The Bobbin and Beaker Vol. 2 No. 1

Clemson University

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THE RIGHT TRAVELER FOR EVERY FIBRE
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Cover Photo by R. G. HUFFORD
To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find area of a triangle multiply base by one-half perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find solidity of a sphere multiply cube of diameter by .5236.

To find cubic inches in a ball multiply cube of diameter by 5236.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U.S. standard) weighs 8 pounds, one-third ounce, and contains 231 cubic inches.

A cubic foot of water contains 7 1/2 gallons, 1,728 cubic inches, and weighs 62 1/2 pounds.

To find the pressure in pounds per square inch of a column of water multiply the height of the column by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard horse power: The evaporation of 30 pounds of water per hour from a feed water temperature of 100 degrees F. into steam at 70 pounds gauge pressure.

To find capacity of tanks any size; given dimensions of a cylinder in inches, to find its capacity in U.S. gallons: Square the diameter, multiply by the length and by .0034.

To ascertain heating surface in tubular boilers multiply two-thirds the circumference of boiler by length of boiler in inches and add to it the area of all the tubes.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 percent for drilled holes.

<table>
<thead>
<tr>
<th>Conversion</th>
<th>Formula</th>
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<tr>
<td>Millimeters × .03937</td>
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<tr>
<td>Millimeters ÷ 25.4</td>
<td>inches.</td>
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<tr>
<td>Centimeters × .393</td>
<td>inches.</td>
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<tr>
<td>Centimeters ÷ 2.54</td>
<td>inches.</td>
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<tr>
<td>Meters × 39.37 = in.</td>
<td>(Act Cong.)</td>
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<td>Meters ÷ 3.28</td>
<td>feet.</td>
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<tr>
<td>Meters ÷ 1.094</td>
<td>yards.</td>
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<tr>
<td>Kilometers × .621</td>
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<td>Kilometers ÷ 1.6093</td>
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<tr>
<td>Kilometers × 3280.7</td>
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<tr>
<td>Square Meters × 10.764</td>
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<tr>
<td>Cu. Centimeters × 16.337</td>
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<tr>
<td>Cu. Centimeters ÷ 3.69</td>
<td>fl. drs. (U. S. P.)</td>
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<tr>
<td>Cu. Centimeters ÷ 29.57</td>
<td>fl. ozs. (U. S. P.)</td>
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<tr>
<td>Cu. Meters × 35.314</td>
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<tr>
<td>Cu. Meters × 1.308</td>
<td>cubic yards.</td>
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<tr>
<td>Cu. Meters × 264.2</td>
<td>gallons (231 cu. in.)</td>
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<tr>
<td>Litres × 61.023</td>
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<tr>
<td>Litres × 33.84</td>
<td>fluid oz. (U. S. P.)</td>
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<td>Litres ÷ 3.78</td>
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<td>Grammes ÷ 981</td>
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<td>Grammes (water) ÷ 29.57</td>
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<td>Grammes ÷ 28.35</td>
<td>oz. avoidupois.</td>
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<td>Grammes per cubic cent. ÷ 27.7</td>
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<td>Joule × .7373</td>
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<td>Kilo-grammes × 2.2046</td>
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<td>Kilo-grammes × 35.3</td>
<td>oz. avoidupois.</td>
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<td>Kilo-grammes ÷ 1102.3</td>
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<td>Kilo-grammes per sq. cent + 14,223</td>
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<td>Kilo-gram metres × 7.233</td>
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<td>Kilo per metre × .672</td>
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</tr>
<tr>
<td>Kilo per cubic metre × .026</td>
<td>lbs. per cubic ft.</td>
</tr>
<tr>
<td>Kilo per Cheval × 2.235</td>
<td>lbs. per H. P.</td>
</tr>
<tr>
<td>Kilo-Watts × 1.35</td>
<td>Horse Power</td>
</tr>
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<td>Horse Power.</td>
</tr>
<tr>
<td>Watts ÷ 737</td>
<td>ft. lbs. per second.</td>
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The Development Of The Textile Industry In South Carolina

By PROFESSOR G. H. DUNLAP

The history of cotton manufacturing in South Carolina involves a great deal more than is shown by the statistical record of its growth. Progress from the pioneer plants to the present commanding position of the industry cannot be traced by a mere recital of figures. To properly visualize this development, we must take into account the economic conditions prevailing when the first mills were started and the various influences which both aided and checked their growth. The story, too, must contain something of the spirit of reconstruction days—of the vision of the leaders of that period who foresaw that the South could find salvation only in the strength of her own efforts to build again an economic structure that would support her people.

To you who are prone to think of the textile industry in South Carolina as a new enterprise resulting from the effects of the Civil War or to those who hold the popular misconception that the textile industry has been transplanted from a parent New England, the history of the development of textile manufacturing in South Carolina should be most interesting.

Perhaps they are apt to remember the complete and picturesque plantation system that existed in this state, where slaves sometimes made the coarsest cloth for their own clothing, and to forget that in the humble homes a majority of the white population lived many a Silas Marner whose heritage in old England has been the skilled craft of manufacturing yarns and fabrics.

It is admitted on all sides that South Carolina has the distinction of being the pioneer in the development of the textile industry in the Southern States. Historically, we believe that cotton manufacturing on a machine basis in South Carolina began in the year 1790. Yet we have recorded in the records, that Governor Glenn of South Carolina in the year 1748 stated in a required report to the English Lords of Trade that the Carolina colonists were manufacturing cloth goods for home consumption.

It is only just and fair to concede to Slater the distinction of going into the cotton mill in a business-like manner, but the claim that the first mill was erected at Beverley, Mass., in 1787 is questionable, and the distinction of having the first mill most probably belongs to South Carolina.

In Gregg’s “History of the Old Cheraws” the following reference, from a Charles Town Gazette of December 22, 1768, establishing the fact that cotton goods were made in this state
as early as 1768.

"A gentleman of St. David's Parish, in this province, writes to his correspondent in Charles Town: 'I expect to see our own manufacturers much promoted in this part of the province. I send you some samples of what hath been already done upon this river in the parish. The samples of white cotton was made in proportion of twelve yards to one pound of cotton. Flax, hemp, and cotton may be raised here in any quantity. As to wool, one can not have much of it.'"

We have records of an eighty-four spindle mill that was situated on the Santee River near Statesburg in Sumter County. It was operated by a small band of English spinners and weavers, and who knows but what the gentleman from St. David's Parish was referring to the small enterprise? It is also stated in the Gazette of March 2, 1769:

"Many of the inhabitants of the northern and eastern parts of the province have this winter clothed themselves in their own manufactures; many more would purchase them if they could be secured."

