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CONTENTS

WANTED: MEN—GUEST EDITORIAL, Alan B. Sibley ............................................. 3
USEFUL DATA ............................................................................................................. 4
REVIEW OF NEW COTTON HANDBOOK, Prof. R. K. Eaton ................................. 5
CORK VS. LEATHER ROLLS, R. H. Jones, '42 ..................................................... 6
"GOSSYPIUM," Gordon E. Williams, '42 ......................................................... 9
THE MANUFACTURE OF TAPESTRIES, T. Arnold Turner, Jr., '44 .................... 10
THE EDITOR'S PAGE ............................................................................................... 11
WE LEARN BY DOING ............................................................................................. 12
WHY STUDY MY COURSE? ..................................................................................... 14
THE HUMAN ELEMENT IN THE COTTON MILL, L. H. Allen, '44 ...................... 16
AN OPEN LETTER .................................................................................................... 17
SYNTHETIC FIBER PRODUCTION, R. L. Cheatham, '42 .................................... 18
SOMETHING ABOUT OUR FACULTY, M. D. Moore, Jr., '43 ............................ 19
G. H. DUNLAP, M. D. Moore, Jr., '43 .............................................................. 20
CARDER'S AND SPINNER'S MEET, M. D. Moore, Jr., '43 .............................. 21

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Cover photo by R. G. HUFFORD
WANTED: MEN

Guest Editorial

BY ALAN B. SIBLEY

When I graduated from college a very successful lawyer said, "Son, you can put this in your pipe and smoke it; there are more good jobs than there are good men to fill them." The man who spoke those words had started out in a small town, later gone to a large southern city with a reputable law firm. He was the oldest son in a large family and had worked his way through college. He had no "pull" or "connections" to help him. All he had was the ability to win cases and that was all he needed.

I must confess that when he told me that, my reaction was, "Well you were lucky, you got the breaks." But as I have grown older and have been in the "market" for good men, I have thought a thousand times of what this lawyer said to me then.

You who are studying textiles are going into the largest industry in the United States. There are many phases of the industry that challenge the youth of today. There is the research and chemical division, the printing and dyeing division, the manufacturing end, consisting of spinning and weaving, and the selling end. Surely, no industry offers such a wide diversification of opportunities as does our industry.

But what kind of men are WANTED today by government, by industry, or in professions? And what questions must you ask yourself to qualify as a WANTED man? First, am I honest? This is number one on the list. Are you shocked when you read in the papers of men in high places who are not honest? Honesty covers a lot of ground but to be honest with yourself is most important; for if you are honest with yourself, you will unquestionably be honest with others.

Secondly, am I courteous? If you are not courteous, you are certainly in the wrong industry. If you are courteous, you will find employees in the textile mills most kind, helpful, and interested in seeing you succeed. The people in the mills are courteous, and they will go out of their way to help you if you are appreciative.

Third, am I humble or do I know all the answers? There isn't anyone who knows all the answers, and there will be many times in your life when you will be glad to have the cooperation and suggestions of others. And when you do receive help, don't hesitate to give credit where credit is due, the world demands this today.

Another ingredient in the WANTED MAN is: will he work? You may have the keenest brain in the world, but if you are not willing to exert yourself and do more than the other fellow, you won't be sought after. When you buy an article in a store, you buy it because you believe that article is either worth what you paid for it, or is worth more than you paid for it. Your services are the only thing you have for sale, and to succeed you must give full value and a bargain. If you are looking for an easy (continued on page twenty-two)
USEFUL DATA

To find circumference of 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 52.36.

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 boilers 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.

Millimeters $\times .03937 =$ inches.

Millimeters $\div 25.4 =$ inches.

Centimeters $\times .393 =$ inches.

Centimeters $\div 2.54 =$ inches.

Meters $\times 39.37 =$ in. (Act Cong.)

Meters $\times 3.28 =$ feet.

Meters $\times 1.094 =$ yards.

Kilometers $\times 621 =$ miles.

Kilometers $\div 1.6093 =$ miles.

Square Millimeters $\times .00353 =$ sq. in.

Kilometers $\times 3280.7 =$ feet.

Square Millimeters $\times 0.645 =$ sq. in.

Square Centimeters $\times .155 =$ sq. in.

Square Centimeters $\times 0.645 =$ sq. in.

Square Meters $\times 10.764 =$ sq. ft.

Square Kilometers $\times 247.1 =$ acres.

Hectars $\times 2.47 =$ acres.

Cu. Centimeters $\div 16.387 =$ cu. in.

Cu. Centimetres $\div 3.949 =$ fl. drs. (U. S. P.)

Cu. Centimeters $\div 29.57 =$ fl. ozs. (U. S. P.)

Cu. Meters $\times 35.314 =$ cubic feet.

Cu. Meters $\times 1.308 =$ cubic yards.

Cu. Meters $\times 264.2 =$ gallons (231 cu. in.)

Litres $\times 61.023 =$ cu. in. (Act Congress.)

Litres $\times 33.84 =$ fluid oz. (U. S. P.)

Litres $\times 264.2 =$ gallons (U. S. P.)

Litres $\div 26.42 =$ gals. (231 cu. in.)

Litres $\times 3.78 =$ gals. (231 cu. in.)

Litres $\div 28.317 =$ cubic feet.

Grammes $\times 15.432 =$ grains. (Act Congress.)

Grammes $\div 981 =$ dynes.

Grammes (water) $\div 29.57 =$ fl. oz.

Grammes $\div 28.35 =$ oz. avoirdupois.

Grammes per cubic cent $\div 27.7 =$ lbs per cu. in.

Joule $\times .7373 =$ foot pounds.

Kilo-grammes $\times 2.2046 =$ pounds.

Kilo-grammes $\times 35.3 =$ oz. avoirdupois.

Kilo-grammes $\times 1102.3 =$ tons (2000 lbs.)

Kilo-grammes per sq. cent plus 14.223 =$ lbs. per sq. in.

Kilo-gram meters $\times 7.233 =$ ft. lbs.

Kilo per metre $\times .672 =$ lbs. per ft.

Kilo per cubic metre $\times .020 =$ lbs. per cubic ft.

Kilo per Cheval $\times 2.235 =$ lbs. per H. P.

Kilo-Watts $\times 1.35 =$ Horse Power.

Watts $\times 746 =$ Horse Power.

Watts $\div 3737 =$ ft. lbs. per second.
The first edition of the American Cotton Handbook is now being distributed and it will be welcomed by all who are connected with the cotton textile industry.

The authors are Professor G. R. Merrill, Lowell Textile Institute; Professor A. R. Macormac, Textile Chemist at Auburn (Alabama Polytechnic Institute); and H. R. Maurersberger, Technical Editor of RAYON TEXTILE MONTHLY. They have this to say in regard to cotton textile literature: "For many years the literature on cotton manufacturing has been scattered, fragmentary, incomplete and often of foreign origin. Whenever information was needed, men of the American Cotton Industry had to refer to a number of books because all reference works in the past have been written around some particular phase of cotton productive and manufacturing process. There was, therefore, a distinct and acknowledged need for a concise and authentic reference work on all phases of the American Cotton Industry."

The authors, except in their own fields, did not attempt to write all of the chapters contained in the Handbook but called upon others for contributions. These collaborators are men at the very top of the fields to which their chapters contribute. Textile manufacturers are all familiar with such names as Alston H. Garside, Charles K. Everett and E. R. Schwarz, to mention only a few of the authorities who helped give the Handbook its value.

The first chapter gives the historical background of the American Cotton Industry. It is concise in its treatment of this important subject and contains the important names and dates which are often difficult to find without reference to several books.

Chapter II, by A. H. Garside, deals with the economic background of cotton growing and manufacturing. As one would expect from this author this chapter gives information about the New York Cotton Exchange, cotton marketing, hedging and merchandising and many statistics in regard to cotton, cotton yarn and cloth production.

Charles K. Everett writes on the subject of Promoting and Merchandising of New Cotton Products. Professor Schwarz's subjects are "Physical and Chemical Testing of Fibers, Yarns and Fabrics" and "The Use of the Statistical Method in Textile Testing."

There are eight chapters of about forty pages each covering all the yarn manufacturing processing including warping and slashing. One of these chapters will be of special interest since it treats on manufacturing cotton sewing thread: a subject on which it is hard to find any reference material.

