The Bobbin and Beaker Vol. 17 No. 2

Clemson University

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WINTER OF 1960

Bobbin & Beaker
VATROLITE® - Use this powerful concentrated reducing agent for brighter vat dyed colors on cotton, linen and rayon...for faster, cleaner stripping results on silk, cotton and rayon.

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

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

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

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

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

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

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

CHEMICAL COMPANY • CARLTON HILL, NEW JERSEY

Manufacturers of Chemicals for the Textile Industry
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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THE BOBBIN & BEAKER is a non-profit magazine organized to serve Clemson students and the textile industry. We ask our readers to consider favorably our advertisers when buying.
Textile Engineering

Textile engineering, as practically applied to new mills and modernization programs by Robert and Company Associates, has enabled many farsighted mill owners to step up production and lower unit cost.

In the past 42 years, Robert and Company Associates has served many of America's great names in the textile field—some for many years and on many projects.

TEXTILE PLANTS
SYNTHETIC TEXTILE PLANTS
FINISHING PLANTS
POWER and FILTRATION PLANTS
AIR CONDITIONING
SEWAGE DISPOSAL
and WASTE TREATMENT
PROCESS MACHINERY
and EQUIPMENT LAYOUTS

ROBERT AND COMPANY ASSOCIATES
ENGINEERING DIVISION
ATLANTA
This school year is the twentieth consecutive year that the Bobbin and Beaker has reached the textile industry. In this issue you will find the history of Burlington Industries as well as articles from several textile concerns concerning their products, industrial relations and other topics. The Clemson Alumni's attention is again called to the new column written by Dean Gaston Gage of the School of Textiles.
It is a well known fact of life that with every privilege there is also a responsibility. To shirk responsibility is to deny the right to future privilege.

If you grant us the privilege of serving your needs for wet processing equipment, we will gladly accept the responsibility of manufacturing equipment that performs to your satisfaction. Of course the first sale is important, but repeat sales mean you are convinced we have discharged our responsibilities well.
Development of
Gaston County
Dyeing Machine Company

Founded in 1921 by Robert F. Craig, well known
textile executive and mill owner, Gaston County
Dyeing Machine Co. has progressed from a small
local shop to its present status of the world’s largest
producer of pressure dyeing and drying machinery.
The founder felt that a county with more than 100
textile mills within its borders would be well known
throughout the textile world so the firm was named
for the county in which it is located. The present
management includes two sons and two grandsons of
the founder.

In the early days all equipment was made of cast
iron, which was inexpensive and had many good
qualities, but it also had many disadvantages for
wet-processing equipment. During the 1930’s it be-
came apparent that some corrosion-resistant and
stain-resistant metal would be necessary to replace
cast iron for dyeing operations. After experiments
with brass, aluminum and monel metal a decision
was made to try a new type of metal being developed
in steel mill laboratories. This proved to be a wise
move since the new metal was stainless steel, which
is now widely accepted for processing equipment.

In 1940 Gaston County introduced the first auto-
matically controlled dyeing machine. With today’s
emphasis on automation it is difficult to realize that
less than 20 years ago it required a real selling job to
convince mill management that automatic controls
were necessary and worth the additional cost. Since
those pioneering days many types of controls have
been developed so the dyeing machine of today per-
foms its function with a minimum of attention from
the machine operator.

In 1950 Gaston County pioneered the development
of machines for high temperature-high pressure dye-
ing of man-made fibers. This development assumes
greater importance each year as more new fibers
come from the laboratories and production plants of
the large chemical companies.

A new concept of yarn package drying was intro-
duced to the American textile industry by Gaston
County in 1956. Closed system, static pressure, rapid
dryers are now accepted as the most efficient method
of drying available. Completely automatic in opera-
tion, these machines will dry 500 pound batches of
yarn in approximately one hour as contrasted to 6 to
18 hours required by older types of yarn dryers.
Heated air under high pressure (75 PSIA) is circu-
lated through the yarn at a temperature of 280°F or
higher and the moisture from the yarn is condensed
and trapped from the closed system without loss of
air pressure. In addition to the obvious advantage of
fast production, this equipment improves yarn qual-
ity due to short exposure to heat and the elimination
of yarn contamination from the atmosphere. It has a
lower operating cost per pound of yarn processed
than any other type of drying.

Although the company has specialized in package
and beam dyeing and drying equipment during its
total history of nearly 40 years, it also produces
pressure dyeing machines for fabrics, autoclaves for
heat setting, raw stock dyeing machines and special
machinery, custom built to customer requirements.

Plant facilities include a new fabricating and as-
sembly plant completed in 1958 and equipped with
the most modern material handling equipment and
metal working machinery such as plate shears, form-
ing rolls, press brakes, punch presses and automatic
welding machines.

The machine shop has been expanded to include
the area formerly occupied by fabrication and as-
sembly operations. Since the company produces cen-
trifugal pumps, centrifugal blowers, special valves
and other machined parts for use on its dyeing ma-
chines and dryers, the shop is one of the most com-
plete and modern in the South. It is equipped with
late model heavy duty machine tools necessary for
machining stainless steel. This equipment includes
many sizes of engine lathes, horizontal and vertical turret lathes, milling machines, horizontal and vertical boring mills, radial drills and a variety of other machines. The shop is able to handle machine work on pieces up to 7 ft. diameter. Because of the scarcity of large machine tools in the South, other shops in the area as well as textile mills and power plants often call on Gaston County for assistance in machining large metal parts.

Gaston County sales engineers, with a combined total of 300 years of experience in serving the textile industry, are well informed and can be very valuable to mills in planning new installations or modernization and expansion of present facilities.

A large staff of engineers and technicians at the home office assist the field force of sales engineers in providing the best machinery designs for individual mill requirements. Every installation is tailored to suit the production requirements of the purchaser.

**TEXTILE QUIZ**

**QUESTIONS**

1. Who invented the power loom?
2. When was Textiles introduced into the Clemson curricula?
3. What is the Sulzer loom?
4. What kind of heddles are used to make Leno cloth?
5. Who invented the flying shuttle?
6. How has the cloth removing process on a loom been improved?
7. What new machine can spin direct from draw frame sliver?
8. What is the ideal temperature and humidity of the spinning room?
9. In what year was the modern card invented?
10. What wartime invention is especially designed for sizing nylon during winding?