In 1770 there seems to have been a general movement toward developing the state along manufacturing lines, and a committee was appointed to establish and promote manufacturing in the province, with Henry Laurens, Esq., as chairman and treasurer of the organization. Petitions were circulated for the raising of money and considerable funds were secured for the promotion of the industry.

Daniel Heyward, the father of Thomas Heyward, Jr., who was one of the signers of the Declaration of Independence from South Carolina, stated in a letter to his son dated February 19, 1777:

"My manufactory goes on bravely, but fear the want of cards will put a stop to it, as they are not to be got; if they were, there is not the least doubt but that we could make six thousand yards of cloth in the year from the time we began."

On the 13th day of March, 1789, Hugh Templeton deposited in the office of the Secretary of State two plans of inventions. One a complete draft of a card machine that would card eighty pounds of cotton per day and the other a complete draft of a spinning machine, with eighty-four spindles, that would spin ten pounds of yarn per day and only required one attendant to operate the machine.

In 1795, the General Assembly of South Carolina passed an Act that a lottery be drawn and the profits used for manufacturing, as a result of which four hundred pounds were entrusted to William McClure to erect a factory to manufacture Manchester wares, provided that he employ and instruct seven white persons for a period of seven years.

The South Carolina Homespun Company of Charleston was organized in 1808 and was considered the most important undertaking in the cotton mill industry up to that time. In 1808 the fad for wearing homespun became so acute that the house of representatives of South Carolina passed a resolution that all members of the General Assembly should appear during the session clad in homespun suits.

The first mills in South Carolina were, for the most part, built in the coastal section of the state on small water powers, but after the war of 1812 had centered attention on the question of home industry, the colony spread out into the water powers of the Piedmont section, now the true textile Alsace-Lorraine of the United States.

It is surprising to learn that many of the outstanding men, noted for leadership, were opposed to the cotton mills, in their economic development of South Carolina. Jefferson was bitterly opposed in his early days to the cotton mills, and John Randolph said:

"The mills in the South would bring yellow fever, not in August, but from June to January, and from January to June."

John C. Calhoun expressed his sentiment with the following words:

"It is better for us that our cotton should go out in yarn and goods rather than in the raw state."

About 1816 many New England settlers came to the upper part of South Carolina and laid the foundation for tens of thousands of spindles which in due course of time were to hum in the Piedmont area. Among these pioneers were George and Leonard Hill, W. B. Sheldon, William Bates, a close relative of Hammetts, the owners and operators of the Chiquola Cotton Mill at Honea Path, John Phillip and Lindsay Weaver, and James Edward Henry.

(continued on page twenty-three)
Government Cotton Spinning Laboratory
At Clemson College
Laboratory Aids Farmer And Spinner

Since 1921 the United States Department of Agriculture, in cooperation with Clemson College, has maintained a cotton spinning laboratory in the Textile School at Clemson. Here samples of cotton ranging from a few ounces to 50 pounds or more are manufactured into yarns, cords, and fabrics, and the products subjected to many tests, to provide accurate information on the manufacturing quality of the cottons and the serviceability of the products made from them. This information, in turn, plays an important part in the broad Federal State Cotton Research Program being conducted by several Bureaus of the U. S. Department of Agriculture, in cooperation with the various cotton producing states.
Several rather distinct applications are made of the results obtained from the spinning laboratory at Clemson. These include: the evaluation and calibration of the grade and staple standards; the evaluation of the results from experiments in the breeding, production, harvesting, ginning, and handling of cotton; the correlation of the properties of the cotton fibers to those of the yarns, cords, and fabrics manufactured from them; and the development of more precise methods of getting the potential value out of cotton during manufacturing. Some of these factors are described in greater detail below.

The staff of the cotton spinning laboratory at Clemson College, headed by J. M. Cook, consist of 11 persons of whom 9 are technical and 2, clerical workers. A similar laboratory established in 1936 is now in operation at College Station, Texas, in cooperation with the A. & M College of Texas. Both the South Carolina and Texas laboratories, known, respectively, as the Eastern and Western Regional spinning laboratories, are under the direction of M. E. Campbell, whose headquarters are in Washington. The spinning work, together with the ginning investigations conducted at Stoneville, Miss., and the physical, chemical, X-ray, and color investigations in Washington, constitute what is known officially as the Cotton Utility and Standards Research Section of the Division of Cotton Marketing. Dr. R. W. Webb is in charge of all of the work of this section.

The textile machinery used in the tests at Clemson for the most part is of regular commercial design, cut down in length in some instances and containing some modifications to adapt the equipment to the special requirements of the test work. For a number of years, use has been made of some of the spinning equipment in the old Textile Building at Clemson. With the completion of the new building the project has moved into new quarters, and at the present time an effort is being made to obtain a complete series of new machinery for use in this experimental work.

The manufacturing tests are conducted under rigidly-specified humidity conditions, maintained by automatically-controlled humidifiers. In the laboratory where tests are made of yarn, cord, and fabric, both temperature and relative humidity are controlled to "standard" conditions — 70 degrees F. and 65 percent R. H.

The equipment and apparatus in the yarn and fabric testing laboratory are unusually complete, and include the most modern devices available for textile testing. Among the machines to be found there are the following: tensile strength testers for yarn in single strand and skein form, and for cord and fabric; automatic yarn reel; motor-driven rotary racks for conditioning specimens; inclined-plane tester for yarn and cord, for tensile and repeated-stress tests; fabric bursting-strength tester; yarn numbering quadrants; twist counters; sliver evenness tester; roving tester; electric oven for determining moisture regain; stroboscope for studying the action of travelers, fliers, and other fast moving parts; several types of tachometers; complete equipment for making cotton fiber quality measurements; microscopes, chemical balances, and many other important pieces of equipment. Some of the equipment was designed and constructed by members of the technical staff. Two of the most important and interesting pieces of apparatus were imported from England. These are an automatic single-strand tester, and a device known as a Shirley analyzer. This latter machine was developed at the Shirley Institute near Manchester, and is used for making precise measurements of the foreign matter content of small samples of cotton.

(continued on page twenty-two)
Differences In Quality Of Rain-Grown
And Irrigated Cotton Shown By Tests

Preliminary results of spinning and fiber tests on irrigated and rain-grown cotton from the 1939 crop were released on November 12, 1940 by the Agricultural Marketing Service.

Manufacturers have claimed that irrigated cotton has more waste than rain-grown cotton, produces yarn of lower strength, produces yarns and fabrics that are unsatisfactory in appearance, is harder to spin, and is difficult to dye. These claims and their reflection in price differences between rain-grown and irrigated cotton were responsible for the study by the Agricultural Marketing Service.