One chapter (XIV) classifies cotton fabrics and lists the commercial fabric constructions. A few minutes' perusal of these pages will give the textile student some idea of the enormous possibilities of the cotton textile industry and the great chance of specializing in any field which interests him.

The designing and weaving of all of these fabrics are explained in some 112 pages including a special chapter on pile fabrics by Robert E. Smith.

There are chapters on knit goods and also all the finishing processes of bleaching, mercerizing, dyeing and printing.

The authors were not satisfied with giving all the information about growing cotton, marketing it, manufacturing it and finishing it but go one step farther and include a chapter on laundering written by the General Manager of the American Institute of Laundering.

The American Cotton Handbook also contains a chapter on English Cotton Literature. This is a "bibliography of books primarily concerned with the various phases of the cotton industry." This list is up to date and is almost worth the price of the Handbook to anyone who is called on to search out the solutions of textile problems.

I heartily recommend it to the readers of BOBBIN AND BEAKER.

Dr. Claudius T. Murchison has this to say of it, "Those whose connection with the industry are professional and those whose interests are economic and social will give equal welcome to this volume. It meets, as no other single volume, the requirements of practical usefulness."

NOTE: American Cotton Handbook is published by American Cotton Handbook Co., 303 Fifth Avenue, New York, N. Y.
CORK VS. LEATHER ROLLS

BY R. H. JONES, '42

In the early days the manner in which the top rollers were covered was a carefully guarded secret. The old-time roller coverer was looked upon as a sort of "Witch Doctor" or "Medicine Man." Each had his own way of covering a roll which he would disclose only to a relative or young apprentice.

As a result of this secretiveness all sorts of materials were used to furnish the extra cushion needed: cotton cloth, linen cloth, and woolen cloth. As far as anyone knew, no mills used the same materials. However, the cotton spinning industry was growing with such leaps and bounds that the natural labor turnover even affected the roller shops, and gradually, through the exchange of ideas, it became apparent to all that there was no better under covering than all-wool Welt Flannel.

The ideal roller covering must always, throughout its useful life, draw evenly and smoothly, without any variation and positively without any adverse results to either the cotton fibers or the strand. Its fiber-gripping and fiber-holding qualities must not vary with its age, or be unduly affected by environment. To attain this end, the roller covering must have a surface that always has a positive, even-drawing action on the fibers. In other words, it must not become slick causing slippage to take place. It must also draw itself, that is, it must have a natural drag to its surface.

The ideal roller covering must be totally unaffected by conditions or materials with which it is apt to come into contact in a cotton mill. It must not be affected by heat or cold, humidity or oil.

Cushion is the other vital factor. The cushioning must not be spotty or local but must distribute the load uniformly over the entire surface. The perfect roller covering will be of material that can be repaired quickly, easily, and at low cost.

An early type of cork covering (an Armstrong patent dated June 18, 1918) was made of several thin sheets of cork "wound in convolute layers cemented to each other and also cemented to the roller." This first covering has been discarded as a failure.

Later on, a helically wrapped cot was developed. One type is a covering consisting of a hard fiber or glued fabric innerlines to which ribbon cork is attached, and the preformed tube cut into lengths. Another helically wrapped cot consists of a single thickness of cork ribbon requiring no innerlines and formed into a tube by cementing the edges of the ribbon material together—this tubing then being cut into cot lengths.

The chief advantages of the helically wrapped cot over previous cork covers lies in its form. Its chief disadvantages for cotton spinning lie in its construction. It does not get away from the troublesome seams, and particularly with cots possessing an innerline there are three or more glue jobs, all of which must be perfect to avoid trouble. Further, with the cot having an innerline, the thickness of cork is reduced, resulting in less cushion and a shorter life for the material. The stresses and strains set up in the cork during the wrapping operation tend to fracture the bond between the cork granules, resulting in premature breakdown in service.

The seamless cork cot is the final perfected development of cork as a roller covering. Here, for the first time, a single thickness of seamless material is made available for cot use, doing away once and for all with troublesome joints or seams and presenting a uniform material in any wall thickness required, one having the utmost in cushion and resiliency.

The very latest development in seamless cot manufacturers has been the tubular or extrusion process, which is fully covered by patents. Cork cots made by this extrusion process guarantee the utmost in uniformity, resiliency, strength, and durability.

Cork has many properties, five of which are of especial importance in spinning good yarn. They are:

1. High friction coefficient.
2. Compressability.
3. Resistance to lateral flow.
4. Resistance to penetration of liquids.
5. Durability.

Cork possesses a very high coefficient of friction, and, unlike other materials, cork retains this property even when wet or in the presence of oil and grease. Its better pulling qualities minimize the effect of hard ends.

When cork is compressed, it is the trapped air in the cells that compresses. The strong cell walls do not change. When pressure is released, cork
tends to return to its original shape. In spinning, this greater cushion is an added margin of safety.

Unlike many materials, cork does not flow or spread out under pressure, but compresses only in the direction of the force, its width or length remaining practically the same. In spinning yarn, this characteristic helps to maintain a true draft surface, since there is no bellowing out or tending to become barrel-shaped due to pressure.

Cork is highly resistant to liquid penetration, since it is cellular in structure and not fibrous. Unlike ordinary covers, it does not shrink or stretch with changing humidity conditions, it does not act as a wick to absorb oil, nor is there any "sweating" of the cork roll in hot humid weather.

Cork has the remarkable capacity for retaining its initial properties practically unimpaired under all conditions where its use is recognized. Unlike most materials, it is not subject to progressive deterioration, and hence does not become less efficient as time goes on. The durability of cork as a roll covering material is well established not only for cotton spinning but also for rayon, worsted, and jute spinning.

To these physical properties of natural cork, modern research and manufacture add other values which mean the spinning of better yarn more economically. These are:

1. Ready adaptability to meet special service conditions.
2. Economy in handling, and through this, control of quality.

The Armstrong Buffing Machine plays an important part in the saving to be made from using cork. A cot worn from service may be made new again and again by resurfacing it. The worn cork cells are removed, bringing to the surface of the cot new, lively cork, and the roll is ready to go back in the frame for another full life of service. Rebuffing costs but one-half cent per roll, and with three or five rebuffings, or in all, four to six lives for each cot.

With the tailor made cot there is no scrap loss, no cutting or fitting, and much less time required in assembling and buffing for service. Figures from nine mills, which total 1,000,000 spindles, show a reduction of 50 per cent in hours of roll shop labor after adopting cork.

With a manufactured product, the roll may be placed in a precision grinder and buffed true and concentric within .001" from end to end.

The seamless cork cot, a quality product, is not high in first cost, so savings begin at once. Today's cot sells for nearly 40 per cent less than it did in 1931, and in a number of cases costs even less than some of the many grades of ordinary covers. For a 2½" guage spinning frame, the rolls require cots 1¾" long, and these cots sell for 3½c each.

The Arkwright Journal, June 1937 issue, in commenting on comparative yarn test from five different mills, makes the following statements in conclusion. "The yarn from mill No. 5 was far the superior of all yarns tested with respect to evenness of both counts and tensile strength. It is interesting to note that cork top rolls were used throughout.

The present seamless cork cot has met the increase demands of new machinery, which include higher speeds, heavier weighting, bulkier roving, and higher drafts. The margin of safety in cork is being recognized not alone, for more severe conditions, but for all services. For this reason, cork is fast replacing ordinary covers and is doing its part in helping the textile industry produce better yarns more economically.

The first leather for spinning rolls happened to be sheepskins, probably because they are by nature uniform in thickness and correct in thickness for cushioning a roll; but more important by far is that their natural grain provided a first-class surface, so good in fact, that sheepskin tanners have always taken great care to preserve it without blemish, as originally executed by nature. The best leather, however, is still bark-tanned, tanned by the slow process of immersion in hemlock liquors in still pits, the strength of liquors being gradually increased until the right temper is attained.

To quote Dr. Fred O'Flaherty, Director of Leather Research, University of Cincinnati, of Cincinnati: "Leather is the ideal material for cushioning since cushioning is the effect obtained by compression of a material, or the structure units of a composite material.

"Leather has a dual cushioning ability; first, the microscopic units of the fibers are compressible to both length and diameter. Second, the arrangement of the fibers in the architecture of the skin and subsequent leather is such that microscopic-sized spaces are present between the fiber bundles. Not only are there regular and numerous spaces, but they are all joined and intimately related with respect to each other, thus a piece of leather is dually compressible."

"When leather is compressed, the load is distributed over the neighboring fiber structure, and a more uniform cushion is obtained.