**ANSWERS**

1. E. Cartwright.
2. September 1898.
3. A Swiss invention which does away with the regular shuttles.
4. Doup heddles.
5. John Kay.
6. The cloth is pulled through a slot in the weave room floor to the cloth room below.
7. The “Nastrofil” machine invented in Italy.
8. Temperature 75 to 80.
   Humidity 50% to 60%.
9. 1830.

**Compliments of the Amerotron Company**

A Division of Textron Inc.

Plants at:

WILLIAMSTON, S. C.
BELTON, S. C.
HONEA PATH, S. C.
BARNWELL, S. C.
HARTWELL, S. C.
ROBBINS, N. C.
RED SPRINGS, N. C.

★
The management of Woodside Mills has long realized that a well planned industrial relations program is just as important as their program concerning production and marketing techniques. Woodside management has established an industrial relations policy over the years that has proven its importance in a successful textile operation.

The staff conducting this program at Woodside Mills consists of Industrial Relations Director, who reports directly to one of the Company’s Vice Presidents; a Safety-Personnel Director, and a Personnel Manager at each of the company’s plants located in Greenville, Anderson, Fountain Inn, Simpsonville, Cateechee, Liberty and Easley, S. C.

The basic functions which are the responsibility of the Industrial Relations Department are:

1. Coordinate operations of the different personnel offices, establishing set policies and procedures.
2. Carry out a program to reduce accidents in the plants through safety training and education, proper medical treatment and prompt and efficient handling of accident claims.
3. Execute a program of public relations, creating goodwill between the company and the public.
4. Promote good employee relations.
5. Establish training programs for supervisors and prospective supervisors.
6. Coordinate company policies. To aid in the interpretation of managements’ policies to employees and employees’ views and attitudes to management.

The responsibilities which fall under these several divisions of the Industrial Relations program have been definitely outlined in a policy manual which is in the hands of all who are charged with these responsibilities.

Each personnel office has the responsibility of maintaining the proper labor supply at the individual plants. This also includes maintenance of proper records, interviews, orientation of new employees and follow-up and exit interviews with terminated employees.

Personnel offices also handle the insurance program which includes the group hospitalization and life insurance for all employees, Unemployment Compensation insurance and our self insurance program of Workman’s Compensation coverage.

The safety program charged with conducting frequent safety committee meeting and inspections, arranging and carrying out various awards programs made for outstanding records and planning and conducting accident prevention education.

To stimulate Woodside’s safety program, a Safety Contest is in effect at each plant which rewards employees who have attained outstanding safety records. It is an incentive type program which allows a supervisor to take his employees “out to dinner” as recognition of their attention to safety. Any six months period free of accidents among his group qualifies them for a safety dinner.

In addition to this plan, which is basically for the employee, an Employee-Family celebration is held for any plant which completes a million man-hours or one year without a lost-time accident. Woodside Mills has an excellent safety record so that the employee and family feeds are quite frequent.

Communication is a highly important phase of industrial relations at Woodside. There used to be an old saying that “no news is good news”, but that is not the thinking of Woodside management. Woodside attempts to advance the idea to the employee that their interests and management’s interests are one and the same and that basic to all managements’ acts and policies is the principle that its first concern must always be for the well being of its employees.

One of the strongest medias used in this communications program is an eight page tabloid newspaper, “Woodside Chain News.” This newspaper contains announcements and messages from top management, editorials, changes effecting the employees, modernization announcements and feature articles on various programs such as safety, quality and waste control, and many others.
Supplementing the newspaper are bulletin boards throughout the plants, weekly information bulletins originating from the personnel departments and posted on the boards, special informative meetings and direct contact between supervisory personnel and employees.

External communications include news releases to daily, weekly and trade publications on happenings within the mills of interest to the general public. Displays of finished products also are arranged for fairs and other public gatherings. Planned tours through the plants for community leaders keep them posted on the advances made through constant modernization.

Training programs include those for supervisors which present information and training that will help him carry out his duties as the immediate representative of company management to the employees. Follow-up and progress reports are made as new employees are trained.

Woodside has long been a leader in textile recreation and athletics. Four full time program directors and some part time directors carry out year-round programs. These programs are primarily for children of employees, however, employees have full access to the well equipped community buildings and gymnasiums at most plants.

A broad employee health program is in effect at Woodside under the direction of the Industrial Relations Department. Pre-employment physicals are mandatory for new employees and physical requirements, including visual standards must be met. This program has aided the health standards of employee by pointing up physical deficiencies which in most cases can be corrected before or during employment.

A number of special projects are undertaken by the Industrial Relations Department from time to time. A pictorial brochure describing Woodside Mills, was developed to show the progress of the company over the years. Special publications which aid the plant programs in cost, quality, safety and others are developed as needed.

Falling under the general supervision of this department are a number of special benefits for employees and members of their families. Gold watches are presented each year to a number of boys and girls selected as outstanding during their participation in the recreation and athletic program. College scholarships valued at $3,000 are awarded annually to the son or daughter of a Woodside employee. One half the cost of correspondence courses is paid for employees furthering their education in textiles. A savings plan is set up for employees who want a systematic method for saving by payroll deduction. These, plus many other employee benefits, round out a program designed to make the Woodside employee feel that he is a part of an organization which is interested in his well being.

While the Industrial Relations Department at Woodside operates under well-defined policies developed over the years by management, these policies do not remain static. They are constantly reviewed as conditions change to the end that the program will be effective and result producing.

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DESIZE with EXSIZE

A 40-year record of service to the cotton finishing industry assures you that Exsize removes starch

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Be Sure — Desize with Exsize!

PABST BREWING COMPANY
Industrial Products Division
Merchandise Mart
CHICAGO 54, ILLINOIS
What a Textile Graduate Can Expect

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 nearing 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 complete.

June 17, 1958
MEMORANDUM

Re: Supervisory Apprentice Training

I would like to set down in writing some thoughts as to how we should handle any college graduates or those we might desire to work through the plant on a training basis. It is thought that, if possible, the trainee should begin in the Standards Department as it would afford him an opportunity to better acquaint himself throughout the mill before starting in the productive departments. The following schedule is suggested:

Standards Department  1 Month
Weaving Department  3 Months
Warping & Slashing  2 Months
Dye House  1 Month
Spinning  1½ Months
Card Room  2½ Months
Designing  1 Month
Cloth Room  ½ Month
Shop  1 Month
Technical Department (Laboratory and Machine Inspection)  1 Month

Total:  14½ Months

The above suggested schedule may vary due to the progress being made by the trainee or the need to adjust the schedule due to departmental conditions.