Samples for the tests were gathered during the 1939-40 season from the Memphis territory, which includes Mississippi, Arkansas, and Louisiana; from California; and from the Arizona-New Mexico-Southwest Texas territory. The samples, believed to be representative of the crop in each area, were packaged and shipped to the U. S. Spinning Laboratory at Clemson, S. C. There they were spun into yarns and tire cords and woven into cloth under controlled laboratory conditions.

Grade for grade these tests showed that cottons having staple lengths of 1 1/16 and 1 3/32 inches produced in the Memphis territory yielded less manufacturing waste than those from sections where the cotton was grown under irrigation. But the longer staple 1 1/8 inch cotton produced in the Memphis territory was somewhat inferior to California cotton from the standpoint of waste.

The tests showed that yarns spun from cotton having staple lengths of 1 1/16 and 1 3/32 inches produced under rainfall conditions in the Memphis territory were neither consistently higher nor lower in strength than those produced under irrigation in California. But yarns made from 1 1/8 inch cotton from the Memphis territory averaged about 4 percent stronger than those made from California cottons. In all three staple lengths, cotton produced in the Memphis territory yielded yarns 2 to 11 percent stronger than those made from irrigated cotton from the Arizona-New Mexico-Texas region.

Rain-Grown Cotton Yarns Show Satisfactory Appearance

In appearance, yarns spun from rain-grown cotton were more satisfactory than those spun from irrigated cotton. Yarn appearance is measured by comparison with standards prepared by the Agricultural Marketing Service which show variations in neps, foreign matter, and evenness of yarns. Differences in yarn appearance are reflected in cloth manufactured from the

(continued on page twenty-four)
Something About Our Faculty

By J. W. Howard, '41.

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

Mr. McKenna was graduated from the Melland School of Design in 1922. He then gained three years of experience in the industry, working in the card and weave rooms. He left the mill to come to Clemson to teach in 1925. He served in this capacity until 1929, when he was granted a one year leave of absence to complete work on his B. S. degree, receiving this degree in 1930 from Clemson College. The work on this degree consisted of general engineering and academic work. Mr. McKenna received his Master's degree from the University of Tennessee in 1933. Since then he has written numerous articles relating to the weaving of fancy fabrics, most of them appearing in the Melland Textile Monthly. He and Mr. A. E. Shinn are co-authors of the article "Weaving Fancy Meshes On The Slotted Doup." He is a member of several national fraternities, among them being Phi Psi, honor textile fraternity. Mr. McKenna, beginning his sixteenth year at Clemson, has done much to improve the Weaving and Designing Department, and we feel certain that he will look to the betterment of this department in the future.
G. H. DUNLAP  
Acting Asst. Prof. of Carding and Spinning

Mr. Dunlap was graduated from Clemson College in 1928. He immediately assumed a position with the faculty upon graduation, a position he still holds today. Before entering Clemson, Mr. Dunlap worked in the card and weave rooms of Aragon Cotton Mills in Rock Hill, S. C. He has done rather extensive work in textile research, working with the U. S. Department of Agriculture in this capacity. He has written, in conjunction with Mr. Willis, several articles, among them being "Comparative Spinning Tests of Cotton Grown in Texas in 1932," "Cotton Spinning," and "Textile Mathematics." Mr. Dunlap attended the University of North Carolina Summer School in 1935. His graduate work consists of courses at The Massachusetts Institute of Technology in 1936, and work at Pennsylvania State College in 1939 and 1940. Mr. Dunlap is a member of Phi Psi, honor textile fraternity. He is at present teaching spinning and textile mathematics. Textile students look upon Mr. Dunlap as a friend and a councilor as well as an instructor, due to his ready willingness to help whenever problems confront them.

T. A. CAMPBELL  
Assistant Professor of Weaving and Designing

Mr. Campbell was graduated from The Clemson Agricultural College in 1928. Upon leaving Clemson, Mr. Campbell accepted a position at Chester High School, where he taught bookkeeping and mathematics. He left Chester to join the Aragon-Baldwin Cotton Mills, where he served as assistant to the Secretary and Treasurer. He stayed with this company during the years of 1930-1931, after which he left to work with Ralph E. Loper and Co., where he remained seven years.

Mr. Campbell has done graduate work at Pennsylvania State College and Clemson College. He is the author of "Elementary Textile Costing," the textbook used by the students studying costing. He is a member of Phi Psi, honor textile fraternity, and is also a member of Iota Lambda Sigma, another nationally known fraternity. Mr. Campbell is married and has two children. His hobbies include raising and cultivating flowers and collecting stamps.

W. G. BLAIR  
Assistant Professor of Carding

Mr. Blair was graduated from the New Bedford Textile School in 1908, majoring in cotton manufacturing. He accepted a position with the Whitin Machine Works demonstrating the Whitin comber in the Eastern and Middle Atlantic states. He was then placed in charge of comber experimental work on waste with the Whitin company at the Ashburn Waste Experimental Plant, Ashburn, Mass. Mr. Blair later served one year with the Johns Mansville Co., trying to improve the manufacturing and standardization of asbestos products. He accepted a position as overseer of carding with the then nationally known Dexter Yarn Co., Pawtucket, R. I.

Mr. Blair came to Clemson to teach carding and spinning, in which capacity he most ably served from 1914 to 1920. In 1920, he went to work with the U. S. Department of Agriculture, where he was placed in charge of cotton spinning research. In 1924, he joined the Armstrong Cork Co., as textile advisor, the work dealing with the introduction and improvement of cork covered top rolls for the carding and spinning rooms. In 1927 Mr. Blair then experimented with the actual raising of cotton on a small place just outside the city of Greenville, S. C. He returned to Clemson in 1936 as assistant professor of carding and spinning, in which capacity he is serving us most capably and efficiently at the present time.

* * *

The Clemson textile department has maintained the unique record over the past 13 years of having placed all of its graduates who wanted to secure jobs in textiles or allied industry.

MR. JOHN T. WIGINGTON

John T. Wigington finished the textile course at Clemson Textile School in 1923. He is in charge of the Government Spinning Laboratory, Cotton Division, U. S. Department of Agriculture, College Station, Texas.
The Editors' Page

SPECIAL TO FRESHMAN TEXTILE STUDENTS

Psi
Phi
Fraternity

WOULD YOU LIKE TO BECOME A MEMBER?