With the native architecture lending itself to cushioning effect, it is possible to regulate the degree
and the character of the cushion by the tanning process. In no other material does one find this advantage."

It needs no proof and requires no argument to prove that leather is not affected by cold. There are no scientific instruments sufficiently sensitive to measure the difference, if any exists, in a piece of roller leather at 100° below zero and 130° above zero. If a change of 230° will in no way affect this leather, it is an absolute certainty that the small variation in a cotton mill will not do so. The same applies to humidity. Roller leather will act just as perfectly in a dense fog, as it would in an absolute bone-dry atmosphere.

It is probably true that many substitutes worthy to be given a trial will spin good yarn part of the time. They may go along for months doing excellent work, but the inevitable time will come when internal physical changes take place, and the rolls will cause so much trouble that they have to be recovered.

Leather will eventually wear out; yet the way it wears is one of its most valuable contributions toward maintaining the quality of the yarn. As soon as the grain surface which does the drawing starts to wear through, the tiny fibers underneath the grain surface begins to protrude and, before very long, get entangled in the fine cotton fibers, grasping them sufficiently firmly to cause the end to break, if it soon breaks again the spinner or the section man sees at once the need for a newly covered roll. No bad yarn had been spun and with the new roll, the spindle will go on producing the same high quality of yarn.

For spinning fine counts only the very best fine-grained lambskin should be used, weighing not over one ounce, which would approximate 20-1000" thick.

For spinning medium fine count, a light medium lambskin is used, which weighs in ounces about 1½ to 1½ oz., in inches 20-1000 to 25-1000" thick.

For the coarser counts and card room work the larger, coarse-grained skins may be used; these will run about 30-1000" to 35-1000" thick.

With most substitutes, it is possible to baffle down minor imperfections; however after a period of time, no matter how strict the buffing schedules, many sizes of rolls are in the frames with the consequent differences in the cushion. With leather-covered rolls, worn rollers are always replaced by new, first-class rollers, all the same diameter and of equal cushion.

The cost of leather-covered rolls depends very much on the type and quality of the materials being used and the size of the rolls. The annual cost per spindle depends, not only on the leather and the cloth, but on the type of yarn being spun, and how it is spun.

Sheepskin cords, exclusive of labor, cost anywhere from 1.5 cents to 3 cents each for ordinary short spinning double-bass roll. Calfskin cords will vary in price between 2.5 cents to 4 cents each, the variation depends on the brand and grade being used.

The price of roller cloth will vary with the quality and the weight from 1 cent per cot to as high as 5 cents per cot.

A good sheepskin roll in a medium coarse yarn mill spinning 12's to 30's should average seven months, double forty-hour shift. After that, on ordinary short draft spinning it may be good for a year in the middle, and after that up to ten years in the back.

The finer the yarn being spun the easier the treatment the roller receives. It is not uncommon for rollers in a fine yarns mill to last two or three years in front, double forty-hour shifts. On such fine work an 8 cent roller would, probably, be used which would give an average annual cost per spindle in the vicinity of 1.5 cents. Then again, mills that keep shifting their counts will consume more rolls than mills that remain on the same count year in and year out.

A calf skin covered roll should average about 1.5 cents per roll more than the best sheepskin. However, calf skin will outwear sheepskin on an average of about one-third. Some mills report calf skin will out wear sheepskin three rolls to one.

New developments in spinning machinery have greatly increased the use of calf skin, especially chrome calf skin. The long drafts, high speeds and greater twists sometimes requires something stouter than sheepskin, on the front rolls especially.

Chrome calf skin is indisputably superior in cushion and resiliency to bark-tanned calf, and because of the relationship of the mineral tannage to static electricity, spins with little or no "eyebrows."

Another advantage of the bark-tanned calf skin is the ease with which it cement, which practically guarantees a good lap. It is a question, however, whether or not the tendency to "eyebrow" affects the value of the good lap. There are many mills using bark-tanned calf skin with good success, but it must be said that they are content to pick the "eyebrows" for the first two or three weeks, or until this condition is reduced to normal.

(continued on page twenty-three)
"GOSSYPIUM"

By GORDON E. WILLIAMS, '42

Living in the midst of the greatest textile industry in the world, few of us have stopped to study its origin and growth in this country. Although cotton had been grown and used for centuries in other countries, it remained for the United States to give commercial importance to the industry. To meet the demands of a rapidly growing population, this country, as if by the hands of destiny, stepped forward to supply a fibre which so amply supplemented others that, by reducing its initial cost, it has made it possible for practically every man, woman, and child to wear what once was the garb of the favored few.

Introduction And Development Of Cotton Growing

When the first settlers came to this country in 1492, they discovered cotton growing wild, but no effort was made to cultivate it until 1621 when a few enterprising citizens experimented with it in what is now the state of Virginia. The seed of the first cultivated cotton, which probably came from the East Indies, was at first planted only in small patches and confined to domestic uses. It was soon discovered, however, that the soil and climate of Virginia made tobacco growing much more profitable. Other experiments in cotton growing were made in several of the northern states, but the production there never reached very large proportions. It was not introduced into South Carolina until 1783 and into Georgia until the following year. As early as 1741, cotton was grown in Louisiana, for in that year Dubreuil of that locality invented the first machine that would separate the lint from the seed. This was the first big stimulant for the cotton industry.

The early development of the cotton growing industry was unusually slow. It was not until 1789 that the first sample of American cotton was sent to England. A few bags were exported from Charleston in 1747, and in 1753 a citizen of Delaware offered $20 for "the most and best cotton off one acre." Due to the small demand for this fibre, the market price was often less than the cost of growing and preparing it. This was a great drawback to the culture, but the greatest drawback was the scarcity of labor. In 1784, when fifteen bales of cotton were shipped to England, eight were seized in Liverpool as being improperly entered, on the ground that so much cotton could not have been grown in the American colonies. After the Revolutionary War, the development was much more rapid and, in 1791, about 400 bales were exported from the United States.

The invention of the cotton gin by Eli Whitney in 1793 caused a remarkable advance in the industry. Two years after its invention, Mr. James Kincaid, a resident of the present Fairfield county, South Carolina, greatly increased its effectiveness by applying water power to its operation. Later inventions, such as the steam engine and improved presses for ginning, tended to increase the industry more and more. The abolition of slavery in the South brought about many radical changes. Big plantations were broken up into small farms and share-cropping and tenant farming came into existence.

The expensive labor which resulted from the Civil War made it advisable and necessary "to make two ears of corn and two blades of grass grow where only one grew before." This condition made the farmer soil conscious and methods of breaking and fertilizing the land were studied and the best were adopted. The intensive system of farming, which involves preparation of soil and rotation of crops, had its beginning in South Carolina in 1857.

Another boon to the industry was the development of railroads in the South. Although there were many navigable streams running through the cotton belt, the early farmers had a great deal of trouble getting their cotton to the market.

Today, because of the favorable climate and the character of the soil, the United States holds first rank in cotton growing.

The Manufacture Of Cotton

In 1738, John Kay, an Englishman, began the series of inventions which were to play such an important role in the commercial prosperity of this country as well as England, by inventing the flying shuttle and introducing it to the woolen trade. In 1760, his son, Robert, invented the drop box and applied the flying shuttle to the manufacture of cotton cloth. Now, the greatest handicap to the industry was the slow, tedious, and expensive process of spinning. Spinners and weavers collaborated on the matter and many experiments were made in an attempt to develop a machine that would spin a hundred or even a thousand threads at one time with only one operator. Such a machine was not invented, however, until 1738, when Lewis Paul, another Englishman, patented a roller machine for spinning.

(continued on page twenty)
THE MANUFACTURE OF TAPESTRIES

BY T. ARNOLD TURNER, JR., '44

As you all know, tapestries are pictures or designs which are made by interweaving colored "woof" or filling threads with undyed warp threads after the latter has been extended either vertically or horizontally upon a loom. This interweaving is done by means of an instrument known as a 'broche' which is neither a shuttle nor a bobbin but works like both of them. Needles are never used in weaving tapestry. Art tapestries can only be woven by trained artists who always interpret and never copy a model. If a slight mistake is made in the process of weaving, there can be no alternative but to destroy what has already been done and start all over again. There is no similarity in hand-woven tapestries and machine-woven tapestries. Every thread of the warp is so completely encased by the filling that warp does not show on either side of the fabric. There are two kinds of tapestries: "haute-lisse," in which the tapestries are woven on an upright loom, and "basse-lisse," in which tapestries are woven on a horizontal loom. This simply means that the warp is stretched like the strings of a harp, usually twenty-two to twenty-six to an inch, but one, the "haute-lisse," has its warp turned vertically while the "basse-lisse" has its warp turned horizontal to the ground. Keep in mind that all of the "real" tapestries are woven by hand. The Gobelin Tapestries, most famous of tapestries, are woven on the "haute-lisse" looms, but the "basse-lisse" looms are about one-third faster than the "haute-lisse."