If a department has not already done so, it is suggested that each department head make out a tentative outline of what they propose that such trainees do in their departments and give such copy to me.

The department head should check frequently on the progress being made by the trainee, and at the end of his time in his department, he should make a report on the trainee which would show the progress he has made, his knowledge of the technical phases and especially how he got along with other people.

Each trainee will also be asked to write a report covering the work done in each department; and these reports, together with the reports from the department heads, will be kept as a matter of record.

It is suggested that the Personnel Manager follow the schedule of any such trainees to be certain that they are moving from one department to the next upon completion of the suggested training period unless it is agreed that their stay in any department should be longer.

If there is any further questions concerning this procedure, please let me know.

[Signature]
Plant Manager

Copy to:
Personnel Manager
All Department Heads

The textile concerns send their representatives to talk to the prospects; from the students interviewed several are usually invited to visit the various plants and become familiar with their types of operations. If the student is still interested following his visit an offer is made soon thereafter. Many of the students choose the company with which they will work by the type of work they plan to do and not from the financial viewpoint alone.

The training program that is given by most mills is probably of as much value to the textile graduate as a Master’s Degree. It gives the graduate the much needed practical experience that is necessary before he becomes an executive.

Following is a memorandum issued by one of the leading textile firms in Tennessee concerning the type of training program this concern has developed to best train graduates in the cotton division of a fancy goods mill:

MEMORANDUM

Of course all training programs vary and must be modified as to the type of mill. It is rapidly becoming practically a necessity for every mill to develop some type of training program however.

In summary, the 1960 graduate can expect: (1) excellent working conditions; (2) higher beginning salaries; (3) more thorough and well-rounded training programs; (4) retirement programs; (5) jobs of the type or in the branch which they prefer.
Burlington Industries, Inc.

Burlington Industries, Inc., largest and most diversified textile manufacturing organization, began in North Carolina just 36 years ago.

From a single small plant in Burlington, N. C., the Company has grown to more than 120 plants in more than 90 communities in 16 states and four foreign countries. There are 58,000 employees in the far-flung enterprise today.

Mainspring to Burlington's phenomenal growth is Spencer Love, founder and chief executive of the Company. Mr. Love has remained at the helm of the Company from its beginning and is today Chairman and President of Burlington Industries, headquartered in Greensboro, N. C.

Young men were—and are—among his key executives in building the world's major textile concern.

Because the Company is young and growing, there must be emphasis on management development and executive training. Thus, Burlington each year seeks young men of imagination, initiative and ability, who find rewarding careers with Burlington.

Mr. Love said recently: “One of the problems facing American industry today, and particularly the textile industry, is the expanding need for management-caliber personnel. Virtually unlimited opportunities exist, and the selection, training and development of young people to fill the managerial jobs of tomorrow has become vital to us.

“More than ever before, challenging and exciting careers are available in textiles. Our industry can be very rewarding to those with ability, those who are willing to learn the business and make a real contribution to its progress. The competition in textiles does result in keen and constant demand for good talent, and thus the opportunity for financial rewards must be commensurately greater in order to meet the demand.”

Burlington's diversification within virtually every phase of textiles makes available a variety of career opportunities—in many different fields—to the graduate concerned with personal growth and development and a career in line for staff management.

While a young man after World War I service as an Army officer, Mr. Love worked at his first textile job in Gastonia, N. C., and soon owned the mill.

When the possibility of a new plant in Burlington came up in 1923, Mr. Love sold his Gastonia real estate and moved his machinery to Burlington, which gave its name, its blessing and some of its money to help the new textile plant get underway.

Cotton mills of that day were having difficulties, but Mr. Love became interested in a little-known man-made fiber, rayon. It was a start that within 10 years was to take Burlington to a predominant position as the largest weaver of rayon fabrics in America.

In 1925, only two years after the Company began, a wooden wall was installed at Plant Number Two at Piedmont Heights in Burlington. Plant Number Two was an expansion of the Company's first plant. The temporary wooden wall, which could be easily removed for future expansion, was symbolic of the spirit of progress shown by Company leaders who firmly believed that Burlington would succeed and grow. The Wooden wall, a door to the future, was often repeated as swift expansion became a Burlington trademark.

By 1937, Burlington had established 30 new rayon weaving plants with sales of $27,000,000 annually, and that year made its first public stock offering on the New York Stock Exchange. Every year since, Burlington has earned a profit and paid consecutive dividends.

The Company had weathered the Great Depression, expanding while other textile mills were closing. In 1938, Burlington began building full-fashionéd hosiery plants, the same year that DuPont introduced nylon. When the war came in 1941, Burlington had 40 plants and sales of 63,000,000.

Burlington's pace accelerated after World War II, through expansion of existing operations and acquisition of promising companies in other textile fields. These developments brought Burlington into tricot fabrics, for lingerie and blouses; into the ribbon and narrow fabrics' business; more significantly than ever into hosiery; and for the first time into the dyeing and finishing field. Later there were even broader diversifications into woolens, worsteds, cottons, vinyl-coated fabrics, glass fabrics, upholstery fabrics, woven and knitted pile fabrics, and many others.

Burlington produces an endless array of textile products. It is a major supplier of fabrics for every type of apparel, for the home, and for industrial uses.

(continued on page sixteen)
The trustees of the J. E. Sirrine Textile Foundation met at the School of Textiles on November 14. They were the guests of the college at lunch and at the football game. Most of you do not realize what this foundation does for the School.

* * * * *

We are in the process of getting bids to air condition two processing laboratories. One will be for weaving and one for yarn manufacturing. These laboratories are essential if we are to carry out our research program. They will be located on the first floor where the old freshman laboratory was.

* * * * *

David Gentry, '55, has accepted a position in our research department. He received his masters degree at the Institute of Textile Technology at Charlottesville in 1957 and has been in research since. He will be a great asset to our program.

* * * * *

I, along with the heads of other textile schools, visited San Joaquin Valley in California in October. We were guests of the National Cotton Council. That trip was an eye-opener. We visited one ranch that was sending 1000 bales of cotton a day to the gins and last year averaged 4½ bales to the acre on 20,000 acres. No boll weevils and no rain, everything is irrigated. They have a great program in plant breeding at the Shafter Experiment Station.