Probably you have noticed some textile students lately who were carrying a shuttle suspended from their necks, had peculiar marks painted on their cheeks and carried boxes full of mints, chewing gum, and cigarettes. Perhaps you wondered what it was all about. In case you did not find out, these men were being initiated into Phi Psi; the highest honor that can be accorded a textile student at Clemson. What is Phi Psi? Phi Psi is the national honor textile fraternity. Its requisites for membership are high scholastic standing, high moral character, and extra curricular activities. Those standards are met by a select few, and it is the purpose of this editorial to get you to think about being a member of this select few. Now is the time to think ahead to your Junior or Senior year—you can be chosen for membership either year, and decide that when you reach this stage of your college career, you will be eligible for membership in this great fraternity of textile men. Your decision to make that extra effort so necessary for this achievement must be backed by hard work during the ensuing years. You will be amply rewarded for your efforts, however, when you have finally reached your goal. Come on, Freshmen, start working now towards an excellent end, Phi Psi membership.

—G. W. C.

AGAIN, WE SAY, “THANK YOU!”

The Bobbin And Beaker was organized in November 1939 by the members of Iota Chapter of Phi Psi, national honor textile fraternity at Clemson. The first issue of the magazine was published in March 1940. A copy of the magazine was given to each Textile student, and a copy was mailed free-of-charge to every mill in South Carolina, North Carolina, and Georgia. Two-hundred copies were carried to Philadelphia and distributed to the delegates to the 37th annual Phi Psi convention by the two delegates from Iota chapter.

This year the Bobbin and Beaker was turned over to the students of the textile school.

Dean Willis has given the staff of the Bobbin and Beaker a well-lighted, heated, and well ventilated room which is just across the hall from the Psi club room.

Again, we wish to say that we appreciate the cooperation of Dean H. H. Willis of the Clemson Textile School, and of the Clemson College Business Manager and his staff who have rendered practical advice and aid. We appreciate the article by Professor G. H. Dunlap. We are grateful to Mr. J. M. Cook, head of the cotton testing laboratory of the U. S. Dept. of Agriculture at Clemson for the valuable information he contributed to the magazine. We thank the students for the articles they have written and also those students who have been ever-willing to render any assistance possible.

Above all, we thank those who have made the publication of the magazine possible by advertising through The Bobbin And Beaker, and we sincerely hope that our services will prove as valuable to you as yours have to us.

—W. R. O.


R. J. Cheatham, Clemson textile graduate of 1916, is in charge of the Manufacturing Division of the new Regional Laboratory, U. S. Department of Agriculture, New Orleans, Louisiana.
"Clemson's School of Textiles Trains Young Men For Work in Mill Industry Over Nation"

Completely surrounded by the South's greatest industry—Textiles—Clemson College has developed one of the most complete and efficient textile departments to be found in any American college.

Bachelor of Science degrees are offered in three major courses of study, Textile Chemistry and Dyeing, Textile Engineering, and Weaving and Designing, and at present a total of 340 students are enrolled in the Clemson school, 95 of these are candidates for degrees at the end of the current school year.

Established in 1896, the Clemson School of Textiles became the first in this country to become affiliated with a college and for this reason is generally accepted to be the oldest School of Textiles in America. There are older textile schools that are not connected with a college or university. The Clemson textile students also gives Clemson the distinction of having the largest full time day student enrollment.

Directed by Dean H. H. Willis, a Clemson graduate of 1917, who returned to his Alma Mater to head his department in 1930, the Clemson School of Textiles offers the textile student a curriculum designed to give preparation for any branch of the textile industry. Additional work and elective courses enable students to adequately prepare themselves for positions as designers, salesmen, research laboratory technicians, technical journalists, and cost and management experts.

REORGANIZATION OF COURSES EFFECTED

In the past two years the Clemson College Textile faculty has undertaken the reorganization of textile courses at Clemson and the preparation of textile teaching material especially adapted to the ever-changing conditions of the industry. The work has been carried on in cooperation with the Textile Foundation and covers all subjects in yarn manufacturing from the cotton grading through the finished spinning. The Clemson faculty now plans to continue the work by teaching weaving subjects.
Where Some Of
Our Textile Graduates
Are Located

J. J. Norton, Jr., completed the textile course at Clemson in 1925. He is now superintendent of Goodyear-Clearwater Mills, Cedartown, Ga.

Roland L. Lee, Jr., finished the textile engineering course at Clemson Textile School in 1925 and is now Head of the Textile Engineering Department, Texas Technological College, Lubbock, Texas.

J. F. Blackmon, Clemson textile graduate of 1916, is general manager of Pelzer Mills, Pelzer, S. C.

J. A. Fewell completed the textile course at Clemson in 1925 and is now with the Burlington Mill, Radford, Virginia.

J. E. Garvin finished the textile course at Clemson in 1920. He is manager of the Blue Ridge Rayon Mills, Alta Vista, Virginia.

Chas. D. Green, Clemson textile graduate of 1928, is general manager of Mills Mill, Greenville, S. C. and Fairforest Finishing Company, Spartanburg, S. C.

M. L. Hall completed the weaving and designing course at Clemson Textile School in 1932. He is superintendent of weaving at Ranlo Manufacturing Company, Gastonia, N. C.

J. D. Jones, Clemson textile graduate of 1915, is general superintendent of Union Buffalo Mills, Buffalo, S. C. He has a son, J. D. Jones, enrolled in the senior class at Clemson Textile School this year.

J. P. Kinard, manager of Cotton Grey Goods Department, William Whitman Company, Inc., 40 Worth St., New York City, finished the textile course at Clemson in 1922.

J. R. Swetenburg, superintendent and purchasing agent for Gluck Mills, Anderson, S. C., finished the textile course at Clemson in 1922.

WILLIAM G. ASHMORE
By GORDON E. WILLIAMS, '42

The faculty and students of the Textile School at Clemson are always glad to hear of the achievements of former students. It was with great pleasure that many of them recently read of the signal honor accorded "Bill" Ashmore of Greenville when he was asked to write an article on the textile industry in South America for the Encyclopedia Britannica.

"Bill", as he was known, was a charter member of the Blue Key at Clemson, a member of Phi Psi, a captain on the regimental staff, a charter member of the C. D. A., and editor of the "Tiger". Besides these Bill belonged to many other campus organizations, and when the Gamma Alpha Mu was organized, he was made an honorary member.

Upon graduation, he joined the staff of the "Textile World" of which he is, incidentally, now the Southern editor. In 1939 Mr. Ashmore made an extensive tour of South America, studying the conditions and trying to get a cross-section of the opinion of the people of that country. Spending around five months down there, he interviewed native business men, foreign ministers, and American business men, staying much of the time on coffee plantations and in native homes.

Of interest to the textile students is Mr. Ashmore's opinion on the opportunities for the young man in South America. "With capital, initiatory, and a sound knowledge of conditions, the chances are that an American with modern management and machinery could do very well in South America. However, this same man with capital and other requisites could probably do all right at home."

