1938, he entered Clemson College from which he received a Degree in Weaving and Designing in 1942. Upon graduation he entered the Army and served for four years during World War II. He then spent eighteen months at the Institute of Textile Technology at Charlottesville, Virginia, where he held a position as a textile engineer. In 1947 he returned to Clemson as an instructor in the Weaving and Designing Department. After serving two years in this position, he entered the Georgia Institute of Technology which he attended for one year. Here he received his Master of Science Degree. While attending the Institute, he was a member of Delta Kappa Phi, honorary textile fraternity.

BOBBIN AND BEAKER

Dr. Pearson Does Research At Clemson

(Continued from Page 10)

much remains to be learned as to why certain seeds fail to mature.

Dr. Pearson has led a very interesting life, which she outlined to me a few days ago. She is originally from Bloomington, Wisconsin, where she attended high school. In 1918 she received her Bachelors of Arts degree from the University of Wisconsin. Upon graduation, she taught science for two years in Sparta, Wisconsin. She returned to University of Wisconsin and received her Masters Degree in Botany in 1921.

After teaching for one year at Cotley College in Missouri she joined the staff at Beloit College, Wisconsin, where she taught both Botany and Zoology. She received her Doctorate in Botany and Plant Pathology from the University of Wisconsin in 1928.

In 1930, after teaching at Eastern Kentucky State Teachers College in Richmond, Kentucky, she entered government service in Washington, D. C. First, she went into the Cotton Marketing Division of the old Bureau of Agriculture of Economics and was later transferred to the Division of Cotton and other Fiber Crops and Diseases in the Bureau of Plant Industry, Soils, and Agricultural Engineering. During this time she wrote several technical bulletins and articles for the Journal of Agricultural Research, which were reprinted in pamphlet form for distribution.

During the war years of 1943 to 1945, Dr. Pearson was temporarily transferred to University of Michigan and worked on the botanical phases of milkweed floss production. At this period of the war, it was becoming increasingly apparent that it might be necessary to find some material other than "Kapok" to be used as a filler for life preservers. The war prevented the shipment of this substance from the Far East, so the scientists with whom Dr. Pearson was associated wished to investigate some of the problems which are connected with the use of milk-weed floss as a substitute for Kapok. Her articles on certain botanical problems connected with milk-weed floss production were printed in the American Journal of Botany and Journal of Agricultural Research.

Dr. Pearson says that her work is not glamorous, but that she enjoys it. Much of it is pure labor, and much monotonous routine. But there is always the interest as to how the next cotton studies will behave, what the next nep will look like under the microscope, for no two are exactly alike, and in more detailed microscopic studies, what the next slide will show. She says if she could have had her wish as to what she would like to have been, it would have been an explorer, so she could climb mountains and go up strange rivers and dig in ancient ruins, but she says the microscope has not been a bad substitute.

Dr. Pearson has a hobby. It is hand-weaving and she thinks that here in a textile school she will get many new ideas as to materials, designs, and techniques.

FALL, 1950
Reminiscing, contemplating, or call it what we may, Clemson’s contribution to the Textile world has been no small thing. Looking back over the years, the list of Textile Chemistry, Textile Engineering, and Textile Manufacturing graduates has been ever increasing and with pride we can point out among the valuable men in the Textile industry, many former Clemson men. Since Textiles have come to the front, especially in the South, the need for trained men along this line is also increasing.