* * * * *

Betts Wilson has been hard at work on the recruiting program. He has visited high schools, talked to students and has secured names and addresses of boys who say they are interested in textiles as a career. These names are being mailed out to the mills in the students home community. Please give this program any help that you can.

* * * * *

As you know, we have, for several years, offered graduate work in Textile Chemistry. We are now working on a graduate program in Textile Management. There is a faculty committee headed by Professor Campbell working on this program.

* * * * *

The USDA Pilot Spinning Plant is now running its 1000 spindles on two shifts. Plans are in the making to do some weaving as well as spinning in the overall program.

* * * * *

J. D. Hollingsworth and Sons is giving us a "granular" card change over. It will be installed on a Saco-Pette card of about 1902. This will make an old card modern by donations. Large 42 x 18 coiler by McDouough Power Equipment Company, comb box and comb by Southern States Equipment Company, individual drive by Earulard Electric Service, licker-in hood by Textile Sheet Metal and metallic clothing, licker-in clothing and now granular top by J. D. Hollingsworth and Sons. We appreciate these gifts.
Outstanding Seniors...

David Lee Cain is a Textile Management major from Slater, S. C. David is married and is living at Clemson while attending school. David majored in Mechanical Engineering for his first two years at Clemson. Since changing to textiles, David has made honors every semester.

Mack E. Atkinson is a textile Chemistry major from Spartanburg, S. C. Mack has gotten that much needed experience in textile research by working two summers at Reeves Plastics, Inc., three summers at Fairforest Finishing Plant in Spartanburg, and one summer at National Starch and Chemical Corporation. Since he plans to enter the research phase of the industry, he has gained valuable experience.

Dan L. Brewton is a Textile Manufacturing major from Greer, S. C. At the present time he lives in Clemson with his wife and two children. Dan served in the Army from 1954-1956 as an instructor in Teletype and Message Center Operations.

Although Dan has the responsibilities of being a family man, he still finds time to be treasurer of the Phi Psi. Dan also received scholastic honors the second semester of his freshman and sophomore years and both semesters of his junior year.

David is a member of the NTMS and the SAM. David has worked three summers at the J. P. Stevens Company, Inc., in Slater, S. C. David has been helped through school by the Veterans Orphans Benefit, free tuition from the State Government, and the Board of Education Scholarship.

When David graduates he will probably enlist in the Army for six months and then serve in the active reserves for several years.

Mack has received scholastic honors four out of six semesters at Clemson. He is also president of the Phi Psi and a member of the Council of Club Presidents.

Mack has been helped through school with two different scholarships. His first two years he received the Reeves Brothers, Inc., scholarship and his last two years received the Ciba scholarship.

Dan received the Keever Starch Scholarship for his senior year to help with his expenses while at Clemson.
BURLINGTON INDUSTRIES Inc.
(continued from page thirteen)

It is the largest weaver of man-made fibers, of worsteds and woolens, of glass fabrics, the largest of hosiery manufacturers and one of the largest factors in cotton textiles.

Only two fibers, rayon and cotton, were used by Burlington 36 years ago. Today the Company utilizes more than 26 natural and man-made fibers, as well as blends of the various fibers which makes possible new and better fabrics, each with special advantages for particular uses.

Rated 53rd in size by Fortune Magazine's 1958 survey of the 500 leading industrial firms, based on sales volume, Burlington's 1959 fiscal year sales totaled $805,450,000, while 1958 sales amounted to $651,461,000.

Recently Burlington's dynamic Mr. Love, in a foreword to a new Company brochure, summed up operations and philosophy of the Burlington organization in this manner.

"We are largely in a fashion business, and sales are affected by fashion and consumer preference as one fiber or fabric replaces another. By operating in all textile fields Burlington is better able to operate profitably, overcoming the peaks and valleys associated with nondiversification. Direction and purpose, and efficiency and economy, are possible through centrally managed functions and staff services. Broad forward planning major policy decisions are vested in experienced over-all management and an active Board of Directors.

"To these advantages add diversification into almost every textile field... modern plant facilities and equipment... competent personnel... constant research and development of new and better textiles... consistent high-quality standards... Imaginative designing and styling complemented by hard-hitting merchandising and selling... and you have the reasons for Burlington's growth.

"Our creed is a simple one: To serve the best interests of our customers, our employees, our stockholders, and the communities in which we operate.

"The future holds new and exciting developments for textiles—progress that will far overshadow all that has gone before—and Burlington intends to be the leader."
All fields of industry consist of two distinct types of producers: (1) the Me-Too group who rush to imitate the originators and (2) the Me-Better individuals who recognize that a surer way to success lies in doing it better. It is in the latter category that Dow’s new Zefran fiber comes; more than that, it has always been a ruling factor in the determination of any new venture that if the company could not make something better than existing competition Dow would not make it at all.

**Dow started in 1897** at Midland, Michigan. Herbert H. Dow was a young chemist who had devised new processes for extracting bromine and chlorine from natural brines; it was not long afterward that his company added calcium and magnesium compounds from the same source, and to this very day brine chemistry is a major part of the entire Dow operation. From here to a fiber development like Zefran might appear to be quite a jump; actually the latter is the result of a gentle transition achieved through research. Dow annually invests 3% of its total sales in research, always keeping in mind Herbert Dow’s precept: If we can’t do it better, why do it at all?

**From Organic Chemistry to the Aesthetic**

During World War I, Dow entered the field of organic chemistry; the company was responsible for the first American production of synthetic indigo dye, and synthetic phenol which is one of the work horses in chemistry and the starting point of a widely used plastic; during the same period Dow undertook the production of metallic magnesium, and ultimately the name of Dow became synonymous with magnesium.

By World War II, the company was ready with the only commercial production of styrene; this is one of the two major components of synthetic rubber, and it is also the base from which polystyrene plastic is made; four huge plants which Dow built and operated to produce magnesium and styrene worked exclusively for the Government. When the founder of the company died, his son Dr. Willard H. Dow was made president and guided the company for 20 years; upon his death in a plane crash in 1949, he was succeeded by Dr. Leland I. Doan who was then director of sales. The company has grown considerably; it is today the fourth largest producer of chemicals in this country . . . but the one basic philosophy has remained constant: either do it better, or don’t do it at all.

