OPERATING PRINCIPLE OF STATIC PRESSURE DRYERS

Without static pressure a yarn dryer must operate at atmospheric (approx. 15 PSIA) or one atmosphere.

A 150 HP blower operating at full H.P. load has an inlet capacity of 4000 CFM. When operating at one atmosphere and 280°F such a blower will handle 250 lbs. per minute, by weight, of saturated air containing a maximum of 8000 B.T.U.

A static pressure dryer requires an average of 100 HP when operated at 5 atmospheres (75 PSIA) and has an inlet capacity of 4000 CFM. If operated at 280°F, the blower will handle 5 times the weight of saturated air or 1,250 lbs. per minute containing a total of 40,000 B.T.U.

Drying is the process of evaporating moisture by heat. The static pressure dryer is more efficient since it provides 5 times the B.T.U. with 33 1/3% per cent less power consumption.

Fast dryers without static pressure are available. An interview with one of our experienced sales engineers will help you decide which type of drying is best for your needs.
# THE Bobbin & Beaker

Official Student Publication
Clemson Textile School

## Vol. 18
Spring Issue 1961
No. 3

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**THE BOBBIN & BEAKER.** Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge four times during the school year by students of the Clemson College School of Textiles. All rights reserved.

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This issue is the last one prepared by the current staff. We hope our publications have been of interest and use to the industry. The new staff will be headed by Bob Wall, the present Managing Editor.

The article on Saco Lowell Research Center concludes our series on research in the textile industry.

The article on the Portable Uniformity Meter is the evaluation that one mill did on this relatively new testing machine.

Of special interest, we feel, is the topic "What Should You Do? Have You Considered a Textile Career?" This is a subject which we feel should be emphasized to high school graduates. Only the people associated with the textile industry can show young people what an opportunity there is for them in textiles.
Evaluation and Possible Use
Of Portable Uniformity Meter

In this article the data obtained using the Portable Uniformity Meter will be compared with that obtained using the Uniformity Analyzer. The amount of data obtained is, of course, too great to include all of it. The highlights in each process will be discussed with findings and conclusions. A list of advantages and disadvantages of the Portable Uniformity Meter compared to the Uniformity Analyzer will be given for each process.

The procedures used in making Portable Uniformity Meter measurements are those recommended by the Lee Sona Corp., unless otherwise stated. The 95% NU determinations are by regular laboratory methods unless otherwise stated. For simplicity, the Portable Uniformity Meter will be termed “PUM” with Uniformity Index (U.I.) being the measured quantity. The Uniformity Analyzer (Laboratory Model) is termed “U.A” and its measurer quantity is “N.U.”

Of all processes tested, the PUM was used to greater advantage on Carding than any other.

Statistical calculation of U.I. data in two locations yielded the following summary results in Carding:

<table>
<thead>
<tr>
<th></th>
<th>#1 Location</th>
<th>#2 Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of weeks in calculations</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total No. of determinations</td>
<td>440</td>
<td>485</td>
</tr>
<tr>
<td>Average U.I.</td>
<td>100.33</td>
<td>95.86</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>7.22</td>
<td>4.55</td>
</tr>
<tr>
<td>Control Limit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95% Significance Level</td>
<td>107.32</td>
<td>104.96</td>
</tr>
<tr>
<td>99% Significance Level</td>
<td>114.31</td>
<td>109.51</td>
</tr>
</tbody>
</table>

From these data plus individual data by card, the following conclusion may be drawn:

1. There are only a relatively small number of cards in either location which have a high U.I. These, in general, are the cards which can be ascertained to have higher than normal % NU.

2. Cards which have U.I. in excess of the 95% significance Level Control Limit have deficiencies which were ascertained.

3. The machine variation in Location #2 is considerably less than in Location #1. This indicates that the cards in Location #2 operate more on an even level than those of Location #1. The closer Control Limits in Location #2 are the result of the smaller variability.

4. There is a significant lower U.I. of the Metallic Cards when compared to the Fillet Cards in Location #2. The average U.I. for Metallic Cards was 82.1 compared to the room overall average of 95.8. It was also observed that no Metallic Card had a U.I. of over 90 during the entire test, while no Fillet Card had a U.I. of less than 90. From previous % NU data this was believed to be true, but had never been tested statistically. This difference in U.I. is certainly significant and real.