In the states throughout the union, Clemson is remembered and respected by many loyal sons, but let us pause for a few minutes and see what some of our graduates are doing in the textile field. For instance, Charles P. Gordon, graduate in the class of 1935, is general superintendent of Riegel’s dyeing and finishing plant in Trion, Georgia. Mr. Gordon is Secretary of the South Central Section of American Association of Textile Chemists and Colorists. In the same plant, serving as chief chemist, we find Ernie Freeman, graduate of the class of ’41. John N. Talbert, graduate of ’39, is Production Control Head at the McCormick Spinning Mill. In the same mill, William H. Ballenger, class of ’50, is a trainee in general accounting work; B. S. Barnwell, class of ’40, is Second Hand in the Carding and Combing Department; J. N. Workman, class of ’47, is Assistant Production Control Head; G. H. Ashley, class of ’49, trainee in the Production Control Department; B. C. McWhite, class of ’47, Office Manager. At Pacolet Manufacturing Company, Pacolet, South Carolina, are three Clemson graduates, L. F. McMackin, ’47; J. H. Harrold, ’49; and D. W. Walker, ’47, employed in the Standards Department as Time Study Engineers. Three Clemson graduates are connected with Joanna Cotton Mills. They are: J. K. Kaits, ’47, Supervisor of Standards Department; C. B. Cannon, Jr., ’49, Laboratory Technician in the Standards Department; and L. A. Crawford, ’47, Assistant Superintendent. There are six Clemson graduates who are now working at Laurens Mills. They are: T. C. Hunt, ’32, serving as Master Mechanic; A. T. Wilbanks, ’49, is Assistant Production Control Manager; E. P. Cleveland, ’40, serving as an Industrial Engineer; T. L. Timmerman, ’43, is a Laboratory Technician in the Production Control Department; J. W. Armstrong, ’48, is a trainee in the Weave Room; J. E. Koopman, ’48, is a trainee in the Weave Room. Clemson graduates presently employed at Johnston Mill include: J. G. Farrell, ’48, is Job Worsted Control Head; R. E. Self, ’49, is Assistant Designer; A. E. Panaro, ’48, is Assistant Designer; A. B. Carwile, ’48, is Supervisor of Accounting; R. E. Chandler, ’46, is Shift Overseer in the Weave Room; P. H. Rosenberg, ’47, is an Industrial Engineer; H. B. Knox, ’40, is Assistant Weave Room Overseer; T. E. Peden, ’38, is Worsted Control Engineer; F. A. Thompson, ’39, Plant Superintendent; F. D. Hill, ’50, is a trainee in Industrial Engineering Department. Presently employed at Watts Mill are: T. P. Townsend, ’29, manager of Watts Mill and Assistant Secretary of the J. P. Stevens and Company, Inc.; H. B. Iler, ’48, Supervisor of Laboratory; J. J. Nipper, ’49, Supervisor of Training; W. M. Washington, ’47, Assistant Overseer of Weaving; W. S. Armstrong, attended Clemson 1938-1940, is Assistant to Superintendent; R. C. Byers, attended Clemson 1945-1946, is Supervisor of Wage and Rate Department.

If space would permit, we could go on and on. We are grateful that some of our best talent stayed close by to instruct and impart their store of knowledge to the newcomers to Clemson’s Textile world. We feel that Clemson graduates, past and future, will make Textiles and Clemson synonymous.
Engineering In The Textile Field

HENRY F. McGILL, '51

During the early years of this century there was little incentive for a young man to attend a textile school because it was difficult to obtain jobs. Those were days when there was only cotton and wool to be spun. Today there are not only cotton and wool but many synthetic fibers and many blends. Now it is difficult for a man without a textile education to advance to one of the higher positions unless he has determination and can demonstrate that he has exceptional ability. In years to come, very few men will succeed in the textile field unless they have been educated for the business.

Now that the textile industry has seen a need for men with a technical education, many engineers are finding employment in that industry. Many of the professional organizations have formed divisions of their organizations in the textile field, and just recently the textile division of the American Society of Mechanical Engineers held a meeting of the Society in Worcester, Massachusetts to form a council for the advancement of engineering in the textile field.

Several years ago a number of Clemson students saw the need for such a society as the A. S. M. E. in the textile field. A professional organization, The American Society of Textile Engineers, devoted to the advancement of engineering in the textile industry, has now been formed at Clemson College.

The A. S. T. E. has not been organized nationally as yet. From such cities as New York and Philadelphia, letters have been received from graduates who want to form chapters in their immediate area. By forming such chapters throughout industry, better coordination between industry and educational institutions will be possible. The popularity of the Clemson Textile School will be greatly increased and, of course, the possibility of employment will be improved. The A. S. T. E. believes industry wants to know more about the courses which make up the Textile Engineering curriculum and the qualifications of the graduate in this major field.