Concerning everyone now is the political interests of South America. Mr. Ashmore was kind enough to give the writer his opinion on this situation. "Most of the native citizens of those countries do not want to be dominated by Germany or Nazism, but they will have very little choice if Germany wins this war. In several of the countries there already is a large body of German-born population and pro-Nazi sympathizers. The United States will have to reorganize its economic and political thinking if we are to keep Europe out of the Western hemisphere. Dollars and guns are worth more than all the treaties we can make with Latin America."
Phi Psi Activities

By G. W. Kirby, '41

Recently inducted into the Clemson Chapter of Phi Psi (Iota Chapter) were twelve outstanding textile students and one faculty member. This is the largest number of new men ever to be inducted into the Clemson Chapter of this honorary textile fraternity at one time. This increase in initiates was voted on by the oldest members at a recent meeting, because they felt that the expanding Textile School warranted the expansion of the Phi Psi membership quota.

These initiates, "worms," as they are called during Phi Psi initiation, are required to carry shuttles for a period of two weeks, furnish mints, candy, and cigarettes to the old members known as "generals", and to do any other thing the nimble minds of the generals can concoct.

To these initiates "The Bobbin and Beaker" extends its heartiest congratulations for their wonderful achievement, and wishes for them continued success at Clemson and in their chosen field of endeavor after leaving Clemson.

PHI PSI CLUB ROOM

The Phi Psi Club room has had its face lifted this year. All of the old furniture has been worked over or discarded and new seat covers have been placed on the cushioned chairs. A new radio with a record changer has been installed, and most of the currently popular songs as well as some old favorites are represented in the record rack. The floor has been thoroughly cleaned, and attempts are being made to secure rugs for it. The number of pictures on the wall has increased, and now the club room has that old "homey touch." Incidentally, the latest magazines, both popular and technical, are always on hand to help pass that idle time. What idle time? A number of the members now find that the club room is an ideal place to study, and are taking full advantage of this feature.

Phi Psi is well represented on the staff of The Bobbin and Beaker this year. Genial, efficient Bill O'Shields is editor of the magazine. Wade Carder is capably serving in the capacity of business manager, while Gus Wham tells the world about The Bobbin and Beaker from his post as publicity agent. G. Walker Kirby and "Duck" Howard are collaborating as managing editors; while Dick Osteen and E. W. "Chick" Dunham are really working hard on the advertising staff. Sam Jenkins is slated to handle the circulation end of the magazine. A. C. Nalley is associate editor. These men are just carrying on the good work of other Phi Psi men who published the first issue of The Bobbin and Beaker.
N. Y. A. and The Textile School

By M. D. Moore, '43

The National Youth Administration plays a great part in the textile school at Clemson. At present, there are forty students, majoring in textile courses, who help defray their expenses while in school and who obtain a better understanding of the textile industry by the aid of the National Youth Administration. The type of work varies; very few students do the same kind of work.

More students are employed in the department of carding and spinning than any other department. In this department, eleven boys each day obtain a better understanding of textile machinery and the textile industry by practical experience. G. W. Kirby, a textile engineering senior, is student supervisor of most of the NYA students in the spinning department. Professor G. H. Dunlap is the faculty supervisor. The general work of the students is to operate carding and spinning machinery; however, there are many other duties to be performed. Machines are often tested for production; machines must be cleaned and oiled in preparation for classes; papers have to be graded, and numerous other duties are required of students.

The department of chemistry and dyeing affords work for six students. However, these students spend practically all their spare time at work and are kept very busy in performing their various assignments. Professor Joseph Lindsay, Jr., head of the Chemistry and Dyeing department, is faculty supervisor of these students. NYA students in this department prepare reagent solutions, wind yarns, prepare all types of textile fibers for use in the laboratories, as well as assistant in dyeing and bleaching semi-practical lots of material for the other departments of the Textile School.

In the department of Weaving and Designing are ten boys who profit immensely by NYA work. Most of these students work under the supervision of Professor A. E. McKenna, head of the weaving and designing department. L. E. Gatlin, Jr., a textile engineering sophomore, is assigned to the post of student loom-fixer. Before entering college, Gatlin was employed for two years as loom-fixer for one of the mills in his home town. Other types of work done by students in the weaving and designing department include operating of winders and looms, and the cleaning of bobbins. Students must also keep the machinery clean and well oiled. They must always be on the lookout for faults in the machinery and report all defects to their supervisor. NYA students must always keep enough products of their machinery on hand for use in classes in the textile course.

In many ways NYA students are being benefited by the program. They are being paid a salary for the work they do, but an even greater compensation than the salary is the knowledge and self-confidence they receive through practical experience in the operation of mill machinery and the solving of problems which confront men every day in the textile industry.
Determining End Breakage In Spinning

By WILLIAM R. O'SHEILDS, '41

Very often a mill executive likes to know in exact figures just how his spinning is running. As a general rule a spinner will say that his spinning is running either "good" or "bad" not knowing in exact figures just what he himself means by "good" today and "bad" yesterday. Today, keen competition has made it absolutely necessary to make every day in the spinning room a day of "progress" instead of a day of "chance."

Many methods have been used in determining end-breakage in spinning, but probably the most accurate way is to have a disinterested party do the testing. By this method the tester has no connection with those who would like to see the test show up better than usual. nor does he have any connection with those who would like to see the test show up worse than usual.

Above all, the tester should know how to approach the spinner, for the approach to the spinner can "make or break" the test. The tester should explain to the spinner exactly what he intends to do and that he is not a "minute man" and is not checking up on her work, but upon the efficiency of the machine and the existing spinning conditions. With just a simple explanation he is able to get the cooperation of the spinner and therefore makes the test easier and much more valuable. One who does not use tact in his approach to the spinner should not be used to make an end-breakage test.

An end-breakage test can be made easier by using forms which contain all data the tester should obtain before starting the test and should also contain all headings and classifications which the tester is to use while making the test. A complete list of the most common causes of end breakage makes the test much easier and the time necessary to take the test much shorter.

It is suggested that the courses be classified under Material, Machine Operation, Cleaning, Doffing, and Unclassified. A high percentage of Unclassified end breakage gives no indication as to the ability of the tester. The tester who has a relatively higher percentage of unclassified might be perfectly honest in classifying the causes and those of which he was in doubt he placed under unclassified and proves to be a better tester than the one with a low percentage of unclassified.

It is also suggested that tests be made at two periods of the day, one on the morning shift and one on the evening shift each period being approximately three hours long, for the tester will usually give a more accurate report up to three hours, but after three hours the tester becomes tired and his efficiency decreases.