5. In general, the Cards that are high one week remain high the following weeks some repair or adjustment is made to improve the U.I.

6. For ease of determining periodicities in Carding the PUM Chart is by far superior to the U.A. Chart. With the PUM Chart it was possible to find doffer periods which were very small in magnitude. Any other method of finding these small magnitude periodicities would have been unsatisfactory.

SIX

THE BOBBIN AND BEAKER
Various typical cards defects found include:
1. Doffer periodicities.
2. Low teeth on doffer gear.
3. Defective teeth in intermediate gears between the doffer and the calender rolls.
4. Low places all the way across the doffer caused by grinding rolls.
5. “Chattering” gears between doffer and calender roll.
6. Eccentric Feed Roll.
7. Bad selvages, tags, etc.
8. Low teeth in feed roll gear.

The advantages of the PUM in Carding uniformity tests are:
1. Very rapid.
2. Longer samples run without destroying sliver.
3. U.I. is simpler to obtain than % NU.
4. Periodicities and other defects show much more pronounced than with the U.A.
5. High U.I. is an indication of high nonuniformity.

6. Modifications of sensitivity and other settings may be made to affect the chart and not the U.I. Since % NU is always calculated from the chart, additional samples must be made if increased sensitivity is used.
7. The instrument is stable and drift is insignificant.

The disadvantages of the PUM in Carding are:
1. No coiler head deficiencies can be determined because sliver is tested before it reaches the coiler head.
2. Small differences in the nonuniformity cannot be detected with PUM.
3. U.I. does not consider the variation about the average weight produced by each card at any time. Instead it gives a variation about an average weight that we select. In % N.U. work, each sliver is adjusted for its own average weight.
4. Variations in delivery speed and weight of sliver from card to card introduce error in U.I.
A summary of U.I. measurements for Finisher Drawing at Location #1 and Finisher and Breaker Drawing at Location #2 is shown in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Location #1 Finisher Drawing</th>
<th>Location #2 Finisher Drawing</th>
<th>Location #2 Breaker Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No. of</td>
<td>207</td>
<td>157</td>
<td>157</td>
</tr>
<tr>
<td>determinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in calculations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average U.I.</td>
<td>98.39</td>
<td>98.46</td>
<td>101.38</td>
</tr>
<tr>
<td>Control Limit:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95% Significance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>106.17</td>
<td>106.62</td>
<td>113.02</td>
</tr>
<tr>
<td>99% Significance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>110.06</td>
<td>110.70</td>
<td>118.84</td>
</tr>
</tbody>
</table>

The control limit shows when a measurement becomes higher than normal. It is expected, at the 95% Significance Level Control Limit, that a deficiency or some other than normal condition exists at that particular delivery. Average U.I. from location to location cannot be compared because the weight of sliver, settings, of PUM, etc. are different.

The PUM's advantages in Drawing tests are:

1. In addition to the advantages found in Carding, the length of sample for a one-minute determination with the PUM is about 150 ft. as compared to the 25 ft. sample used with the U.A. This additional testing length is very much desired.

2. All finisher drawing deliveries can be checked in 2 to 2½ hours.

3. Very long term variation can be found if it exists using this relatively longer sample.

The disadvantages of the PUM in Drawing are:

1. No coil head defects can be observed because sliver is tested before it reaches the trumpet.

2. Sliver weight variation from delivery to delivery is not to be considered by PUM.

3. Magnet on the sliver head is not sufficiently strong to hold the head in place. The operator must manually hold the bridge box and head while making the measurement.

There are two methods of making measurements in the Roving process. First, one minute determinations may be made to obtain a U.I. reading. Second, a short section of Chart, about 10 seconds in duration, at each spindle location can be made and a comparison of these charts can be made to determine differences between spindle locations.

In Location #1, we found very little or no difference in the uniformity produced by the FS-2 frames either frame to frame or spindle to spindle. The FS-2 frames in Location #2 appeared to be similar to those experienced in Location #1. However, the Whitin frames, which produced the filling roving, appeared to be radically different from any of the FS-2 frames. Some of this difference is due to the finer hank roving (1.50).