We hope the A. S. T. E. will bring older alumni in contact with young graduates and develop acquaintances which may be of value to each.

Fluid Drive For Textile Carding Machines

RICHARD BOYD, TM, '51

Professor C. B. Gambrell, Instructor in Textiles at Clemson College, has recently developed and successfully applied the principle of transmitting power though a liquid for driving a textile carding machine.

By applying this fluid-drive principle to the carding machine, several undesirable conditions which now exist in the textile industry can be eliminated. Professor Gambrell's main objective was to develop a successful individual drive to replace the overhead multiple drive, central power source method now in use in most textile mills. Due to the fact that overhead drives are highly susceptible to mechanical difficulties, they require constant maintenance attention. Also, if there is a failure of the central power unit, entire groups of cards supplied by the unit are shut down.

The majority of individual drives which are now in use for carding machines require larger motors for starting than for running conditions because of the great amount of starting torque required. As a result, this requires the purchase of a larger motor to meet the requirements for the starting load.

Professor Gambrell's application is relatively simple and inexpensive. It allows the use of a motor approximately 1-3 the size of that used on most individual card drives. Shock load and torsional vibrations are cushioned out through the fluid coupling so that a gradual and smooth flow of power is always obtained.

FALL, 1950
IOTA Chapter of Phi Psi started the semester with a meeting on September 14. Included in the business taken up was the appointment of committees which were to study the project for the annual Phi Psi Convention and to compile a list of Phi Psi Alumni. Through the efforts of our president and other officers, and with the assistance of Dean Brown, the Phi Psi room in the basement of the Textile Building has been painted and redecorated and several new pieces of furniture obtained.

On October 6, we were honored to have as our guest the Grand President of Phi Psi, Brother M. Earle Heard, who is vice president of the West Point Manufacturing Co. at West Point, Georgia. Brother Heard visited Iota Chapter for the purpose of conferring honorary degrees on Mr. Walter Regnery, President of Joanna Cotton Mills, Joanna, S. C., Mr. Harold Whitcomb, Vice-President of Fieldcrest Mills, Spray, N. C., and Mr. H. B. Wilson, Assistant Professor of Yarn Manufacturing at Clemson. Before the meeting, the Chapter enjoyed a steak supper at Kluttz Steak House.

On November 4, the Chapter held open-house for Phi Psi Alumni, guests, and faculty after the Duquesne-Clemson football game. Approximately one hundred guests visited the chapter room, where refreshments were served.

NEW MEMBERS

GREENVILLE ALUMNI CHAPTER:
During the past semester, we have been in the process of compiling a list of names and addresses of Phi Psi Alumni in Greenville and surrounding area. This list is complete and a Dutch supper is to be held at Greenville, S. C., in the very near future for the purpose of reactivating the Alumni Chapter. The coupon below was printed in the last issue of this publication, but if any alumnus located in the vicinity of Greenville has not contacted Iota Chapter, please do so immediately.

NEW OFFICERS
A meeting held November 30, officers were elected to preside over the chapter for the coming semester. Since several of the present officers are graduating in February, it was necessary to hold this special election. The new officers elected were Walton B. Cassidy, President, W. Clyde Hayes, Vice-President, William G. Raines, Senior Warden, Bernie Fleisher, Junior Warden, and George A. Mobley, Secretary and Treasurer. Fortunately, we are losing very few members this semester. Among those graduating, however, are W. M. Kirby, President, J. W. Christenbury, Vice-President, J. F. Catathcart, Senior Warden, W. H. Dixon, Secretary, C. E. Hollis, J. F. Buxton, C. E. Reddick, D. J. Brett, H. O. Bryant, B. D. Hicks, C. J. Price, J. H. Stewart, and R. N. Van Ham.

CAROLINA SUPPLY COMPANY
TEXTILE SUPPLIES
Greenville, S. C.