In making an analysis of the results of the test, the possibilities are great for an executive with an analytical mind to determine exactly where his greatest troubles really occur. If the results of these tests were discussed with the overseer of carding and the overseer of spinning the carder could be on the lookout for the causes for the end-breakage resulting from the material being produced in his department, such as, the number of hard-ends made in the card room, bunches in roving resulting from improper and inadequate cleaning of the frames, improper settings, and careless "cleaning-down" overhead. The spinning room overseer could be on the lookout for causes of end-breakages under "Machine Operations", "Cleaning" and "Doffing". See that the rings are given proper care, the traveller changed at the proper time, and that the steel roll and top rolls are not injured by the spinners hook, knife, or fingernails.

If the mill executive knows definitely from where his trouble comes, he can combat the trouble much more effectively, and the test also enables him to see at a glance which way to strike to eliminate the troubles.

The first artificial silk ever to be produced commercially was made from nitrocellulose, a substance formed by treating cellulose with nitric acid. In plastics and explosives, it is still important. The abandonment of this method has been due to its higher cost and to the improved qualities of viscose and acetate rayons which have given them preference for textile purposes.
History Of Rayon
By M. D. Moore, '43

Rayon, a textile fiber made from modified cellulose, is fast becoming more and more in demand by American and foreign consumers. Because of its many types and advantages, rayon is rapidly displacing many textile fibers which, until now, have played very important parts in the textile industry.

The leading rayon process is that of using the solution known as viscose, discovered in 1892 by two English chemists, Cross and Bevans, who treated wood pulp with caustic soda and bisulphide of carbon to form a plastic cellulose compound readily soluble in water.

Prior to 1900, extensive laboratory experiments for the production of viscose artificial silk were made in Massachusetts; the first commercial production was started in Lansdowne, Pa., in 1903, and several hundred pounds per week were produced at the plant during the following five or six years. This plant failed financially because the product was too irregular in quality and too costly to produce on a small-scale. The first large-scale production of viscose rayon in America began in a plant erected by an English company, at Marcus Hook, Pa., in 1911, under the direction of the American chemist, Dr. Charles A. Ernst, who had first become engaged in viscose rayon research in the earlier small-scale production in Lansdowne, Pa. The new company controlled the basic viscose rayon patents and during the next ten years earned enormous profits as it was the only successful large-scale producer of rayon in the United States. After the expiration of the early viscose patents numerous other companies began operation here. Today there are dozens of large-scale producers of viscose rayon scattered over the United States. Approximately 75 percent of the rayon yarns now made in the United States are viscose.

Second in importance are yarns made from cellulose acetate, which type of cellulose was discovered in 1869 by German chemists Naudin and Schutzenberger, but its use was confined to plastic for many years. Cellulose acetate is made by treating purified cotton linters with acetic acid and acetic anhydride. In 1894 Cross and Bevan, the English chemists and inventors of the viscose solution, also patented a method of producing electric light filaments from cellulose acetate, and a German chemist, Emil Bronnert, made the first cellulose acetate textile yarn experimentally in 1899. Commercial production of cellulose acetate yarn was started in the United States in 1915, but no large-scale production began here until 1925, when a cellulose acetate plant at Cumberland, Md., built during the World War to supply aeroplane dope, was equipped to produce textile filaments from this material. The production here was under the direction of the brothers, Henry and Camille Dreyfus, Swiss chemists, who now operate similar plants in England, France, and Italy. Cellulose acetate yarns now account for almost twenty-five percent of the rayon produced in the United States. The cellulose acetate rayon process is more costly than the viscose method, but the yarn, because of its waterproof qualities, sells at a higher price for some purposes.

The third rayon process is the cuprammonium method in which cotton linters are treated with copper salts and ammonia to produce a solution from which the filaments are formed. This solution of cellulose was invented in 1857 by the German chemist, Schweitzer. The solution was first used for making filaments for electric lamps by Weston in 1882 and a French chemist, Despaisis, was granted the first patent for making a cuprammonium artificial silk in 1890. It earliest commercial development was in Germany in 1897 under the patent of Herman Pauly. During the next decade various attempts were made to establish rayon plants using this method in the United States, but none were successful here until 1924, when an American branch of the leading German manufacturers using it erected a plant in Tennessee. One other similar plant has been erected here since then, but the product is more costly to make than viscose rayon and domestic production by this method is now estimated at less than three percent of the total made here.
Carders And Spinners Meet

By G. W. KIRBY, '41

The fall meeting of the South Carolina Carders and Spinners Division of the Southern Textile Association was held on Oct. 12, 1940 at Clemson College, Clemson, S. C. Dr. Watson opened the meeting with a prayer, after which H. H. Willis, Dean of Clemson's Textile School, introduced Dr. R. Franklin Poole, Clemson College's new president. Dr. Poole welcomed the carders and spinners and stated that the facilities of the Textile school are at their disposal at all times. He spoke of the two objectives of the Clemson Textile School, which are (1) to train students for the textile industry, and (2) to aid the textile industry by doing research work.

The highlight of the program was an interesting speech on national defense by Major G. Heyward Mahon, Greenville, S. C., who is chairman of the defense program for South Carolina and a former member of the Military Affairs Committee of the House of Representatives. Maj. Mahon was introduced by the chairman of the meeting, Mr. W. T. Morton of Monarch Mills, Union, S. C.

In his speech Major Mahon said that national defense had been his hobby for many years, and that during his tenure of office as representative from S. C., he had urged, and had been laughed at for so doing, an adequate national defense. He lauded the present administration for having done more to adequately prepare this country for defense than any other administration.

Major Mahon emphasized the fact that our National Defense Committee was wisely chosen, because it has been functioning smoothly and efficiently since its inception. "Every man, woman and child can best aid the defense program by doing the job you are doing now as well as you can," said Major Mahon. "The National Defense Committee, in addition to the production of defense goods, is endeavoring to keep the normal way of living and the normal production on ordinary goods going."

Major Mahon concluded his speech with a rousing denunciation of "slackers" and "profiteers" who try to harm the country instead of helping it. "What this country needs," according to Major Mahon, "is a revival of old-fashioned patriotism."

The speaker volunteered to answer any question on defense the audience wanted to know about, and several questions were asked.

One question was asked about the effect of the draft upon textile employees. Major Mahon answered this by saying that all essential men engaged in the production of government defense products would be exempted from the
Summer Employment
By G. W. Kirby, '41

Of inestimable value to any textile student is summer employment which gives the student the practical experience so necessary to supplement theoretical training received at school. The advantages of summertime employment to the textile student are many-fold. Chief among these is the better understanding of class room work, because the student has seen a practical application of the theory studied in class. Frequently students with practical experience are called upon to explain something in the class room or in one of his numerous labs. The professors notice such students as this more quickly than other boys, and this may enhance the student's grade which certainly is to the student's benefit.