We were able to determine, by U.I. and Chart readings, bad rolls which we inserted. In some cases we were able to determine some bad top rolls. For ex-

(Continued on page 15)
Since the Fall Issue of “Bobbin and Beaker,” Iota Chapter has made a field trip to Deering-Milliken Research Center in Spartanburg and Lyman Printing and Finishing Company in Lyman. While at the Research Center, the members were given an extensive tour of the building and its facilities. Very capable guides explained the various operations and answered all questions. After a very delightful meal was served in the dining room, the group then traveled to Lyman and enjoyed a most interesting tour of their printing and finishing operations. Faculty advisor David Gentry and Dr. Martin Chanin accompanied the group on these visits.

Iota Chapter, along with the NTMS and AATCC Chapters of the textile school, were entertained with a steak supper at Dan’s by Judson Mills and Gerrish-Milliken Mill on March 8. The supper was attended by prominent men from both of these Deering-Milliken Mills and members of the textile school staff and department heads.

Members of Iota Chapter assisted in registration and tours for the ASME—Textile Engineering Conference held March 15, 16, and 17 at the Clemson House.

Iota Chapter will have a softball team in the Spring Intramurals for the first time in years. It is hoped that this will create new interest in Phi Psi and will eventually develop into a very active participation in Intramurals by our Fraternity.

Members of Iota Chapter are looking forward to the Annual Phi Psi Convention in Washington, D. C. This convention offers an excellent opportunity for the student delegates to meet and talk with some of the top men in the textile industry as well as having a great deal of fun and fellowship.
The enrollment prospects for next year are looking up. The latest figures from the registrar’s office show that of next year’s entering freshmen 83 have signified a preference for one of the Textile Courses. This compares with 56 for the same time last year. The Clemson Liaison Committee is doing a wonderful job on selling a Textile career to the high school students, parents, and teachers. Betts Wilson is now visiting the committee members, giving what help he can.

In our curriculum revision of four years ago, we included a seminar course. The idea was to have men from the industry come in and speak to this class on a wide range of subjects. Besides the students taking the course, all other students and faculty members are invited to attend. We have tried to cover those fields that are least touched on in formal classes.

We have covered the field from cotton procurement to cloth selling. Included were speakers on personnel work, industrial relations, waste control, and many other subjects. We are tremendously pleased with the program.

Our research department continues to grow. Our last move is to air condition a laboratory to do combing research. We now have a contract to do some work on combing and we expect to increase this.

We are spending several thousand dollars bringing our slasher up-to-date. This includes a larger size kettle and the latest thing in controls. We are doing a great deal of work in the field of slashing research, both on cotton and man-made fibers.

We are in the process of starting up four new looms for doing a weaving evaluation study on the yarn spun in the pilot plant.

Come by to see us.
By
William E. Barrineau, Jr.

Age 22, John B. Swart came to Clemson from Venezuela in order that he might major in Textile Management. John, a foreign student of Dutch national- ity, lived in Buenos Aires, Argentina, for 4 years prior to moving to Caracas, Venezuela. One year later he came to Clemson. Practically every semester, John's name has appeared on the Dean's List of Honored Students.

John is now Vice President of the International Students Association, and Junior Warden for Bill Townsend, a Textile Chemistry major, is a married student. He has one child. Bill, age 22, is resident of Aiken, S. C.

Every semester of Bill's attendance at Clemson, his name has appeared on the Dean's List of Honored Students. Bill is a member of many campus organizations. His memberships include the PHI PSI, Block 'C' Club, Golf Team, AATCC, and Phi Kappa Phi. He has also served in the Air Force ROTC.

In the textile field, Bill has gained valuable experience with the Graniteville Company in Graniteville, S. C., having worked with this company for two summers.

A three-year basketball letter- man, David A. Wallace is honor- ed as an outstanding senior. Da- vid, age 22, is a Textile Management major from Spartanburg, South Carolina. David, a day student, is married and has two fine children.

David, who is on a full basket- ball scholarship, has kept up with his studies closely, for his name, too, has appeared on the Dean's List of Honored Students on several occasions.

David is a member of the PHI PSI and the Phi Kappa Delta. He is also a member of the Block "C" Club.