THE BOBBIN AND BEAKER
not feasible at the time. The most common patterns or weaves used in the manufacture of plastic goods are the 2/2 regular twill and the herringbone twill. This is a result of consumer demand. An interesting factor about Saran found so noticeable in the weaving process is the effect of the different colors on the weaving efficiency. Characteristics of the different colors create problems that can only be solved as the goods are being woven. This leads one to regard Saran as being unpredictable; therefore no set rules can be followed. The average construction of Saran fabric is 11-8 pounds per yard with 64 ends and 30 picks per inch. The yarn count is usually 10 mil or 12 mil. However, fabric specifications are largely left up to the buyer.

CLOTH ROOM

The woven fabric is next taken to the cloth room where the cloth is graded. The gray goods are inspected first on the back and then run through again for inspection of the face. The usual inspection is carried out here in the same way as for other type goods. The fabric is put up in 50 yards for further finishing operations.

FINISHING

There are two machines used in the finishing of Saran—the Verdium Calendering Machine and the Tenter Frame. To which machine the goods are first fed depends entirely upon the kind of fabric being run. In yarn form, Saran is round in cross-section. After calendering in cloth form, the yarn is flattened. This process changes the appearance of the cloth materially, giving the cloth a fuller, closer-woven effect. The weight on the two large rolls on the machine is from 15 to 30 tons. Temperature of rolls is approximately 260 degrees F.

The Tenter Frame process is used to stretch the fabric so as to increase its width and also to frame the fabric. This is accomplished by hot air being circulated through a portion of the frame at approximately 150 degrees F. This high temperature softens the Saran in order that the fabric may be more easily stretched in the tentering process.
School of Textiles

Begins Expansion Program

(Continued from Page 5)

1 36-Spindle Spinning Frame 4" Gauge—Whitin Machine Works
1 Model J Comber, Short Frame—Whitin Machine Works
1 Revolving Flat Top Card—Whitin Machine Works
1 4-Delivery Drawing Frame—Whitin Machine Works
1 S-L F S 2 Roving Frame—Saco-Lowell
1 S-L Lap Meter—Saco-Lowell
1 Set Flats for Card—Saco-Lowell
1 Worsted 10 x 5 Bobbin Roving Frame—Saco-Lowell
1 4" Gauge Worsted Spinning Frame—Saco-Lowell
1 36-Spindle Super-Draft Roving Frame—Whitin Machine Works
Long Draft Spinning Frame—Whitin Machine Works
Single-Cylinder Waste Machine—Kirkman & Dixon

WOODSIDE MILLS

Plants Located at
Easley, S. C. Simpsonville, S. C.
Liberty, S. C. Fountain Inn, S. C.
Greenville, S. C.

1 40-Spindle Roto-Coner—Universal Winding Co.
Twister—H and B Machine Co.
Vacuum Stripping—Abberget Corporation

The Textile Management Department also falls into the well-rounded expansion program in that a large amount of equipment is being added to the Testing, Microscopy, and Costing Laboratories. The addition of this new equipment has greatly alleviated the need for more adequate equipment for the large numbers who must take these courses. Included here is some of the more important equipment which has been added to the Management Department.

9 Calculating Machines—Monroe Calculator Co.
1 Model J Tester for Cloth and Skeins—Scott Testers, Inc.
2 Microscopes—American Optical Co.
1 Microscope—Bausch & Lomb Optical Co.
2 Micrometer Discs—Bausch & Lomb Optical Co.
1 Marchant Calculating Machine—Marchant Calculating Machine Co.
1 Model A-2 Evenness Tester—Uster Corporation
1 Integrator for Model A-2 Tester—Uster Corporation
1 Pacific Evenness Tester—Anderson Machine Works

(Continued on Page 21)
1 Hardy Device—A. M. de La Rue

The preceding lists give only a part of the new machinery and equipment being added to the School of Textiles, but one does not have to be overly discerning to realize that the Clemson Textile School is rising to a position of even greater prominence throughout the textile industry.