In high art "haute-lisse" tapestries, well filled with figures of people, the artist weaver can weave only about one square yard in a year! At the famous Gobelin factories today, this square yard cost about eight hundred and eighty dollars, which does not include taxes, insurance, and salary of the weavers! Nero, the great ruler of Rome, once paid two hundred thousand dollars for a one yard by two yard tapestry. The weaver passes from one color to the other by using the intermediate colors so as to produce a design that looks as if it were painted on the warp. This process is called "hatching the colors," and is the most difficult task in tapestry weaving.

In both "haute" and "basse-lisse," the weaver works on the back side with the finished part facing away from him instead of toward him. The "haute-lisse" weaver has to go around to the front of the tapestry in order to inspect his choice of colors, etc. Neither can the "basse-lisse" weaver inspect his work without going to a great deal of trouble also. The "haute-lisse" tapestries usually bring a higher price because the artistic shading is better than the "basse-lisse" tapestries.

The precautions taken by the weaver to verify the correctness and excellence of his work are of little advantage if he doesn't possess the talent, skill, and experience to insure success in his tapestries. Let it be brought to mind that he uses dry and supple materials which cannot be manipulated as readily as the liquid colors of the painter. He cannot correct, alter, or modify what he has done. Neither can he erase and reproduce it, as the painter. He cannot create harmony of colors except with the difficult task of "hatching" the right colors together; first, in his mind, then, on the warp. Is it any wonder that it takes 12 to 15 years to educate a weaver into all the tricks of the profession? It took several generations of the Gobelin family in France to perfect the art of storied tapestries. Since the design is first drawn on the face of the warp, the weaver reproduces it in the reverse. After the tapestry is finished, no one can tell which is the face of the cloth with the naked eye.

Some of the oldest existing tapestries are no doubt the fragments from the Church of Saint Gereon in Cologne, which were woven in Europe in the 11th or 12th century. The oldest of all existing tapestries was woven in Asia four hundred years B.C. and was found in Crimea. These early tapestries were usually worn on costumes for decorative purposes.

Everywhere they occupied the places of honor. Great Generals carried them to the wars; houses were decorated with them to create warmth and congeniality in the homes.

In France and Flanders, the manufacture of tapestries became nationalized. The most important weavers of France and of the world were the Gobelins. Incidentally, the factory still produces magnificent pieces of art. In 1662 the factory at Faubourg Saint Marcel was purchased by Colbert on behalf of Louis XIV. This manufacture is still carried on by the state.

There are only two museums in Europe devoted to the exhibition of tapestries and textile products exclusively. These are the Gobelins in Paris, and the Crocelta in Florence, Italy. In each museum there are over six hundred or seven hundred pieces of tapestry arranged to show the modifications at different epochs of weaving.
ON FRATERNITIES

Freshmen, would you like to become a member of a national honor fraternity? If this is one of your ambitions, now is the time for you to start working. For a good scholastic record is a prerequisite to membership. Also, evidence of high moral character must be shown before a student may be admitted to most of these organizations.

Phi Eta Sigma is the first fraternity into which a Textile student may be admitted. Members are initiated at the end of the first semester of the Freshman year, and again at the beginning of the Sophomore year. In each case, a grade point ratio of 7.5 must have been attained in all previous work. Members of all six schools at Clemson are eligible.

The next honor fraternity that you will wish to join is Phi Psi, the national fraternity of the textile schools and industry, and the organization that most interests textile students. During the first semester of each year, several high ranking Juniors and Seniors are admitted, while during the second semester, some more Juniors and the highest Sophomore in the School of Textiles are tapped. However, grades alone are not enough, as morals and character are also taken into consideration. To become a member of this fraternity, the oldest on the campus, is the desire and ambition of every textile student at Clemson.

At the beginning of your Senior year in college, you may be asked to join Phi Kappa Phi, honor scholastic fraternity with chapters all over the nation. Scholastic standing alone is considered in determining eligibility for this fraternity, a grade point ratio of 6.5 being necessary.

These are the major honors in the scholastic field which await the textile student who is willing to work for them. Members of these fraternities, Phi Psi, Phi Eta Sigma, and Phi Kappa Phi, command respect not only in the whole school, but in later life as well. Therefore, members of the Freshman Class, start now to gain a high grade point ratio, as next spring may be too late. Any effort on your part will be well rewarded.—(E. A. L.)

A SUGGESTION

The Clemson Textile School has gone far. The key note has been progress. Year after year its students have stepped out into the world of industry to make their contribution to a newer and better life. They have upheld the traditions of their fathers in spreading the fame of Clemson far and wide. They have played their part.

Have we played ours? In one way, we have. We have kept up with them to the best of our ability. A mere inquiry will bring from Dean Willis’ files the history of any textile graduate’s progress from the day of his graduation to the present day. In another way, we have not. We have failed to file or save the masterpieces of work that have been developed during four years of college work. We can not say proudly to our friends, “This article or sample was made by a textile student in 1929.” In short, we have no room in which we can display the products of many long hours of work and study. I ask you, “Is that commendable of a school as large as the Clemson School of Textiles?”

It seems to me that this would be a good project for either Phi Psi or the Weaving and Designing Club. It would certainly bring credit to our school to have a room in which the actual products of the student’s work could be displayed to new students, old students, visitors, and faculty members. It would certainly be a center of attraction on the campus if carried out successfully.

Can’t we do something about this? . . . I think we can.—(G. E. W.)

PHI PSI ACTIVITIES

Earlier in the semester, eleven new members, six Seniors and five Juniors, were taken into Phi Psi. The Seniors who were taken in are Ralph Sullivan, A. E. Zeigler, Howard Tarleton, R. L. Cheatham, Bobby Jones, and W. A. Barnette, while Juniors are Lang Ligon, B. A. Chestochowski, Henry Hahn, John Dysart, and J. H. Propst. These boys have completed the third degree of initiation and are now full-fledged members of the fraternity.

The club room has been redecorated, a flag, hat rack, and new curtains being the major additions to the furnishings. Many new records, both popular and semi-classical, have been purchased.

President Jimmie Barton, Theron Hegler, Harry Sturgis, Grady Cash, and Tommy Croxson are performing a very efficient job of leadership in the fraternity, and this year promises to be one of Phi Psi’s best at Clemson.—(E. A. L.)
WE LEARNING

Theory right work prescribed for college also subscri "learn by doing."

In carrying a large part of the posed of labora find students put they have learned classes.

(Left) Prof. Mc-
Kenna, Bill Gilmore, and Mike Hubbard Examine the Christ-
mas Greeting Sam-
ple.

(Right) Prof. Gage and His Cotton Grading Labora-
tory.

(Left) Prof. Eaton Explains the Funda-
mentals of the Slub-
ber to His Junior Lab.
Preparation ... 

Part of the college curriculum is con-

(Right) A Few Freshmen Observe the Sliver Lapper.

(Right) Prof. Thomson Teaches the Sophomores the Practical Side of Carding.

(Left) Seniors Learn Their Cost Finding Under Prof. Campbell.
WHY STUDY MY COURSE?

Editor's Note: Due to the fact that we are prone to think of the subjects directly connected with our textile courses as the only important subjects of our college career, many of us have frequently asked the question: "Why do I have to take that course?" The BOBBIN & BEAKER has passed this question on to various faculty members of other departments, and we now present their answers.