A very important part of summer-time employment is the contacts made in the textile industry itself. Frequently, because of his summer work in some plant, a student is hired upon graduation by that plant or some other plant to whom he has been recommended. Only by contact or association with something do we get to feel a liking or disliking for that something, and what better way is there for a student to find out if he likes or is suited to textiles than by working in a textile plant during his vacation periods? Many boys earn part of their school funds by virtue of their summer employment. The advantages to the student are many, and the only disadvantage is the forfeiture of his summer vacation.

Benefits of summer work do not confine themselves solely to the student; prospective employer's of the students are immeasurably helped in several ways. In the first place they get students who can go into a plant and assume positions of responsibility more rapidly than a man of theoretical training only. Employers are often able to judge a student's ability while he is serving his summertime apprenticeship, and when this student graduates, the employer can offer him a job with confidence in that student's ability to make good. Students employed on part time jobs frequently run tests for the mill which sometimes result in savings for the management. The employers get better trained men, because students with practical experience understand their theoretical training better and get more from it which makes them more valuable to an employer.
Wool—Yesterday and Today

By J. W. Howard, '41

Wool manufacturing in the United States is nearly as old as the country itself. But the history of wool dates back much further than the discovery of America. Wool was used for clothing in China before silk made its entry, and in Egypt before cotton was used on a commercial scale. The sheep from which we get our wool were supposed to have been brought here by an expedition of Mexicans, intent on settling in Arizona and New Mexico.

Sheep raising is now done on a commercial scale in every one of the forty-eight states. Rhode Island has the lowest production of wool, with about 12,000 pounds per year, while Texas leads with about 63 million pounds early. The United States is second only to Australia in the production of wool yearly, with Argentine ranking third on this list. The quality of the wool produced in the United States is as fine as any produced today.

One rather interesting point to observe is the fact that the American people are using far more wool today than ever before, yet there are fewer mills today producing woolen goods. Naturally, this point brings a question to mind as to how this could be possible. The answer to this rather perplexing problem is that large plants are slowly absorbing the smaller ones and installing precision-built, higher-speed machinery.

Despite the fact that wool is not used any longer for certain types of clothing, government figures indicate the use of wool has steadily grown. About 281 million pounds of fleece wool was grown in 1910, and about 40 million pounds of pulled wool was produced. Also, about 94 million pounds of wool was imported for use in this country. This gave a total of 415 million pounds of wool available for manufacturing purposes in 1910, and this figure increased to 532 million pounds by 1936.

At the turn of the century, many of the small mills were run by small cliques, usually families. This worked fine as long as demand stayed ahead of supply. The World War, however, upset the whole system of things, and it became necessary to greatly increase the supply to meet the tremendous demand the war placed upon the woolen industry. At the end of the war, consumption decreased so rapidly that many of the small mills were forced to close. Productive machinery began taking care of the woolen needs for the first time. Only the large mills were able to keep their machinery running, and the demise of the small mill soon became apparent.

As business moved to the larger plants, in order to maintain their status in the industrial world, much new machinery was developed along with new methods of manufacture. Much more expense in the form of high labor costs, increased taxes, and unionization was introduced to the industry. Little change was made in the preparatory machinery, speed being the only factor changed. The greatest change has taken place in the carding and spinning departments of the mill. Space does not permit the writer to explain in detail what changes were made, but suffice to say, greater production and speed have been attained through these changes.

But what of the woolen industry today? Can it withstand the tremendous competition placed upon it by the numerous synthetic fibres that have been placed on the market in the past few years? Let us examine a little more closely the factors that are cutting off the very life blood of the woolen industry. Adjustments can be made by manufacturers to change from processing natural fibres to synthetic fibers. The real threat to the woolen industry is the transfer of the manufacture of certain types of fabrics to other groups. It is plainly evident that rayon has brought many problems to woolen manufacturers. At first, mill men scoffed at the deal that rayon could possibly take the place of natural fibres, but today they seem to be grasping at the last straw, figuratively speaking. Woolen manufacturers no longer mix rayon with wool for a novelty effect, as was first the case. It is now being done because rayon is threatening to become a substitute for wool. The question naturally arises, "What can the woolen manufacturer do?" He can sit tight and watch the cotton mills move in on him, or he can fight this invasion by renovating his plant, changing personnel, etc., until he is ready to answer the challenge flung out to him by the invader.
GOVERNMENT COTTON SPINNING LABORATORY AT CLEMSON COLLEGE

(continued from page eight)

The U.S. Department of Agriculture, through its Bureau of Plant Industry, and through its fiber and spinning laboratories, is endeavoring to find ways and means by which the farmers can produce better cotton. While this has always been desirable, the need for better cotton has never been as urgent as it is now. First, if the United States can hope to regain and maintain for its cotton the relative position in the world's markets that it once held, it must produce better cotton than its competitors. And these competitors, aware of this fact, are themselves attempting to produce cotton of better quality. Second, American spinners are becoming more "quality conscious." With the increased use of research in the textile industry, cotton manufacturers are paying more attention to the quality of their products and, consequently, to the raw material used.

How does the quality of cotton grown under irrigation in the Southwest compare with that of rain-grown cotton in the main Cotton Belt? What were the reasons for the relatively poor spinning quality of the 1937 crop, reported by so many spinners? What is the new Sea Island like? How does the new Sakel x Pima cotton compare with Pima? What affects does speed of gin saws have on the quality of cotton? Is the quality of lint picked with new cotton picking machines as good as that of hand picked cotton? What happens to the spinning quality of cotton if the fibers in the bale are highly immature? What is the best temperature to use with the recently-developed cotton driers now being used at so many Gins? Does storage affect the spinning quality of cotton? Are the fibers injured when the bale is compressed to "high density?" These are a few of the many practical questions which the spinning work at Clemson College is concerned with.

Cotton research laboratories in various parts of the world are concentrating on ways and means of predicting the manufacturing behavior and service performance of cotton free from a new quick and inexpensive laboratory test. Until such a Utopia is reached, however, nothing can take the place of a manufacturing test, properly conducted under adequate conditions.
THE DEVELOPMENT OF THE TEXTILE INDUSTRY IN SOUTH CAROLINA

(continued from page six)

It is not definitely established who was responsible for the erection of the first cotton mill in South Carolina. There are divided opinions, some believe the Weavers, while others think the Hills should be given the distinction. Anyway, the records show that the Industrial Manufacturing Company, founded and erected in Spartanburg County by the Weavers, soon went bankrupt, and next we find the Weavers located in Greenville County, where they erected a mill on the Tyger River.