As the textile industry continues its migration South, the industry will begin to turn more and more to the southern schools for graduates to fill positions calling for well-trained textile graduates. It is with this view in mind that Clemson has entered upon such an extensive expansion program, not only in the School of Textiles, but in all of the various schools here at Clemson.

Such a program is of prime importance to both Clemson students and to the firms or fields of endeavor which they will serve upon graduation. Clemson College is definitely on the upgrade and the School of Textiles is in the forefront of the impetus towards making Clemson famous as a “maker of men.”

How to DESIZE with complete SAFE-T

Exsize-T is harmless to the sheerest and most delicate fabrics. Not a chemical—but a liquid enzyme concentrate with a neutral pH.

Now used by many of the largest textile mills, Exsize-T is efficient, economical and safe! Write for free booklet.

AATCC News

(Continued from Page 11)

each month was set for the regular meeting with other informal meetings to be held as considered necessary.

At the November meeting the student chapter enjoyed a very delightful dinner in the Purple Room of the new Clemson Hotel. On this evening, Mr. C. O. Stevenson of the Ciba Company was present as a guest and outlined the revised rules of the student paper contest to the group. This contest is sponsored by the Piedmont Section of the A. A. T. C. C. and original student papers are presented at the Spring meeting of the section. Awards are made based on the originality as well as the scientific and practical value of the work done. The first of these contests was held in Winston-Salem last year, and the Clemson chapter was very proud to receive first prize. The members of the section are working on several problems at the present time, and hope to make at least as good a showing as the papers of last year.

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Serving Clemson Students, Clemson People and Clemson’s Friends and Visitors is our way of mixing pleasure with business.

“WHERE ALL CLEMSON MEETS”
The BOBBIN AND BEAKER, official publication of the Clemson Textile School, announces the appointment of the new staff for the coming year. Retaining his post as Co-editor is Samuel P. Morrah, Textile Manufacturing student of Greensboro, N. C. and replacing W. M. Kirby as the other Co-editor is George A. Mobley, Textile Engineering student of Simpsonville, S. C. Walton B. Cassidy, Textile Manufacturing student of Hartsville, S. C., is the Managing Editor, with A. H. Clarke, Textile Manufacturing student of Laurens, S. C. as the Assistant Managing Editor. R. P. Boyd, Textile Manufacturing student from Charlotte, N. C. is remaining in his present capacity as Business Manager, and R. J. Kay, Textile Engineering student from Trenton, N. J. is Advertising Manager. H. E. Batson, Textile Manufacturing student of Laurens, S. C. and P. V. Hazel, Textile Manufacturing student of Woodruff, S. C. are the Circulation Manager and Assistant Circulation Manager, respectively.

The following men have been appointed to the Editorial Staff: M. E. Price, TE, of Ninety Six, S. C., Bernie Fleischer, TM, of Waterbury Conn., W. H. Walker, TM, of Laurens, S. C., and W. C. Hayes, TM, of Dacusville, S. C.


Warp Ends

The farmer's daughter, now a city dweller, awakened one morning to find a note from her companion of the night before pinned to her pillow. The note read: "Goodbye, my little Hollyhock." She was puzzled so she looked in the Florists' Almanac and suffered quite a shock to her pride to read: "Hollyhock, ... does well in fence corners and behind barns, but no good in beds."

"At last," groaned Buxton, "total paralysis of the left leg! I've feared it for years."

"If it will relieve your mind any," whispered the sweet and more or less demure thing on his left, "it's my leg you've been feeling."
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Write for more information about Texize Individual Service
Is there need of a society for the purpose of furthering the interests of the Textile Manufacturing students? Comments of students and faculty members indicate that such an organization would meet with universal approval among the TM students at Clemson. Many of these students feel that Textile Engineering and Textile Chemistry students have advantages to better themselves socially and intellectually through the medium of the American Society of Textile Engineers and the American Society of Textile Chemists and Colorists—advantages which are of benefit to TE and TC students when applying for a position in the industry which they will serve—advantages which also give the TE and TC students an opportunity to remain in contact with friends whom they have acquired while under graduates. The opinion has been expressed by many TM students that they are definitely interested in an organization such as the Textile Manufacturing Society of America. This organization or society would be molded along much the same line as other professional societies for Textile students. An organization of this type would be an asset both to the individual and the school for various reasons. First of all, it is my belief that any society which is organized for the purpose of brotherhood and fraternal associations is a great influence in promoting high ideals. Secondly, I believe that it would guide the ambitions of its members along more profitable lines than any course which might be included in any textile curriculum.