Literature . . . Dr. J. C. Green

The fruits of the study of literature are richer, more varied, and more delectable if, perhaps, less tangible and less marketable than are the fruits of other fields. The more apparent and more easily appraised value of these fruits may be seen in the contribution which they make to the development of personality, one of the most important factors in one's advancement in life. From a study of literature, which in its fullness is a record of the best which has been thought, said, and done, one may derive manners, knowledge of social niceties, knowledge of human nature, forcefulness and charm of expression, worldly wisdom and various experience which will aid him in his struggle to meet his material needs. Such practical values are keenly appreciated today—in fact overemphasized by enthusiasts for subjects other than the humanities. However, the less tangible benefits of the study of literature far outweigh the more tangible ones just mentioned. In the realm of the spirit, one may, in the enjoyment of the golden apples of literature, gain nourishment for the soul; commune with the great minds of the past; gain an emotional outlet and a relief from unpleasant reality; keep before himself the vision of the ideal; and acquire fortitude and a philosophical optimism in times of adversity. If properly presented and studied, literature is, of all subjects, the most cultural and, outside one's professional field, of all subjects the most fruitful.

Steam Power . . . D. H. Shenk

Why should Textile Engineers study Steam Power?

Webster's unabridged defines engineering as "the science and art of making, building, or using engines and machines or of designing and constructing works or the like requiring special knowledge of materials, machinery, and the laws of mechanics." Assuming this definition to be correct it must follow that an engineer is familiar with engines, machines, public works and mechanics. There seems to be no more logical way to become familiar with these subjects than to study them. The course referred to at Clemson as Steam Power is really a course in all kinds of prime movers and their auxiliary equipment. I can think of no division of learning more essential to a professional engineer than that presented in the steam power course for Textile Engineers.

Textile manufacturing requires large quantities of steam which must be produced under direction of the Textile Engineer. The understanding of power plant principles is necessary for any engineer engaged in a professional capacity.

Electrical Engineering . . . L. A. King

A course of study of the fundamentals of Electrical Engineering is important to the student of Textile Engineering from three points of view:

First, that of mental development through a high class of visual and analytical thinking as required by the course.

Second, the practical knowledge of electrical equipment and manipulations with which the practicing Textile Engineers will be concerned.

Finally, the cultural development gained from some knowledge of the electrical quantity which is one of the foundation units of the universe and which is such a vital part of the mechanics of our daily living.

Mechanical Drawing . . . W. W. Klugh

It's the language of the engineer in every engineering profession.

Sociology . . . Frank A. Burtner, Jr.

Each of us lives in a world composed of dynamic groups of various sizes, functions, purposes, and duration. Each of us, by virtue of the fact of birth, is a member of at least several groups and, as a member, one interacts with and is influenced by, be it directly or indirectly, other members. The elements, processes, patterns, and consequences of behavior antecedent or subsequent to this interaction among individuals and between groups is the subject matter of sociology.

Since groups are common to all human life and their influences inescapable, it would seem to behoove each of us to attempt to understand, at least in some measure, the causes, context, and consequences of these relationships. Such an understanding does not make one the absolute arbiter of his fate, but it does enable one to give intelligent direction to
his efforts in the process of fitting himself into his community and, thereby, all society.

Mathematics . . . Dr. D. C. Sheldon

Scientific research is rapidly becoming the basis of the modern textile industry. New fibers are being developed, new testing methods are being applied to determine the physical and chemical properties of the fibers in all stages of the manufacturing process, new methods for the treatment of textiles are frequently being introduced, and new ideas relating to weaving are being put through the experimental stages. In short, the whole industry is in a state of flux. This semi-chaotic condition is largely due to the impact of science upon the ancient processes of the textile industry. We can look back over the past twenty-five years and see the effects of scientific research but no one can foresee what revolutionary changes may be introduced in the next quarter of a century.

The qualified textile man must be prepared to understand and use the results of scientific research. A knowledge of chemistry and physics is therefore an absolute essential. Much of the results of chemical research and practically all of the results of physical research are expressed in the scientific journals in mathematical terms. If one wishes to be able to read, to understand, and to use the results of this scientific research and to be able to predict in some small measure what the future may bring to the textile industry, he must have a working knowledge of mathematics. A glance at the scientific journals dealing with textile research will be convincing.

Public Speaking . . . Dr. J. D. Lane

Combine ability to speak effectively with devotion to a good cause and you have a valuable citizen. The textile engineer who can think and speak on his feet in committee meetings, at conventions, at banquets, class reunions, or wherever men gather, will go further than if he had not this accomplishment. Inability to speak in public is a handicap to any engineer who has something worth saying.

Economics . . . Dr. James E. Ward

The study of economics is assuming a place of increasing importance. The disturbed conditions of the past decade or so have greatly enhanced the interest of the general public in economics and economic problems.

Many economic questions are now being discussed on all sides—in the newspapers and magazines, in books, on the public platform, in legislative debates, over the radio, and in private conversation. Therefore, every person in modern times is forced more, or less concerned with economics. Indeed, economic discourse has become so much a part of our everyday life that not only is a knowledge of it necessary to successful business life, but also equally as essential to intelligent citizenship and important from the standpoint of one’s general culture. For the student’s immediate situation, however, the study of economics not only provides him with a fund of interesting, important, current information, but it impresses upon him the complexity of certain problems which on the surface may appear simple, and enables him to sift the wheat from the vast amount of economic chaff that nowadays finds its way into our newspapers and magazines.

History . . . A. G. Holmes

Technical colleges, such as Clemson, attempt to teach the student a technique, by which he can earn a living or on which he can build a vocation, or a profession. A textile student should get this in his Textile School. And, if the student was out simply to learn a trade, perhaps this would be sufficient.

However, a fair proportion of college graduates never make use of their technique as a means of livelihood. So, in many of the subjects which the student takes, he studies not to master a technique but for mental discipline, or for general cultural background, or for both.

Probably, most, if not all subjects, may be used to develop a technique as well as for mental discipline and general cultural effect. There is a technique for History but, since Clemson makes no effort to train students as writers, or teachers, of History, little attention is given to technique.

A student of History at Clemson, if he really puts out, should develop a critical attitude in judging between fact and fiction, should be able to understand the present the better through a knowledge of the past, should broaden his horizon (and this he sorely needs in this modern complex industrial society), should learn what is worth preserving of our social heritage and what should be destroyed by reforms, and should develop a broader human sympathy toward men of all nations and of all races. Here is mental discipline, intellectual integrity, broad culture. These are some things, but not all, that History teaches.

Why then should a Textile student, rather than a student of some other technical school, take History? For no reason at all—except that the better engineering schools, such as Clemson, for many years have been insisting (and the tendency is increasing) that their students, as graduates, make better engineers, better citizens, better leaders when they are required to study the so-called social sciences. And this seems to me a good reason for the study of History.
THE HUMAN ELEMENT IN THE COTTON MILL

By L. H. ALLEN, '44

Our generation has seen many changes and improvements made in the manufacturing processes in the textile industry. Improved opening and picking and carding equipment has been introduced; long draft roving and spinning has been perfected; high speed spooling and warping, as well as high speed weaving, is replacing the slow speed processes.

We have seen marked improvement in living and working conditions of the employees. The eight-hour working day, social security, unemployment insurance and other dreams of our fathers have become a reality. Educational facilities for the children of the mill employee have expanded until they are now on a level with the best. Many mills operate or sponsor health clinics for their employees. Group hospital and health insurance programs have been undertaken successfully by most of the mills. Vocational training classes for employees have been organized by the different state and county education boards in cooperation with the mill executive. Numerous other improvements have been made also.

In connection with the improvements in machinery and working conditions, we see also improvements in the management of employees. Many mills have set up personnel departments to select new employees and to hear and study the complaints of the old. Different systems of improving the efficiency of the employee have been introduced into our industry.

With all of these improvements, there still remains before us the fact that a great part of the profits of the industry is still lost and thrown away by the carelessness, indifference, lack of forethought, or sometimes lack of responsibility on the part of the "human element." From the receiving of the raw cotton to the shipping of the finished product, how many dollars of profit go with the wind? In the opening department, a cotton bale buckle carelessly thrown into the hopper may ruin a beater or start a fire in the picker. A careless setting of the evener motion on the picker may cause a loss of production or result in poor quality goods. Poor cleaning and stripping of the cards will have the same effect. Bad end piecing on the fly frames will damage the rolls and cut production and quality in the spinning. Careless roll settings and end piecings in the spinning room are reflected in the cloth. In the weaving department, how many shuttles and bobbins could be saved each year by a little more diligence and care on the part of the loom fixer in setting the transfer motion and picking motion? How many bobbins of dirty filling could be saved by the doffers and battery fillers? How many parts and supplies, as well as losses due to stoppage, could be saved by a little more care in setting the different motions of the machines? How many dollars are lost from the lack of a drop of oil in the right place? In the cloth room, how many feet of baling ties are lost each year because the press man uses a tie two or three inches too long?