SPRING ISSUE 1961
Saco-Lowell Research Center

By Forrest Dixon

(Information furnished by Saco-Lowell)

The Saco-Lowell Research and Development Center has been charged with the important responsibility of designing and developing more efficient and more economical yarn preparatory machinery. Designed specifically for the research and development of textile machinery, this single story building of yellow faced brick contains forty thousand square feet, and situated on the top of a knoll occupying nearly thirty acres of the new Ravenel Research area overlooking the Clemson College campus. Air-conditioned and humidity controlled throughout, the building provides special prototype rooms, model shops, and a variety of laboratories which provide ideal conditions in which both research and development activities can be carried out.

While modern facilities are essential for effective research and development, the experience of the people who staff such a facility is even more important. The Saco-Lowell research and Development Center is staffed by an outstanding group of engineers and technicians headed by Robert M. Jones, Saco-Lowell Vice President and Director of the Research Center, and a forty year veteran of the company with many firsts and patents to his credit. Jones' staff, under the direction of Gordon C. Anderson, Harry J. Burnham, and Erhard E. Stiepel, combines the proven experience in the textile machinery industry with the fresh viewpoint provided by skilled engineers and technicians from other fields.

The Research and Development Center is divided into four departments—Research, Development, Test, and Administrative. The Research Department is responsible for the investigation of new ideas and to explore their feasibility when put into effect. The staff of this department takes into consideration all the ideas and theories which they gather from their own experience and from the ideas submitted by Saco-Lowell's representatives throughout the world. One main source of ideas for machine improvements comes from the textile industry where the need for more efficient and more economical operating machinery is a constant problem for competition in the industry. These ideas are transferred onto paper in the form of rough sketches and often small working models are constructed for the benefit of Saco-Lowell's engineers. A scientific appraisal of machines now in production is made and when possible machines in existence are incorporated into a new or 'beefed-up' machine to do the job. If the goal to be achieved requires a totally new concept, the drawings and notes are submitted to the Development Department. The main objective of the Research Department is to blaze new frontiers to assure the continuous improvement of the textile arts.

The Development Department, as the name implies, must, often starting from scratch, develop a new machine to do a job. If a totally new concept must be employed, the Development staff experiments with many ideas before the correct design for the part or the entire machine is found. Such was the case in the development of the Rovematic roving frame. When the need for a roving frame capable of turning out more roving at a lower cost was brought to the attention of top men at Saco-Lowell, they thoroughly investigated all aspects of the situation and concluded that a completely new concept of roving frame construction would be needed if production rates were to continue to rise on a sound basis. Re-working the old design any further was rejected as being impractical. Forcing more speed under heavier machine saving, would soon be paid for through the accelerated machine wear and breakdown which would naturally ensue. The development of a new machine requires three to five years of intensive ef-
fort because of the many concepts and ideas which must be tried before the most practical design is discovered. When the Development staff has completed a satisfactory working model the project is returned to the Testing Department into full size prototypes which are tested by the Testing Department.

The Testing Department submits the experimental parts from the Development Department to a most rigorous set of trials. The design is checked for its efficiency under ordinary mill conditions and then it is purposely abused to check its workmanship and endurance. The Testing Department compares the results of each test with those of a machine now in production and also with the standards set up by the other departments in the Research Center. If a part falls short on any one item, it is sent back to the Development Department, where it is revised or discarded in favor of a better or simpler design.

Throughout the Research Center importance is placed upon simplicity of design and ease of maintenance. A machine must be easily and economically made; however, this economy must not hinder the quality of the finished product. A properly constructed machine must also be easily repaired and cleaned. The design must be such that a replacement part can be installed or the machine itself overhauled when the need arises. One of the features of many Saco-Lowell developments is self-lubrication and to some extent self-cleaning. The Rovematic roving frame features a self-contained lubrication system which requires no servicing other than periodic inspection of the oil level. The self-lubrication and self-cleaning features alone clearly cut down on the maintenance of parts and extends the working of the machine.