The Textile Manufacturing students, comprising the largest number in any one major, are, paradoxically, the only group which does not have a society to bring about a more intimate relationship. It is rather late in the semester, but I believe that there is ample time to make great strides toward activating such an organization. Mr. T. A. Campbell, Jr., Associate Professor of Textile Management, is very much interested in an organization of this type and has been appointed as the faculty advisor for the purpose of expediting the formation of this society. All sophomores, juniors and seniors seeking a B. S. Degree in Textile Manufacturing who are interested in this plan should contact Mr. Campbell at their earliest convenience.

ACKNOWLEDGEMENT
We are proud to accept the challenge of producing a publication that is worthy of representing the School of Textiles at Clemson. We wish to extend our appreciation to the advertisers who, through their interest, have made this publication possible. We are indebted to all who have contributed, advised, and worked with us on this issue. Furthermore, we wish to express our appreciation to every member of the Staff and Mr. A. E. McKenna, our faculty advisor, for their tireless effort to present a publication that will be of interest to the students, the Alumni, and the Industry.

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### Textile Chemicals

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>VATROLITE</strong></td>
<td>For brighter vat dyed colors on cotton, linen and rayon. Use this powerful concentrated reducing agent for faster, cleaner results on wool, cotton and rayon.</td>
</tr>
<tr>
<td><strong>DISCOLITE</strong></td>
<td>A concentrated reducing agent, highly stable at high temperatures, outstanding for discharge printing. Employed successfully wherever the reducing agent must dry into the fabric and retain its reducing power.</td>
</tr>
<tr>
<td><strong>PAROLITE</strong></td>
<td>A dust-free, white crystalline reducing agent. Soluble, colorless, excellent for stripping wool rags, shoddy, acetate or Nylon fabric.</td>
</tr>
<tr>
<td><strong>NEOZYMÉ</strong></td>
<td>Concentrated low temperature desizing enzyme. Removes starch and gelatine. Excellent for eliminating thickeners from printed goods at low temperature.</td>
</tr>
<tr>
<td><strong>NEOZYMÉ HT</strong></td>
<td>Concentrated high temperature desizing enzyme. Removes both starch and gelatine. Suitable for continuous pad-steam method. Remarkable stability at very high temperatures.</td>
</tr>
<tr>
<td><strong>CASTROLITE</strong></td>
<td>A highly sulphonated castor oil used as a staple penetrant for dyeing or bleaching in leading textile mills.</td>
</tr>
<tr>
<td><strong>ZIPOLITE</strong></td>
<td>Very efficient detergent with high wetting power. Effective in neutral, acid or alkaline baths. Dyeing assistant having good dispersing and leveling properties.</td>
</tr>
<tr>
<td><strong>VELVORAY</strong></td>
<td>A blend of vegetable oils and specially selected fats for a superior, non-foaming, finishing oil. High in combined SO₃ and stability. Excellent for sanforizing.</td>
</tr>
<tr>
<td><strong>DRYTEX</strong></td>
<td>A high-test wax emulsion type water repellent finish having extreme stability both in the barrel and in diluted form as used. Non-foaming.</td>
</tr>
<tr>
<td><strong>DISPERSALL</strong></td>
<td>Effective retardant for dyeing vat colors. Dispersing and leveling qualities, useful in wool and acetate dyeing. Valuable auxiliary in stripping vat colors, naphthols.</td>
</tr>
<tr>
<td><strong>NEOWET</strong></td>
<td>Effective wetting at all temperatures—particularly useful with enzymatic desizing agents. No reaction to soft or hard water. Not affected by either acid or alkali chemicals.</td>
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