These seem to be small items, but they add up to a great amount when taken over a period of time. During the present period of booming industry, we are prone to concentrate more on quantity than on efficiency. In the inevitable days that are to come during the post-war era, we will hear more about and see more done to improve the "human element." A little research will go a long way in improving the "human element" of any mill.

Mr. G. B. M. Walker, Textile Engineering graduate of 1937 and now Assistant Editor of "Textile World," was a visitor at the recent Carder's and Spinner's meeting held at Clemson.

Mr. E. L. Ramey, Textile Engineering graduate of 1931, is Superintendent of the Riverdale Mill in Enoree, South Carolina.
AN OPEN LETTER

DEAR BROTHER RAT:

In this fast-moving world of changing trends and economic crises, there arises, among other important questions, the questions of a college education. Is it worth the time and expense? Does it pay dividends? What does the young man profit from it?

If college is considered to be a gateway to soft positions, if college is a preparation for a country club life, if it is conceived as an open sesame to wealth and political influence—if this be the purpose, college is no longer a success. The boy thinking of college should narrow his thoughts down to one question: “Is there a fundamental need of human society for which college will prepare me?” If there is, he should go to college and work toward that goal. If, in his mind, there is not, he should stay at home, go to work, and save his money.

What is education? The word “education” is derived from the Latin word “educere” meaning to lead forth, to bring forth; hence its meaning is something more than mere receiving and absorbing knowledge. “Knowledge is power,” but unused knowledge is wasted power; and wrongly used knowledge is misdirected power, whose effect is destructive rather than productive. Knowledge alone is not wisdom. “Wisdom is the power of knowledge put to productive use.”

The object of all education is the same—to build character. Health, scholarship, leadership, and a love for the finer things of life are all traits of character. Character is more than merely freedom from immorality, more than obedience to the Ten Commandments, more than obedience to the laws of society. A good character is a system of refined and reliable traits. It is a character that presupposes the avoidance of such acts as cheating, lying, and stealing, and consists of a positive system of habits involving health, intelligence, sociability, and devotion. A good character is one that may be depended upon in these respects at all times.

Some students seem to have the false notion that character can be assumed when there is a demand for it, and that it lies in great deeds. One or both of these fallacies have wrecked the lives of many potentially great men, for character is not character unless it exists at all times. It is not judged by great deeds, but by the simple actions of our everyday life. Colleges can not make such characters. They can only give the young man the opportunity to do his share.

A person’s mind is a personal power; he only can work it. It is made up of three aspects: intellect, will, and feeling. Its capacity for thought is boundless, but it can only hold as much good thought as the person will have it hold. Education of the intellect furnishes knowledge; education of the will furnishes morality; and education of the feelings furnishes culture and refinement. A European visiting this country remarked, “You have no art, and the proof of it lies in the fact that you make a show of what you have.” This is a perfect example of the individual. The proof of esthetic development comes, not in flashes, but in the persistence of a natural glow. Art and sentiment are not for the fastidious. The love for these two things aids in making a man a real man.

Recreation is truly a very important part of a college life. Wise use of the recreational period is a great help to a wise use of the study period. No truer words were ever spoken than those of the adage—“All work and no play makes Jack a dull boy.” The work of the football player, the golfer, and the swimmer tends to develop the brain as well as the muscle; and that work helps to form a habit of thinking and purposing firmly that can’t be obtained in the classroom.

This country, the United States of America, the young man’s country, needs more men and women of broad vision who can see beyond the day; something beyond mere culture. She needs men and women who will throw off the heavy burden of selfish interests and dishonest politics; who will help to secure for all mankind an even-handed justice, a justice for all, a justice which will stimulate men to honesty in their own work. She needs men and women who can see that the owe a duty to their fellow citizens.

The young man’s education is preparing him for a life after college which will be worth living. He is gaining information and making new friends. He is cultivating a firmness in wisdom of will and purpose that will help him in his everyday life. He is learning to make his thinking aid his work. He is preparing to be a clear-headed, fair-minded, honest citizen, who recognizes the needs of his country. He is learning that there is a deeper meaning to everyday life than just outward appearances. He is learning what it means to be a Christian at heart, in mind, and in life.

College offers you today the keys to the world’s (continued on page twenty-three)
SYNTHETIC FIBER PRODUCTION

BY R. L. CHEATHAM, '42

Synthetic fiber, an important product on the textile and yarn market in the late twenties and early thirties, has developed with such rapid strides in the last decade that it competes with almost unbelievable success with the natural fibers. From a world production of only 457,000,000 pounds in 1930, rayon production has grown to a total of over two billion pounds in 1940. This phenomenal growth constitutes a serious threat to the supremacy of wool, cotton, and silk, the most important of the natural fibers.

This has not come as a result of an overnight invention or some similar act of magic, but is a result of consistent progress made in the research laboratories. It seems to parallel the advancement made in the field of organic chemistry. A better understanding of the cellulose molecule and the more complete utilization of chemical processes on a commercial scale has had an important part in the development of the synthetic fibers. Rayon has ceased to be an imitation of the natural fibers, especially silk, but is now rapidly becoming an individual product with favorable properties and advantages which make it more valuable to the consumer. Many of these fibers can be processed more simply and less expensively than the natural fibers.

The inability of manufacturers to get raw silk has necessitated the substitution of synthetic fibers in fine goods and in sheer hose. The present rayon fibers will not satisfactorily replace silk, but it will be replaced by vinyon, nylon, or some yet to be developed fiber. In the lingerie products, silk will be replaced last, and it is in this field, if at all, that silk will come back after the present war.

Leading the gains in synthetic fibers is rayon staple fiber with an almost unbelievable increase of production from 6,250,000 pounds in 1930 to 1,236,850,000 pounds in 1940. The continued rapid growth is shown by an increase of 154,855,000 pounds in the year 1939 alone. This advance can be attributed to the production of a better grade of staple fiber, more successful adaption of the regular cotton machinery to carding and slashing of the spun rayon, the added experience in bleaching and dyeing the synthetics, introduction to the market of longer staple fibers, the delustering of the fiber which enables their use in ordinary cotton goods, and other developments. The fact that we are becoming more efficient in handling the fibers everyday gives reason to believe that this growth will continue. A few years ago, the finishing plants could not cope with the problem of bleaching and dyeing the rayon products that were sent to them for processing, but this handicap is being overcome rapidly. Another important reason for the success of staple rayon fibers is their ability to be mixed; that is, the fibers made by the different processes can be mixed, one with the other, and the synthetic fibers can be mixed with the natural fibers. This produces a desirable and sometimes novel effect in the finished product. The adaptation of synthetic fibers to felting and knitting has increased the consumption of the staple fiber.

Synthetic fibers were first produced in Europe and were developed there, until, in the twenties, production was started in this country on a sizeable scale. The industry in the United States has grown as rapidly as in Europe since the turn of the decade. From 1930 to 1940 the total rayon production in the country increased 343,485,000 pounds. This does not quite parallel the increase in Japan and the countries of Europe but the obvious reason is that, since this is the home of cotton, cotton is more accessible to the manufacturers; while these foreign powers must import this natural fiber. These countries began the development of synthetic fibers with the object of reducing, if not eliminating, the dependence upon importation from other countries of the natural fibers.

This early lead in rayon production taken by the European countries caused the United States to import a large part of her staple fibers and filament yarns from them. In 1930, we imported 7,941,706 dollars worth of rayon. In 1937, our importations amounted to 9,522,095 dollars, and in 1939 to 11,847,375 dollars. This shows a steady increase in rayon importations, but this increase is very small when compared with the increase in total rayon consumption in this country. In 1940, our rayon importations dropped over 50 per cent. This can be explained partly by the war conditions preventing export from Germany, and partly by the increased domestic production. The importations from Germany and Italy have become almost negligible; but England, with an eye toward salvaging this country as a customer after the war, and in an effort to keep her imports from becoming too much out of balance with her exports, is rationing her home consumption. The difficulty in getting rayon from Europe is forcing the domestic producers to increase (continued on page twenty-one)
SOMETHING ABOUT OUR FACULTY

BY M. D. MOORE, JR., '43

D. P. Thomson

Mr. Thomson was graduated from Clemson College in 1927. He immediately began working with the Dornan Mill in Greenville as weaver and installation man. After two years at Dornan, Mr. Thomson accepted a position as textile instructor on the faculty of the Wellford-Lyman-Tucapau consolidated school at Tucapau where he remained for two years. Upon leaving Tucapau, he became a member of the faculty of the textile department of the Parker High School in Greenville, South Carolina. He held this position until the summer of 1941 when he was appointed to succeed Mr. G. H. Dunlap, now on leave from the Clemson Textile School for one year.

