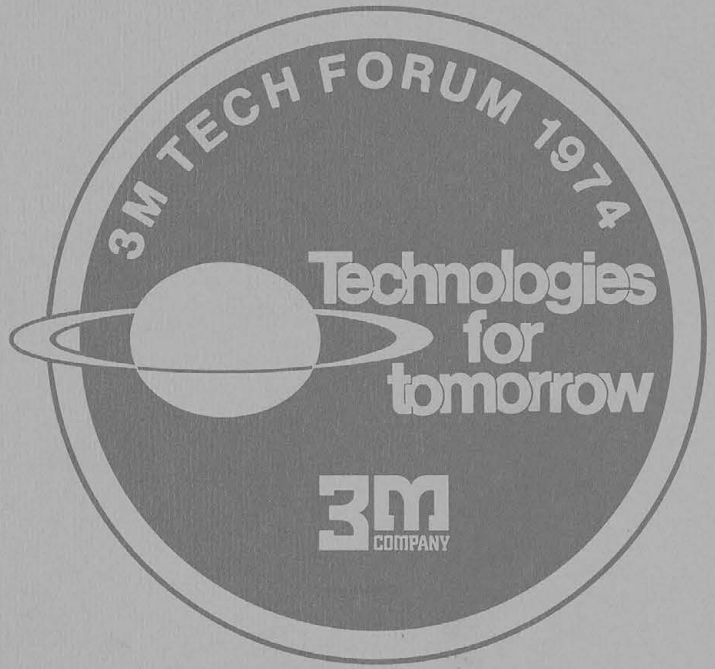
Alvin W. Boese Papers.

Copyright Notice:

This material may be protected by copyright law (U.S. Code, Title 17). Researchers are liable for any infringement. For more information, visit www.mnhs.org/copyright.

Version 3
August 20, 2018



May 22 9:00 A.M. - 5:00 P.M.
May 23 9:00 A.M. - 2:30 P.M.

THIS INFORMATION SHOULD BE TREATED AS 3M COMPANY CONFIDENTIAL AND NOT DISCUSSED OUTSIDE THE TECHNICAL COMMUNITY

CAREY JR PATRICK H
CORP INNOVATIVE LAB
53 5 M-17

"CASE STUDY OF AN IDEA - NON-WOVENS"

Almost $100 million annually from one idea — sound unbelievable? It's not. Today, non-wovens in their various forms account for many millions of dollars in sales from several divisions at 3M. Names like Sasheen, Scotch Brite, Micropore, Rescue and Fibremat mean non-woven technology. How did it start?

In 1940, the Tape Laboratory needed a *non-corrosive* backing for an electrical tape that was inexpensive and patentable. Several unsuccessful attempts were made using a "wet" approach similar to paper manufacture with synthetic fibers. The "dry" dispersal approach similar to paper manufacture with synthetic fibers. The "dry" dispersal approach by Al Boese yielded the first non-wovens — an inexpensive new process for web manufacture. A carding machine called a Garnett which is commonly used in the textile industry was purchased to "comb" the fibers into a web. By proper choice of fibers, a heat bonding technique for the web was developed to "cure" the fibers into a non-woven substrate. However, the web had insufficient strength to be used for a tape backing, so the project was terminated. The initial objective was not accomplished. Thinking that non-wovens had a place at 3M, "enterpenuer" Boese bootlegged a continuing laboratory effort for non-woven technology and market potential.

In 1942, Boese displayed his wares to management, convincing them to reestablish the non-woven laboratory under a new wartime objective to develop a non-abrasive, lint free lens cleaning tissue. Under Dick Drew, the Product Fabrication (Profab) Laboratory was organized to include a non-woven project. Initially, John W. Pearson, Warren Hurd, Vic Potter and Boese experimented with non-wovens to develop new 3M products. A lens tissue, "Mistlon" was manufactured, as well as a light diffuser for photographers. In 1944 the "Trimite" Polishing Cloth, developed for Western Electric, utilized a soft abrasive on a non-woven backing. While never expanding into a million dollar market, "Trimite" is still manufactured today.

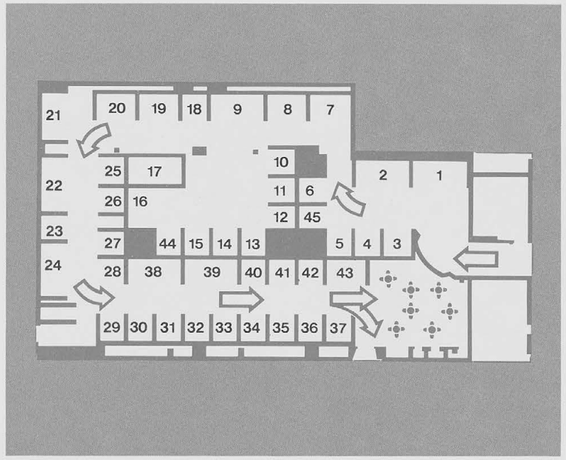
Also in 1944, the first ribbon was developed and marketed in the old "Golden Rule" (Donaldsons). Non-wovens as ribbon were cheaper and more easily printed than colored cloth. To broaden the scope of fiber technology used for non-wovens, an exploratory program was established with Hercules Powder to spin new fibers for achieving various properties. Howard Hoover and Galen Meirs spent six months perfecting techniques for the unique fibers which later became the basis for "Lacelon." This was 3M's entry into fiber spinning which is now a business primarily for the BS & CP Division. From 1946 to 1949, ribbon was the successful non-woven from the Profab Lab. "Mistlon", "Sasheen" and "Lacelon" were marketed as 3Ms first decorative products. Unsuccessful non-wovens included bookcovers, draperies and window display material.