Many historians are positive that the Hills erected a mill in Spartanburg County in the year 1816. The mill does not exist today but the property now belongs to the Enoree Manufacturing Company.

William Bates, after failing in his adventure in Spartanburg County, moved to Pelham, South Carolina and started the operation of a mill.

As to the development in Greenville County Col. S. C. Crittenden states that there were three mills in the county during the year 1835. One was Vardy Mcgee's, on Reedy River, six miles from the village of Greenville; another known as the Weaver Mill was situated 19 miles north of Greenville, and the other was the Batesville Cotton Mill, located on the Enoree River ten miles east of Greenville, and was owned by William Bates.

According to the records of time a cotton mill was erected at Autun, South Carolina, now known as LaFrance, in 1838. It was built by B. F. Sloan, Thomas Sloan, and Berry Benson. The plant was capitalized at $50,000 and was operated by water power. It is claimed that this is the oldest mill in the South in continuous operation.

In 1846 William Gregg built the first big mill in South Carolina. The plant was located at Cranitveille and contained 8400 spindles and 200 looms. It was only after a long and bitter fight in the General Assembly that Gregg secured his charter for the organization of his mill. The application for the charter remained in the hands of the General Assembly for several years, and finally a favorable report, by the nine committee men on manufacturing, was reported showing a majority of one.

The epoch marking periods in South Carolina of the cotton mill industry may be dated in the year 1847, when the Graniteville Company first put its goods on the market, and the early eighties when other pioneers began to see the possibilities of the greatest industry in our state.

By 1860 the cotton mill movement had expanded to such an extent that no one could deny that the manufacture of cotton cloth was supplementing the raising of cotton. The textile industry and agriculture by 1860 had joined together and created a dual system of wealth that placed the state third in the per-capital wealth of the United States.

There were eighteen mills in South Carolina at the beginning of the Civil War and only eleven survived, nine of the eleven were in Greenville and Spartanburg counties. Emerging from the catastrophe with only eleven mills, by 1830 the number had increased to fourteen. In the chaos of the period the development of more than its practical dormancy until the movement of 1880. Then in the same spirit of wisdom and courage with which General Robert E. Lee turned to his broken South, an unusually able group of men came forward to build up and guide the present-day textile industry. The movement from its emergence about 1880 until the present is purely a picture of industrial romance. The deans in this school of romantic adventure were D. E. Converse, Lewis W. Parker, Captain Ellison A. Smyth, Col. J. P. Hammett, Dr. W. C. Hamrick, Captain J. H. Montgomery, Leroy Springs, and D. A. Tompkins, whose field of influence was by no means limited to North Carolina. In the succeeding decade came James L. Orr, William Ernest Lucas, John B. Cleveland, Robert McCloud Fannin, W. B. S. Whaley, T. E. Moore, John Geer, Captain W. A. Courtneym, and a long procession of strong young men. The earliest pioneers were the explorers. They blazed the trail. But it remained for the men just named to follow the trail and improve it. It would be unfair to those who ventured into the industry before Captain Smyth, Converse, Hammett and the many others, to single out one as the leader in the development since 1880. But in 1921 the publication "Commerce and Finance" was so impressed with the remarkable growth of the industry, that they were led to ask who had been the leaders in this so very important
development; and being unable to answer the
question to their own satisfaction, they mailed
questionnaires to at least one officer of every im-
portant cotton mill of the South, asking him to
consult with his principal officers and designate
six men, living or dead, who in their opinion
were best entitled to be considered as leaders by
virtue of what had been done—or was being
done, not only for their own enterprises, but for
the interests of the southern textile industry as
a whole. As a result of the ballot, Captain Elli-
son A. Smyth led the list.
According to Captain Smyth's own testi-
mony, the beckoning call of one already within
the industry, William Gregg, led him into the
field, just as the industry today is calling to
enterprising young men who possess inspiration,
determination, and the will to become pioneers.
The ranking position South Carolina holds
in textile manufacturing today is a mark of dis-
tinction attained by men of foresight coupled
with an undaunted spirit. Picture if you can,
an industry in our native state with only 30,000
spindles in 1860 that has now grown by leaps
and bounds until the number now totals between
5,500,000 and 6,000,000 spindles. Only North
Carolina outranks South Carolina in the total
spindles, yet South Carolina takes first place in
all America in total active spindles and active
spindle hours. There are approximately 200
mills in South Carolina today employing practi-
cally one-fifth of the white population, and manu-
ufacturing from cotton, jute, rayon, wool and silk
practically every known necessity for the exist-
ence of human beings.

Today, South Carolina's textile industry is
great because of the friendly relations that existed
from the beginning between those who were
working to build it. Tomorrow, South Carolina's
great enterprise will be still greater only through
a spirit of mutual confidence and by mutual
understanding.

DIFFERENCES IN QUALITY OF RAIN-GROWN
AND IRRIGATED COTTON SHOWN BY TESTS
(continued from page nine)

yarns spun from cotton produced under rain-
grown conditions in the Memphis territory were
in most cases easily distinguished from those made
from yarns spun from irrigated cotton. Fabrics
made from the non-irrigated cotton contained
fewer naps and particles of foreign matter than
those made from corresponding grades of irri-
gated cotton. Yarn and fabric appearance is
particularly important in uses, such as dress
fabrics, where a smooth uniform appearance
and texture is desired.

Laboratory tests revealed no differences in
manufacturing behavior between irrigated and
non-irrigated cottons. All of the cotton used in
the comparative spinning tests were processed on
the various machines without any unusual diffi-
culty.

Dyeing tests of yarns and fabrics will be
undertaken later.

The spinning tests were made under the
general supervision of M. E. Campbell, who has
charge of the Department's cotton spinning work,
and John M. Cook, in charge of the Department's
laboratory at Clemson College.

Samples Representative of Various Sections
In commenting on the results of the tests,
Mr. Campbell said that he believed they were
representative of cottons produced in the various
sections in 1939-40. He added, however, that
considerable variations in the quality of cotton
within large producing areas is usually found.

"Cotton tested from California was generally
found to be somewhat superior to that grown
in other sections of the irrigated region," Campbell
said. "It is not unlikely, however, that some
cotton produced in Arizona-New Mexico-Texas
territory is equal or superior to that grown in
California."

Cotton produced under irrigation in the
United States constitutes on the average about 7
percent of the total crop. It runs unusually high
in grade and is considerably longer in staple than
the average of the United States crop.

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