Today Dow produces several hundred different chemical products; each has led to another in close and logical affinity. To list the succession of plastics developments by the company is unnecessary; the main point is that it was merely a matter of time before Dow would get into fibers . . . and specifically into the production of a fiber like Zefran. But here again, despite the fact that Dow had the facilities and a waiting market, Herbert Dow’s thinking dominated.

**Manifold Objective for Zefran**

The assignment given to the research and development staff was this:

1. What type of fiber has a logical and waiting market?
2. What characteristics do existing competitive fibers lack?
3. Which features should be added or substituted to make the fiber easier to finish, easier to manipulate into good fabrics and to create easy-to-needle fabrics?

The first decision, from the marketing staff, was that Dow should bring out an acrylic fiber. True, others existed; but field research unearthed the fact that several desirable characteristics would be warmly greeted by everyone concerned, from fiber spinner to consumer. Generically, what was urgently needed was a new acrylic with built-in aesthetic features . . . and now the baton was handed to the laboratory technicians: the making of an acrylic was not the objective; rather, it must be an acrylic which would have a better dye affinity, one which would resist pilling, one which would have more of the hand which typifies the natural fibers.

Zefran, originally titled Q-1204 was born after nine years of arduous research effort. It was the result of
teamwork by the chemists under Dr. G. William Stanton; it stemmed from a most careful screening of the many types of polymers to find the one best suited to modern needs. In the course of this research many fiber possibilities were hit upon, some of them already in existence and some in improved versions. But it was not until the very end that the chemists finally developed the formula for the one acrylic which not only matched existing fibers in structural and functional form, but was endowed with all of the aesthetic features which Dow sought.

The virtues of acrylics were already known to textile chemists before Dow started on its own study . . . but so were the disadvantages. Here, again, the thinking of Herbert H. Dow was put to work: do it better, or don't do it at all. First came field research among consumers, weavers, finishers, cutters and retailers. Good as acrylics were, what would it take to make them better? When the great mass of data was correlated and analyzed, the factors which had to be included.

1. A new acrylic would have to take dyes better than existing fibers.
2. It must be economical to produce, easy to manipulate.
3. It must be widely adaptable, to meet the varying needs for a great diversification of finished product.
4. It must be adapted to blending with other fibers.
5. It must have a more natural hand, or feel.
6. It must contribute better draping and needling qualities, to reduce sewing costs.
7. It must reduce the tendency toward pilling.
8. It must parallel the leaning to Wash and Wear fibers.

These were the goals which were put before Dow’s chemical technologists in the plant at Pittsburg, California and Dr. G. William Stanton, chief of this group. Work started on this project in 1949; for the Fall season of 1958, Zefran made it bow as the fait accompli.

Zefran Goes Through Actual Experience

One of the most significant portions of Dow research on Zefran is in the pilot plant built at Pittsburg. In this building Zefran, from its inception, has been subjected to every type of actual manipulation through which it must pass in secondary hands. This includes every step of processing from spinning through cutting and sewing; it puts Zefran up against the problems anticipated when it has to be dyed, woven, finished, cut and then needled and pressed; if any troubles show up in the pilot plant, the way to overcome them is developed before Dow’s customers and their customers go into production. Thus, there is almost a prior guarantee of satisfaction attached to the fiber.

Technically, Zefran, like other acrylic fibers, is based on the raw material acrylonitrile, which is a derivative of natural gas; the big difference is that somewhere along the line of production, a dye-receptive component has been incorporated into the fiber. Because of this, Zefran is given a greater flexibility in the choice of dyestuffs that can be used to color it, than any other fiber whether natural or synthetic, without sacrificing any of the inherent physical properties of the fiber. Exceptional dyeability on standard equipment, outstanding resistance to pilling, good dimensional stability, a pleasant hand and durability have already been scientifically (and through practical testing) proved to be Zefran’s strong points in either woven or knitted fabrics.

Still Being Improved

No one at Dow calls Zefran a miracle fiber. They hasten to point out that despite its many advantages, Zefran still faces certain chemical problems which are being worked on: a sensitivity to highly alkaline solutions in bleaching (for which Dow already has a corrective recommendation); Zefran does not now spin into the high bulk yarns currently popular in some sweater applications; dyeing Zefran in special shades presents peculiar problems which Dow’s technical service group can help to solve.

But the facts already proved indicate that Zefran is not only a new acrylic but in many ways what Herbert H. Dow asked for: a better one. With a better fiber came the problem: How to merchandise it best? It was decided that rather than throw Zefran onto the open market, a sounder plan would be to place it carefully with a selected group of fabric producers; they in turn would not only develop specialty fabrics but channel the distribution to manufacturers noted for their openness to new ideas. In short, the introduction of Zefran for Fall 1958 was to be in the form of limited editions . . . and this is precisely what is now available. Those millmen who have been working with the fiber report that it offers ease of processing on conventional equipment, and that it presents an unusual ability to take fast dyes without the use of pressure, carriers or other extreme conditions. Manufacturers state that the various types of cloths woven and knitted with yarn made from Zefran offer no problems in factory handling; and

(continued on page twenty)
A Progress Report on Plastic Shuttles

In the Summer, 1957 edition of the Bobbin & Beaker, the SOUTHERN SHUTTLES DIVISION OF STEEL HEDDLE MFG. CO. was privileged to present an article on its plastic shuttle—the SOUTHERN DURAMOLD. This present article will attempt to cover the additional information and further results obtained during the intervening two years.

In mid-1957, plastic shuttles, while having completely emerged from the development stage, were still in their relative-infancy as a production item in the country's weaving mills. Since then plastic units have rapidly become the standard and sole shuttle used in countless mills on all types of looms, and on many, many different fabrics. For example: it is estimated conservatively that almost 35% of the looms operating in the state of South Carolina are weaving with plastic shuttles and approximately this same proportion will be found in all sections of the textile industry. It is significant also that this tremendous acceptance has come about in the short space of the last two or three years.

At the present time nearly 20% of the shuttles produced by the SOUTHERN SHUTTLES DIVISION are made of our DURAMOLD material, and it is felt that this proportion will continue to grow very rapidly over the next few years.