Mr. Thomson is a charter member of Phi Psi, and was one of the organizers of the fraternity here. He is also a member of Iota Lambda Sigma, national honorary Industrial Education fraternity. We are very glad to have Mr. Thomson on the Textile School faculty and we wish for him a very bright future at Clemson.

E. P. Ward

Mr. Ward received his diploma from Clemson College in 1937. Immediately upon graduation, Mr. Ward accepted a position as Laboratory Assistant with Ciba Company, Inc., in New York. After serving in this capacity for one year, Mr. Ward returned to South Carolina to accept a position with the Gregg Dyeing Company of Graniteville. He remained with this company for three years, and held several positions while there. At the time he was appointed a member of the faculty of the Clemson Textile school, Mr. Ward was foreman over dyeing.

Mr. Ward is a member of Phi Psi, national honorary Textile fraternity. He has been appointed to fill the position of Mr. W. L. Hicks, now a First Lieutenant in the Quartermaster Corps, United States Army.

Gaston Gage

Mr. Gage was graduated from Clemson College in 1921. Since that time he has held numerous positions of major importance in the textile industry. Immediately upon graduation from Clemson, Mr. Gage began work in the Aragon-Baldwin Mill at Chester, South Carolina, as card and frame hand. Other positions held by Mr. Gage in the Aragon-Baldwin Mill include: Loomfixer, Weave Room Second Hand, Cloth Room Overseer, Card Room Overseer, Spinning Room Overseer, and Paymaster.

After eleven years with the Aragon-Baldwin Mill, Mr. Gage accepted a position on the faculty of the Clemson Textile School as Instructor of Carding and Spinning. Mr. Gage once obtained leave of absence from his duties of teaching to conduct work in flax research. Mr. Gage is a member of Phi Psi, national honorary textile fraternity. He received his Master Degree in Education at Pennsylvania State College in the summer of 1941. He is well liked by all students who know him and by all men who have studied under him; he is “tops” in the eyes of his two young sons who attend grammar school at Calhoun.

I. S. Pitts

Mr. Pitts was graduated from Clemson College in 1929. He at once accepted a position with Draper Corporation at Hopedale, Massachusetts, where he held a position in the shop and erection department. After three years there, Mr. Pitts resigned this position to take over the position of Weave Room Second Hand at the Muscogee Manufacturing Company in Columbus, Georgia. He was soon promoted to Weave Room Overseer at the same plant. He had held this position for four years when he resigned to accept the position of Weave Room Overseer at the Martell Mill in Asheville, North Carolina. After a short while with this company, Mr. Pitts accepted the position of Assistant Superintendent of the Southern Brighton Mill in Shannon, Georgia. While holding this position, Mr. Pitts was forced to quit work because of an injury. After a period of rest and recuperation, Mr. Pitts accepted a position on the faculty of the Clemson Textile School. He began teaching here in the fall of 1940.

While a student at Clemson, Mr. Pitts was very active in worthy student organizations. He is a member of Phi Psi, national honorary Textile Fraternity. Mr. Pitts is well liked in the classroom as well as on the campus, and in the eyes of the textile student, is a “regular fellow.”
“GOSSYPIUM”
(continued from page nine)

Although this machine was invented thirty years before Arkwright invented his machine of similar nature, it never was a success largely due to the lack of experience in the owners.

Mr. Paul made another contribution to the industry when, in 1748, he invented the rotary card. Hitherto, carding had been accomplished with stock cards. This machine, together with John Lee’s feeder, greatly improved cotton carding.

Around 1764, James Hargreaves, a poor weaver of Lancashire, England, discovered the principle of the spinning jenny, which he later developed, by the accidental overturning of a spinning wheel. He kept his invention a secret at first, but it was soon discovered and destroyed by a mob who feared that the machine would do away with their jobs. Hargreaves fled to Birmingham and, in 1770, obtained a patent for his jenny. Its importance was immediately recognized by manufacturers and several were put into use. Again, the laboring class revolted, destroying the jennies in that part of the country.

In 1769, Richard Arkwright patented his roller spinning frame and soon put it into production. He soon made a fortune off of the machine which had failed to attract public notice when invented by Lewis Paul only thirty years previously.

These inventions, together with Samuel Crompton’s spinning mule, which superseded the spinning jenny, had done much to speed up the manufacture of cotton. With the development of the steam engine and the power loom, the cotton industry continued to grow and expand.

Around 1788, Samuel Slater brought much valuable knowledge of English machinery, which was being held under embargo in England, to this country. He soon entered into partnership with Almy and Brown of Providence and began working on a series of machines after the Arkwright pattern.

The only remaining obstacle to the cotton industry was the lack of raw material. This was overcome, in 1793, with the invention of the saw gin, which made it possible to clear the fiber of seed rapidly. To the relief of manufacturers and planters alike, the market was soon flooded with cotton and cotton mills began to spring up over the country.

The dreams of great inventors were rapidly realized, and such inventions as the power loom, the warp stop motion, the filling stop motion, automatic bobbin changers, the Dutcher temple, and the dobby loom have given the industry the highest standing in the world of commerce and industry: for, today, no one article of manufacture so controls and dominates the prosperity of the world as does the product of the wonderful plant “gossypium.”

G. H. DUNLAP

BY M. D. MOORE, JR., ’43

Mr. G. H. Dunlap, on leave from his duties as professor in the Clemson Textile School, is now employed to establish and supervise research in cotton mills wherever his services are desired. His work is supervised by the Southern Textile Association and the Arkwrights. The Textile Foundation of Washington, D. C., is financing the research to the extent of $5,000 per year.

Mr. Dunlap calls on mills where a test is wanted. He finds out the nature of the test and immediately lays out a form of the test. He then selects men in the mill who wish to help carry out the test. He presents these men with the form of the test and leaves the men to conduct the test. He then endeavors to have the same test made in other mills, so as to eliminate errors due to conditions peculiar to one mill.

Thus far, Mr. Dunlap has been very successful in his new work and is progressing very rapidly. He has begun tests in many mills in Virginia, North Carolina, and South Carolina. Some of the tests which are now under way in mills throughout this section include:

1. A test on long draft roving with various roll settings and the effect of these settings on the yarn.

2. A test on drawing frames using various types of top rolls.

3. A test on drawing frames using a combination of roll settings and the effect of these settings on the yarn.

4. A test on conventional draft spinning running a self-weighted top roll or slip roll and using a combination of roll settings.

5. A test on the slasher to determine the proper temperature on the cylinders, its effect on drying the yarn, and to determine also the number of yards slashed per minute.

6. A test on mill laboratories with standard conditions as compared with laboratories without temperature control.

7. A test to study the effect of blending reserves on picker laps made on one process pickers.

These are only a few of the tests begun by Mr. Dunlap since he entered upon his duties in the summer of 1941, after completing thirteen very successful years at Clemson.

Mr. Dunlap’s new address is Walhalla, South Carolina, but he may be contacted also at the Clemson Textile School to which he often returns to carry on the research connected with his new position. Any persons interested in making a test should contact Dr. Dunlap. His services are available without charge.
Annual Carder's And Spinner's Meeting

BY M. D. MOORE, JR., '43

The annual Carder's and Spinner's meeting was held in the Auditorium of the Textile Building at 10:00 A.M., November 15, 1941. Mr. W. W. Splawn, Chairman Carder's Division presided over the meeting.

In the absence of Dean H. H. Willis, Mr. R. K. Eaton of the Clemson Textile School faculty introduced Dr. R. F. Poole, President of Clemson College, who delivered the Welcome address to the visitors. Dr. Poole stated that much progress had been made toward securing new equipment for our Textile Department. He also expressed his desire for more research in textile mills of this area and in our Textile School at Clemson.

Dr. Kinard, President of Newberry College, was scheduled to speak but could not attend the meeting because of an injury received in an automobile accident. Judge J. S. Thurmond, of Edgefield, delivered an address on a very timely and interesting topic, "Things Worth Fighting For." He stated that "the clarion call of today is production" and urged the mill men of South Carolina to cooperate to increase production. He closed his address by reciting a very inspiring poem of patriotism.