Most developments coming out of Saco-Lowell's research take from three to five years from their first inception until they are in mass production and available to the textile machinery market. One of Saco-Lowell's recent developments is the model SJ Spinning Frame, a major stride forward in attaining higher production rates. To gain higher production the efforts of Saco-Lowell engineers were directed to the ring and the traveler, for many years the barriers against increased speed. The Saco-Lowell frame of 1952 proved that the old 'mile-a-minute' traveler speed concept was a myth and that by proper balloon control, it could be safely exceeded. Today, the new
Marathon Ring, coupled with proven balloon control, permits Spindle speeds unheard of for large packages just a few years ago.

However important speed is, it is of no benefit to the mills without constant maintenance of yarn quality. This is one of the great attributes of the Magne-Draft Pressure System. Using the forces of magnetic attraction to produce required roll pressures, Magne-Draft does away with conventional weighing apparatus and eliminates all lubrication (oil and grease) in the drafting zone. Magne-Draft is now proving in leading mills that it gives the cleanest, most efficient operation of any spinning drafting element ever developed. Because the magnetic forces are constant and not subject to the variables of mechanical weighing systems, Magne-Draft delivers a more uniform yarn.

The Magne-Draft concept was one of the major break-throughs in the improvement of spinning frames brought about by Saco-Lowell Research. The Magne-Draft concept was first worked on in 1946 and a patent was issued in 1954. This revolutionary idea was patented after only eight years of research and it is the first major change in design of drafting rolls on spinning frames in the history of that machine. The first full scale prototype was exhibited at the Textile Exposition in Greenville, South Carolina in 1958 and mass production was begun in 1959.

The Magne-Draft concept is a good example of the type of research carried on by Saco-Lowell. They are constantly striving to improve their machines and thus increase production and thereby cut operating costs in the mill. Research is the only way we can improve the textile industry. It is only through research that the future of the American Textile Industry can be assured.

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ample one spindle had a U.I. of 150 and % NU of 43.3%. Replacement of the top roll cleared this condition.

The advantages of the PUM in Roving are:
1. Relatively fast. Can measure one frame for U.I. on every spindle in about 3 hours. With the short method, all spindles may be checked in about one hour per frame.
2. Can spot check about 12 spindles to characterize a whole frame.

The PUM’s disadvantage in Roving are:
1. Shorter sample used. A one-minute determination will give about 35 feet of roving tested.
2. Some trouble with ends down.
3. Must be particular to get all roving twist out before making measurements.

In the Spinning process the PUM was used to check spindle to spindle, side to side, and frame differences. A summary of data for both sides of one warp frame appears below:

<table>
<thead>
<tr>
<th></th>
<th>Right Side</th>
<th>Left Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average U.I.</td>
<td>96.3</td>
<td>95.3</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.01</td>
<td>1.96</td>
</tr>
<tr>
<td>C. V.</td>
<td>2.09%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Highest Value Obtained</td>
<td>118</td>
<td>130</td>
</tr>
</tbody>
</table>

From this summary of data, it can be seen that some spindles throughout the side or frame have poor uniformity as compared to the frame average. The 130 U.I. spindle was due to a bad top roll, while no deficiency could be found at the 118 U.I. spindle to have a U.I. of 100, so presumably the 118 U.I. was due to some roving differences.

From this procedure, it was possible to determine some spindles which were producing poor quality work. Among these were bad front top rolls, condenser missing and a bad apron. However, most of these defects can be noted by careful inspection of the frame. Since it takes about 8 hours to measure...
one frame of spinning, it is impractical to consider measuring every spindle location. Careful inspection of spindle locations on one frame could be made probably in one half-hour.

The most realistic approach to spinning is to try to characterize a side by a small number of spindles in order to find high and low sides in terms of U.I. To do this, 12 spindles should be measured on each side in order to obtain a reliable result. This is based on a C.V. of approximately 7%, 5% sampling risk, and 1.4% error.

From data it has been determined that a side average must be higher than the average for the whole group of frames to be significant at the 99% level.

The advantages of the PUM in Spinning are:

1. It will pick out defects. However, most of these defects are apparent to the eye.
2. May be advantageous to determine sides which are producing high nonuniformities if used on a routine test basis.