It is further interesting to note the types of fabrics upon which these shuttles are being used so successfully. Since initial concentration was in this field, the majority of DURAMOLD shuttles are employed in the weaving of cotton. There is also a very wide usage in the field of spun synthetics. Although the introduction of plastic shuttles in the sizes required by woollen and worsted looms has been made more recently, they are presently cornering a sizable portion of this market. It is only in the field of fine filament weaving that a widespread acceptance has not been forthcoming and the reasons for this will be examined later in this article.

DURAMOLD-type shuttles have returned a particularly rewarding performance in conditions where the shuttle design is comparatively weak. (As an example: in shuttles of the overall specifications proper for an 8” quill, which have been redesigned to accommodate an 8-3/4” quill.) In wooden shuttles produced to these designs a higher degree of failure through splitting is encountered than is the case in conventionally-designed shuttles. However, when DURAMOLD material has been used for shuttles of this type (known as LEP—Larger Filling Package—Shuttles) this splitting has been eliminated and complete satisfaction has been gained.

Figures as to the life expectancy of DURAMOLD shuttles compared to conventional shuttles varies from mill to mill. It is generally conceded, however, that a life ratio of 3 to 1 in favor of the plastic shuttles may be reasonably expected, and performance considerably in excess of this is not out of the ordinary.

To cite examples:
One mill has considered several types of looms running on DURAMOLD for the last full year and has compared shuttle-consumption with their shuttle-consumption for wooden shuttles the year before. On a block of C & K jacquard looms the shuttle usage ratio of DURAMOLD to dogwood...
is 1 to 6.38; on a block of terry looms the ratio was 1 to 4, and on a block of C-5 looms the ratio was 1 to 3.38. This mill has computed their total savings in shuttle costs for the year at almost $3,400.00.

Another large group of cotton mills has reported that after large-scale tests for 13 months, the average life of blocks of DURAMOLD shuttles was 47.7 weeks, as against an average life for wooden shuttles of 14.3 weeks. In addition to this, it is interesting to note that 60% of the DURAMOLD shuttles involved in the test were still running on the date when these figures were taken.

As was to be expected in projects of this sort, several minor problems concerning plastic shuttles arose during their development. However, one by one these have been eliminated through proper design and improved material, to the point where today the only remaining objection appears to be the increased weight characteristic of all plastic shuttles. The materials molded into DURAMOLD shuttles have a specific gravity of approximately 1.35 as compared to a specific gravity of .8 — .85 for dogwood. In finished shuttle stage this amounts to 1-1/2 to 2 ounces in an 8"-quill cotton shuttle (due to the percentage of the shuttle's weight that comes from the metal fittings which remain standard, regardless of the body material itself).

In most instances the weight objection is magnified beyond its true significance. Through proper loom adjustments DURAMOLD shuttles may be boxed in almost any loom with relatively the same force found with conventional wooden shuttles. This has been proven many times in mills where early complaints on weight were received, but where DURAMOLD shuttles were adjudged completely satisfactory after experience in running them had been gathered. Due to the delicate nature of the yarns involved, this weight increase has been, and continues to be a source of particular trouble in the weaving of filament yarns. It is something upon which research is presently being concentrated, and it is felt that the objection may be removed within the near future.

Another problem which arises from time to time deals with the replacement of certain metal fittings, notably the grip or spring which holds the bobbin, in plastic shuttles. This higher replacement frequency is the result of the extremely long life of the shuttle and such replacement is to be expected. However, unless attention is paid to replacing the grip at the proper time, a condition can arise where grips that are worn out are allowed to continue to operate in DURAMOLD shuttles, with the resulting drop in the bobbin. This, of course, will result in filling breaks and must be guarded against through periodic in-

spection of the grip and replacement where indicated. In addition, SOUTHERN Research is striving constantly to develop long-lasting, better grips and fits and several promising designs are presently being evaluated in selected mills.

In summation, it is felt that the DURAMOLD shuttle has justified the confidence that the SOUTHERN SHUTTLES DIVISION has had in its future. It is at present a very important product on the shuttle market and we are confident that it will continue to gain in use until within a very few years more DURAMOLD plastic shuttles will be produced than are produced out of dogwood.

ZEFRAN
(continued from page eighteen)

the retailers who have committed their stores to Fall purchases anticipate good acceptance by the consumer.

But Dow is not shutting off its research and development work at this point. The same technical services which were offered in the very beginning are still available to every business company which works with yarn made from Zefran, or is seeking to develop new products; and always there is the Dow service which offers to put the yarn through a test run under the actual future handling conditions which it must meet, to iron out bugs before the spinner, weaver, knitter, finisher or manufacturer gets involved.

First Fabrics Now Available

Among the fabrics available this Fall are wool and specialty fibers blended with Zefran for women's, men's and children's apparel; blends with rayon in dressweight goods; and 100% new fabrics being in the development or finished stage right now. Union-dyed blends of Zefran have created a great deal of interest among mills; pad-steam dyeing in the larger cotton mills, in the regular cotton technology, has produced excellent results for Fall; printed cloths combining Zefran with cotton will be vat-dyed for Spring and Summer fabrics, based on satisfactory tests already made. And for both men's and women's suits, a 6- to 6½-ounce tropical worsted blend with Zefran promises to be a successful venture.

The new fiber will be aggressively promoted by Dow, by the fabric makers and by the manufacturers who are showing Zefran. The simple statement of facts about Zefran should see this new fiber in millions of consumer homes within a short period of time.
At the first meeting of the Iota Chapter, Phi Psi, at Clemson College, eight new members were tapped. These members were invited to become members of the National Honorary Fraternity established on the Clemson campus in 1927.


The first two degrees were given the new members by Grand Council President Bellemere and Second Vice President Anderson along with Grand Secretary W. C. Whitten on October 27 following a banquet at the Clemson House.

The third and final degree was given by the chapter on December 7.

Of interest is the fact that seven of our brothers have received scholarships for outstanding scholastic work. They are: Mack Atkinson, TC Senior, President of the Phi Psi, Iota Chapter, was awarded the Ciba Scholarship; Dan Brewton, TM Senior, Treasurer of the Iota Chapter was awarded the Keefer Starch Scholarship; Don Faile, TM Senior, Junior Warden of Iota Chapter, was chosen to receive the David Jennings Memorial Scholarship; Bernard Brown, TM Senior, was awarded the Seydell-Woolley and Company Scholarship; Jay Adams, TS Junior received upon entering Clemson the Southern Textile Manufacturers Association Scholarship; Aubrey Adams, TM Junior, received the Southern Textile Overseers Scholarship; and W. Harral Young, Jr., received the Carolina Yarn Association Scholarship.