After a speech by Mr. J. C. Cunningham of the Kindall Corporation, Mr. Cunningham answered several questions concerning problems of salvaging materials, the topic of his talk being "Salvage." One of the questions which brought about much discussion and thought follows:

"Has anyone developed a definite salvage program in anticipation of breakdowns or faulty running of machinery? If so, what is it?"

This open discussion was followed by a short talk by Mr. G. H. Dunlap in which he told the group the nature of his new work of supervising tests in mills in South Carolina and surrounding states. He also made the statement that he is available when needed to begin tests in any mill. He told of one test that he is conducting in several mills at the present in which the speed of the card is increased. Results of his tests clearly show the marked increase in production and the increase in the breaking strength of the yarn produced from the sliver obtained. Mr. Dunlap, in answer to questions, told of conditions of the card room floor and the type of cotton used where this specific test was conducted.

Other questions and Mr. Dunlap's answers follow:

Q. Is the sliver properly carded with this increase in the speed of the card?

A. Mr. Dunlap answered affirmatively by reading to the group the waste results of his tests in two different mills.

Q. Were the settings of the flats changed?

A. Mr. Dunlap replied negatively.

After questioning Mr. Dunlap, the group entered into an open discussion of general mill problems and the methods used in solving these problems economically and efficiently.

The local chapter of Phi Psi, National Honorary Textile Fraternity, cordially invited the group to use the Club Room as their headquarters over the weekend. The members of Phi Psi acted to the best of their ability to make the weekend a very enjoyable one for the Alumni and other visitors.

Synthetic Fiber Production

(continued from page eighteen)

their plant capacities and to erect new and larger plants in order to meet the demand in this country.

Under the present conditions the imperialistic countries are unable to purchase cotton, wool, and silk in any appreciable quantities and are turning to the synthetic fibers to relieve this scarcity. The total amount of synthetic fiber produced in these countries cannot be accurately determined but it is believed that the production in Germany, Italy, and the occupied countries has not been decreased and, if anything, has increased. This is a gain for rayon when the fact that manpower, research efforts, and other essentials are being concentrated on the production of munitions and armaments.

In the future, the production of rayon will probably grow by leaps and bounds. It has been predicted that by 1950 the rayon production will be about 25 or 35 per cent of the total fiber consumed as compared with only 10 per cent in 1940. Viscose, the most successful synthetic fiber at present, will not gain as much as acetate and the protein fibers. The picture of rayon in the future is a bright one.
Where Some Of Our Textile Graduates Are Located

R. T. Osteen, Textile Chemistry graduate of 1941, is now a Second Lieutenant in the United States Army. Mr. Osteen is stationed at Fort Jackson.

T. M. Champion, Textile Engineering Graduate of 1940, is Overseer of Carding with The Marion Manufacturing Company of Marion, North Carolina.

W. C. Blakeney, Textile Engineering graduate of 1931, is Overseer of Spinning with the Springs Cotton Mills of Fort Mill, South Carolina.

P. J. Burns, Textile Engineering graduate of 1940, is now Lieutenant in the U. S. Army, and is stationed at Fort McPherson, Georgia.

S. M. Bush, Textile Chemistry graduate of 1941, is now connected with the Hercules Powder Co., Wilmington, Delaware.

L. S. Duval, Weaving and Designing graduate of 1936, is assistant Manager of the Ranlo Mfg. Co. (Burlington Group), Gastonia, N. C.

J. L. Edmonds, Textile Engineering graduate of 1941, is now in the Quartermaster Corps, United States Army.

W. C. Gilmore, class of '13, is now Overseer, designer, Duncan Mills, Greenville, South Carolina.

A. D. Graham, Textile Chemistry graduate of 1940, is now a Lieutenant in the U. S. Army, and is stationed at Fort Jackson, S. C.

G. W. Kirby, Textile Engineering graduate of 1941, is now in the Quartermaster Corps, United States Army.

R. B. Smith, Jr., Textile Engineering graduate of 1930, is now Supervisor of Spinning, E. I. duPont de Nemours, Inc., Charlotte, North Carolina.

J. E. Simkins, Jr., Textile Engineering graduate of 1939, is now a Lieutenant in the A-Medium Tank Regiment, U. S. Army, Fort Knox, Kentucky.

A. S. Sanders, Weaving and Designing graduate of 1938, is now a Lieutenant in the U. S. Marine Corps.

B. S. Rose, Textile Engineering graduate of 1931, is now Assistant Superintendent, Duncan Mills, Greenville, South Carolina.

WANTED: MEN
(continued from page three)

job, change from textiles today. When you start in a mill, you will probably be put to work cleaning looms, not only to give you an opportunity to learn but to see if you can "take it." The only way for you to "know" a job is to have run that job yourself, it gives you confidence and also a sense of justice to have worked in the more menial positions.

What about character? How are my morals? More supervisors in the textile industry have fallen by the wayside from "wine, women, and song" than for any other reason. You must command respect to be a leader. A man may get by on his energy and brain until he is forty-five, but then men are wanted for their character and experience.

When you become the manager of a mill, remember you are working for three groups. You are working for the stockholders of the mill, and you are the trustee and guardian of their property. You are also working for the employees in your mill. It is your duty to see that they are not imposed upon and that they get a square deal. You must also keep their jobs competitive; because if you do not manage the mill well, keep waste down, and give people jobs comparable with other mills, your people will be thrown out of work because of your negligence. You should keep your mill competitive in equipment: the day has passed when a "flying machine" can compete with a dive bomber. And third, you are working for the public. If you can make goods at the lowest cost, you can guarantee the public will be at your doorstep buying. Edison could have charged $10 an ace for his electric lights, but he did the world a service when he produced them at a reasonable cost to all.

And just as the world needed men ten, twenty-five, or fifty years ago, so it needs them today. As you walk along the street, you can see posters which state: "Uncle Sam needs you." And he does need you—in industry, farms, and professions. We have tried to tell you a few of the things he need in you. And remember this, fellows, when the world seems tough and you feel you haven't a chance—just put this in your pipe and smoke it: "There are more good jobs than there are good men to fill them."

Mr. Richard A. Martinell, Textile Chemistry graduate of 1940, is now a chemist in the Dye Department of the Baker-Camak Hosiery Mill in Burlington, North Carolina.
Clemson Textile School

Clemson Textile School moved into its new plant in September, 1938. This new building cost approximately $475,000, and has 127,000 square feet of space.

Clemson, having 353 students, has the largest four-year day enrollment of the ten textile schools in the U. S.

According to the records of this office the textile students are located in states per the attached. No doubt many of those in the column marked "Doubtful" are in textiles or allied industries.

During the past ten years, approximately 95 per cent of the textile graduates have gone into textiles or allied work such as teaching textiles, textiles sales, etc.

The enrollment has grown from some four or five students in 1893 to a present enrollment of 353. In addition to this number, we have about ten students taking special textile work, making a total of 363 students.

Since the compiled figures in the table below do not include the graduates of 1941 and do not take into account the changes due to military conditions, there have probably been some slight changes in the status of the Clemson graduates.

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AN OPEN LETTER

(continued from page seventeen)

library, a standard for the appreciation of other men's work, a host of new friends, the chance to learn manners from students who are gentlemen, and the chance to form character under professors who are cultured. You have done some hard thinking. You have taken yourself seriously. The world is yours. What are you going to make of it?

Sincerely yours,

THE EDITOR.

CORK VS. LEATHER ROLLS

(continued from page eight)

It is possible that there are some mill executives who will find that their costs do not compare favorably with the figures given here. Some will have better figures. Our advice to the former executive is not to jump to conclusions too quickly but to consider every point carefully. He should consider his cotton, his manufacturing machinery and methods, his counts, the skill and attitude of his operatives, as well as his roller-covering materials. Each has some weight in the final results.

Mr. W. E. Dunn, Textile Engineering graduate of 1938, is Assistant Superintendent of the Chiquola Manufacturing Company in Honea Path, South Carolina.

Mr. W. B. Harry, Textile Engineering graduate of 1938, is Assistant Superintendent of Minette Mills in Grover, North Carolina.

Mr. R. B. Fuller, Textile Engineering graduate of 1940, is Textile Designer with The Springs Cotton Mills in Lancaster, South Carolina.

Mr. W. J. Erwin, Textile Engineering graduate of 1921, is Vice-President of the Republic Cotton Mills in Great Falls, South Carolina.
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Greenville Textile Supply Co.
Greenville, South Carolina