The disadvantages of the PUM when applied to the Spinning process are:

1. Excessive ends down on filling.
2. Length of time required makes it impractical to determine the U.I. of every spindle.
3. Only short samples are used.
4. Small amounts of trash in the yarn causes extreme deflections of the meter. This, coupled with the low response of the meter, makes it extremely easy to obtain large erroneous readings.
5. Excessive drift occurs unless the machine is allowed to warm up for a period of two to three hours in the atmosphere of the room where the measurements are to be made.
6. Determination of U.I. in spinning is very fatiguing to the operator.

There are several general conclusions which can be drawn from these tests. The experience with the PUM has shown that it is a very good instrument to be used in carding. Also, drawing and roving can be measured effectively with this machine. However, its use in spinning does not seem to be advisable. Both machines have their own errors and bad features. In general, they agree quite well over a large range of uniformity, but small differences cannot be detected accurately. As long as both are consistent in their results, they will both be of value.
WHAT SHOULD YOU DO?

Have You Considered A Textile Career?

W. Harral Young, Jr., T.M. '61

When a boy graduates from High School it is seldom that he really knows what he wants in the way of a career. In this day of electronics and science a young man is easily confused with much of the "glamour" talk that is constantly being spread. Very often this same young man chooses one of the so-called glamour careers only to find that he is not satisfied with it. The time to make this all-important decision is before you choose a career for which you are not suited. Make this decision wisely for, chances are, this will be your life's work.

This school year there is a definite trend upward in the starting salaries being made by many textile companies which have interviewed at Clemson. The average offer is well over $400 per month with several offers exceeding the $500 per month mark.

Practically every textile student who will graduate this year has had several job offers. There are openings in sales, research, production, personnel, engineering, management and many other related fields. There seems to be an increase in the competition among the textile firms for the textile department graduates due to the ratio of graduates to the number of jobs open. Even if all the textile graduates do enter the textile industry many other openings will have to be filled from industrial management and engineering departments due to the large number of jobs available.

Many of the companies are also adding attractions to induce the better students to come to work for them. Several have added retirement programs for the management while others have added incentive and bonus plans for beginning executives.

Training programs of various forms are also being set up by many of the textile concerns. This has especially proved effective in securing the young graduates who are interested in the production fields. Many of the companies are also sending employees back to Clemson during the summer months to attend the short courses offered in the various textile fields.

The companies' interviewers look for different qualities in the graduates as they talk with them and inspect their records, but all seem to favor the student who has had some experience in textiles even if on a very limited level. A student with an outstanding extra-curricular activity record usually is an outstanding leader in industry. Of course grades play an important part in the selection of the graduates.

During the next few years there will be even more job opportunities for college graduates in the field of textiles and competition is expected to increase even more among the companies looking for management trainees.

Many of the large companies and larger chains of mills are even hiring graduates with military obligations. They hope that by working the young men the short time before they must enter the military service they will be able to rehire them after the military obligation is completed.

Are you still interested? Here are a few pertinent facts about the Clemson College School of Textiles. Clemson offers three major courses which lead to a Bachelor of Science degree. They are:

1. Textile Management—This is the area where textile specialist pool their knowledge and ideas and come up with the "woven wonders" that the public enjoys today. Surveys prove that qualified men get top managerial jobs faster in textiles than in any other industry. These same surveys also show that they stay there longer and make more money than in other industries.

2. Textile Chemistry—This graduate is primarily engaged in dyeing, bleaching, and finishing of the goods. Here, an otherwise poor looking fabric can be made to look attractive. These men were also instrumental in the development of wrinkle resistant, drip-dry and a host of other finishes. There is also a place for the Chemist in the synthetic fiber industry.

3. Textile Science—Although many of the textile manufacturing processes have remained basically unchanged through the years, the machines used to accomplish them have not. The Textile Scientist is primarily interested in the machines, how they operate, how they can be improved, and how certain operations can be eliminated or combined with others. Many graduates in this curriculum continue their education through graduate school and then on into research.
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DISCOLITE® - A concentrated reducing agent, highly stable at high temperatures, outstanding for discharge and vat color printing. Employed successfully wherever the reducing agent must dry into the fabric and retain its reducing power.

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

DISPERSALL - Effective retarder for dyeing vat colors, dispersing and leveling qualities, for dyeing mastic and vat colors, useful in wool and acetate dyeing. Valuable auxiliary in stripping vat colors, naphthols.

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

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