The National Textile Manufacturing Society is enjoying an active year under the supervision of their new faculty advisor, Mr. H. B. Wilson.

Several projects have been undertaken for the school year. Field trips have been made to various textile plants which were of special interest to the club members. Several more trips are also being planned.

A party was held at the Boscobel Country Club to better acquaint the members with each other. It was a tremendous success. The Society is also planning to prepare small pillows with "Clemson" on them for sale among the students.

The officers for the current year are: Alan Bell, President; Sammy Fleming, Vice President; Tommy Arial, Treasurer; and Harral Young, Secretary.
The Bobbin and Beaker, official publication of Clemson College School of Textiles, will observe its twentieth anniversary this calendar year. For two decades it has been serving both the textile industry and Clemson students.

This magazine is published four times each year with each issue featuring a theme on some phase of the textile industry; for example, one issue may feature textile machine companies together with their products, while the next issue may place emphasis on research programs in various mills and plants. The staff plans to continue the policy of offering a variety of articles covering the many branches of the textile field to insure a well-rounded magazine for those whom we seek to serve.

20th Anniversary
The Bobbin and Beaker

Each issue of the Bobbin and Beaker goes out to approximately 2,000 business concerns, educational institutions, and individuals. These 2,000 copies travel to practically every state in the United States and to several foreign countries. The magazine is mailed free of charge to anyone asking that it be sent.

The Bobbin and Beaker is edited and published by a senior and junior staff. The senior staff is composed of seniors from Clemson's textile school. It consists of an editor-in-chief, advertising editor, circulation manager, and a business manager. The junior staff consists of four juniors from Clemson's textile school; these junior staff members serve as assistants to the senior staff. Together these student staff members carry out all functions necessary for the publication of the Bobbin and Beaker. A faculty member from the School of Textiles serves as advisor for the staff.

Many of the articles that appear in the magazine are written by guest writers from the textile industry. Other articles are prepared by staff members from rough drafts or essential facts sent to them from various sources. A column written by the Dean of the School of Textiles now appears in every issue; this column is especially written for Clemson College School of Textiles alumni; it contains many important happenings in Clemson's textile school. Another column of interest to the textile industry as well as to the Clemson students is the "Outstanding Seniors." This article or column features three Clemson students elected by the faculty, students considered by the faculty to be outstanding in their graduating class.

The Bobbin and Beaker is supported entirely by the advertisements which appear in each issue. The Sirrine Foundation provides the magazine staff with a banquet each spring and provides an honorarium for each senior staff member; it also backs the publication in the event a loss occurs on any issue.

The Bobbin and Beaker was originally organized by the Iota Chapter of Phi Psi Fraternity to be published and distributed to the textile industry. In the twenty years following its organization it has continued to be published quarterly and still serves the textile industry and college students. Future plans are also being made both for expansion and for improved ways for presentation of material. The major draw-back is the financial side of the picture. Larger editions will require many more advertisements which at present are hard to obtain. The Bobbin and Beaker is a non-profit organization. Any surplus funds saved from one issue is used to improve the next.

This magazine is the chief contact between the textile industry and Clemson's textile school students, since it has articles on both, articles which are prepared by both industry and students as well. Any company which has any speeches, articles, or other information that may be of interest to our readers may submit such material to the editor. The views and opinions expressed in articles in the Bobbin and Beaker are not necessarily those of the staff or the textile school. All sides of any subject are presented as fairly as possible.

The Bobbin and Beaker staff is open to all suggestions or criticisms and will appreciate any letters of such nature on your part. It is our goal to present to you, our reader, the type of magazine that you would best like and profit by. Also any support by any of the textile industry in the way of advertisements will certainly be of great help.

We, the members of the present staff, feel that the former staffs have published excellent magazines. We feel especially honored to have been chosen to follow those who have performed so superbly in the past and only hope that we can follow at least "afar off."
SAFETY!

GENERAL SAFETY SUGGESTIONS

1. Report all injuries to your foreman at once regardless of how slight. Small cuts and scratches may become infected and should have first aid treatment immediately.

2. Report all unguarded machines or unsafe or unsanitary conditions to your foreman.

3. Help keep plant clean by keeping paper and trash off the floors and putting all empty cartons and paper cups in trash cans.

4. Take time to pick up objects you find on the floor which might cause you or someone else to fall.

5. Watch for oily or wet spots on the floors and pay particular attention to "Wet Floor" signs.

6. Walk—do not run. This applies especially to those pushing boxes or trucks.

7. Scuffling, horse-play or practical jokes are childish and have no place in an industrial plant.

8. Compressed air is dangerous and should not be used for blowing off clothes.

9. Loose or "baggy" clothing should not be worn around machinery.

10. Wear safety shoes or shoes heavy enough to protect your feet.

11. On account of the fire hazard, smoking is allowed only in lunch rooms and certain offices.

12. Use of chewing tobacco or snuff is unsanitary and is not permitted anywhere in the plant. Do not spit on floor, machinery or in drinking fountains.

13. Get help in lifting heavy objects and always lift with your legs instead of your back.

14. Always use goggles when operating emery wheels or where dirt or lint is likely to get in eyes.

15. Do not carry open knives or sharp instruments in your pockets unless protected by holsters.

16. Do not attempt to fix anything of an electrical nature unless it is part of your job.

17. Be careful in using ladders. Report them if out of fix, and return them to proper place when not in use.

18. Do not remove gear covers of guards while machinery is in motion unless instructed to do so, and then see that everyone is in the clear.

19. Never attempt to stop a machine by grabbing a belt or using any part of the body as a brake.

20. If you must shift a belt by hand, always use the palm with the thumb and forefinger extended.

21. Use only tools that are properly sharpened and in good condition.

22. Never use a wrench or other makeshift as a hammer.

23. When repairing machinery, do not scatter tools or extra parts on the floor.

24. Keep your work bench clean and see that everything is in its place.

25. Remove all projecting nails from barrels, boxes and other places where they might cause an accident. Notify your foreman of any boxes or bins that need repairing.
SPECIAL DEPARTMENTAL SAFETY SUGGESTIONS

Carding:
1. When cutting bale ties, keep face as far from bale as possible. Also, keep others away from cutting ties.
2. Be careful to remove all ties and tie buckles from floor.
3. Keep cleaning rags or waste away from high speed beater or fan shafts.
4. Never raise beater covers unless power is off and the beater locks are securely in place. Report any locks not working properly to your foreman.
5. Start new picker lap around lap pin with the palm of your hand; never use your fingers.
6. Use light stick to remove flyings from under Cards.
7. Be sure cylinder has stopped before opening stripping doors.
8. Do not place mop or brushes under Card.
9. When starting lap machine, keep your hands clear of wooden spool.
10. Do not cut off steel roll laps. Get section man to do this.

Spinning:
1. Never stand top cleaner board on end when cleaning rollers; place on top of creel.
2. Do not wear long or loose hair around spinning frames. Use hair net if necessary.

Preparation:
1. In starting new beam on warpers, be very careful to avoid catching fingers between beam and drum.
2. Keep floor clean of starch, size and water around slashers.
3. Keep front delivery roll guard in position when slasher is running.
4. Always stack empty beams in a safe manner.
5. Be sure steam is cut off before raising size kettle lid, and then raise slowly to avoid hot size splashing on operator.

Weaving:
1. Never allow one person to push back shuttle and another to start loom at same time.
2. Fixer should have power turned off or shuttle out of loom before working under looms.
3. When replacing fuse in motor switch, be sure electric current is off.
4. Weavers should carry scissors for trimming broken ends off of cloth.

Cloth Room:
1. Keep cloth tubes in proper place.
2. Never try to stop folder blade as it travels toward you.
3. Keep folded cloth and rolls of cloth stacked neatly.

General:
1. Release clutch before shifting belts on all lathes and milling machines.
2. Clamp work securely in drill presses and milling machines. This is easier and safer than holding part with your hands.
3. Take lathe bits out of holder while placing heavy work between chuck or centers.
4. Only authorized persons are permitted to use rip saw or band saw.
5. Electricians should never do any work on electric circuits until current is cut off. Be certain to test line and place “Danger—Man on Line” sign at disconnected switch.
6. Do not jump fuses or heater relays.
7. Remember, no job is finished until materials is cleaned up, waste and rubbish placed in proper container, and tools are back in proper place.

TWENTY-FOUR

THE BOBBIN AND BEAKER
E. I. du Pont de Nemours and Company Incorporated

The selling prices of Du Pont products on the average have dropped below the level of 1949 despite the rising tide of inflation.

The company said today this was made possible by the rising volume of sales and reduction in costs through technological improvements. Sales have doubled since 1949 and this year will go over two billion dollars for the first time.

"Had it not been for the inflation in almost everything we have to pay for, our prices could have been even lower," said Ira T. Ellis, chief economist of the company. "Even so, we have now been able to overcome most of the postwar inflation as far as our own prices are concerned."

Du Pont produces about 1,200 products and product lines so diversified that they go into every category of manufacturing in the nation, primarily as raw materials used by other industries largely for consumer products. Thus the prices of Du Pont products have the effect of holding down prices all down the line.

Ten years ago Du Pont prices were on the way up along with everything else. Until 1951 they went up at about the same rate as prices generally. For the next two years the company was able to hold them almost even, and then, in 1954, it was able to start them down, a trend which has now brought its price level below 1949.

Statistically, Du Pont's index of selling prices was 104 in 1949 (the customary base of 1947-49 equaling 100). By 1951 it had risen to 112. Starting the downturn in 1954, it went to 105 in 1958. At the latest tabulation (for November 1959), it had declined to 103.4. The index represents a composite of the prices of the company's broad product lines, Mr. Ellis explained. Thus some products may be up when others are down.

Du Pont had its first billion dollar sales year in 1949. While sales have doubled since then, so have taxes, wages and salaries, and other major costs. During the same time, the company created about 12,000 new jobs, principally in the commercialization of new products.

The increasing physical volume of production was one of the major factors in the company's ability to bring down prices, Mr. Ellis said. "A larger sales volume usually produces lower unit costs, especially for newly developed products," he explained.

Coupled with this is the never-ending job of process improvement to make things better and at lower cost, he said. "In a highly competitive industry, Du Pont has sought operating economies just as tenaciously as it has scouted new and larger markets for both old and new products."

The results stem from the company's expanding technological improvements and from the larger operating investment in facilities, he explained. Since the war, the company has spent close to two billion dollars for new plant capacity, plant modernization, and laboratory and service facilities.

In contrast to Du Pont's declining price level, the consumer price index went up 13 per cent since 1951 and industrial products generally rose 11 per cent. Mr. Ellis pointed out that this rise in the cost of living was caused largely by the rise in prices of housing, food, public and private transportation, and medical care.

Earlier in the year, John F. Daley, a vice president and adviser on sales, said, "Some Du Pont price reductions were made to meet competition while others were made to widen markets, a development made possible by strong, continuous research programs and generous expenditures for new and improved manufacturing facilities. These expenditures enabled us to trim unit costs. We expect to continue these efforts with, we hope, favorable effects on our selling prices."

He cautioned that higher production costs cannot always be absorbed by technological improvements or greater output. "There are times when the pressure from costs overwhelms the advantages gained from process improvements and new technology. Then we can stay in a particular line only by raising prices to cover part of the increases."

Prices across the range of Du Pont products have been generally holding steady or declining slightly in recent years. Of the older products, fibers, dyes, and petroleum chemicals generally are down, reflecting continuing process improvements and greater output. A typical nylon yarn, for example, sold for $2.70 a pound in 1954 and now is $2.30.

Most plastics and farm chemicals are among the major product groups holding steady. Prices of newer fibers have come down as technology has been improved, with some price reductions made to broaden markets. "Mylar" polyester film, titanium metal, and hyper-pure silicon are examples of newer products undergoing price cuts since start-up of commercial operations. The recently announced price cuts on "Teflon" FEP fluorocarbon film and "Teflon" TFE fluorocarbon resin also typify that situation.
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A complete staff of field engineers to solve your problems.

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Enthusiasm is an important ingredient of success. This is true whether the job is preparing a lesson for tomorrow’s class or carrying out an assignment in industry. We at Cone Mills are enthusiastic about the future of the textile industry and there are many job opportunities for those young people who would like to share this enthusiasm with us.

CONE MILLS CORPORATION

"Where fabrics of tomorrow are woven today."

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FINISHING DIVISION: Executive Offices, Greenville, S. C.