The early '50s saw the ribbon group split to form the Carfab Lab (carded non-woven fabrication) which soon became the Gift Wrap Division under Al Redpath. "Decorette" ribbon was added to the product line. In 1955, the original objective of an electrical tape was accomplished by the introduction of a thermally bonded polyester web. Polyester also allowed for non-woven electrical insulation (Fibremat), dusting fabrics and other profitable products. By impregnating the fibers with resins, the molded products could be manufactured — the first being bra cups and shoulder pads. The marketing of products such as these was a new challenge which could not be overcome at that time. However, the bra cups moved up to become dust masks in 1959 with medical and weather masks a few years later.

The Profab Lab continued their non-woven development under Ralph Oace using an air deposited web (Rando technique). From the mid '50s through the '60s, the Profab Lab was charged to expand non-woven technology to new products for many divisions.

Until 1956, non-wovens had been manufactured from light denier fibers treated in two dimensions. With heavy denier fibers, the third dimension could be combed forming a new, soft abrasive called "Scotch Brite." With fiber and web technology multiplying, several divisions discovered non-wovens as solutions to their problems. Printing Products needed a dampening sleeve for the litho presses — non-wovens were the answer. A press pad for the "209" in Duplicating could only be made of non-wovens. Tapes and dressings for medical use were patented from non-woven technology. Blown microfine fibers for sterile medical masks allow for further diversification of non-woven products. The list goes on and on. Non-wovens can do the job neither cloth nor paper can do. They can be made from heat shrinkable fibers, water soluble fibers and even from metallic fibers. The webs can be reinforced, needled, laminated or molded. They can be porous or dense, rigid or stretchable. Most all of the synthetic fibers can be used as a basis for non-woven webs. Non-woven technology is by no means dead. Almost daily someone is finding a new variation of fibers or a new treatment method for the web to solve a problem or create a new product. Non-wovens may be an answer to an objective on which you are working.

In 1940, "non-woven" was a *Technology for Tomorrow.* It has blossomed from one idea into many products. It has solved many problems while creating profits for many divisions. The "Non-woven Focal Display" at the 1974 Annual Event is a case history of an idea. Are your ideas today going to become tomorrow's technologies? In a decade from now, will your work have a similar story? As Mr. Herzog stated, "We expect all our projects to become departments, all our departments to become divisions and all our divisions to become groups." Stop at the Annual Event for the full non-woven story.



1 Instrumentation and Control Systems Engineering

PSSA-A PROBLEM SOLVING SYSTEM - This exhibit presents advanced control systems technology comprising the problem solving level of 3M's *first* multi-level process computer control installation.

The easy to use, conversational programs featured include: process optimization and modeling and a versatile manufacturing management information system.

UV FLUORESCENCE GAUGE - A device used for measuring ultra-thin coatings. A dye is added to the product and the resulting fluorescence is correlated to weight.

MAGNETIC WEB STEERING DEVICE - A device using plastiform and a magnetic transducer to steer a web.

2 Printing Productions Division

TRANSFER KEY - A unique single sheet four color proofing system.

PYROFAX - A rapid access means for producing lithoplates employing magnedynamic imaging and elastomer transfer technologies.

3 New Business Ventures Division

AUTOMATIC BACTERIA COLONY COUNTER AND ANTIBIOTIC SENSITIVITY ANALYZER - Optical scanning instruments; the first was introduced in March, 1973 and the second is about to be introduced.

4 Special Enterprises and B.S. & C.P.

RECLAIM, RECYCLE, AND REUSE - This display presents technologies for reclaiming, recycling, or reusing materials at 3M, as well as new product applications for reclaimed material.

5 Systems Research Laboratory - Central Research

CONTINUOUS PHOTOGRAPHIC EMULSION - Continuous manufacture of photographic emulsion on a lab scale at a rate of one litre per hour.

6 3-M National Advertising

ADVANCEMENTS IN DISPLAY - Tomorrow's graphic imagery techniques and display concepts for interior decoration as well as indoor/outdoor advertising.

7 Microfilm Products Division

ELECTRONIC IMAGING - Magnetic stylus recording will be demonstrated; illustrating concepts for erasible displays, imaging on plain paper, and reduction of images to microfilm (CDM). Laser beam modulation and deflection concepts will also be shown.

8 Commercial Tape Division

COLD EXTRUSION DEVICE - Demonstration of a device used for extrusion of solid thermoplastic materials at ambient temperature through various substrates.

LIQUID CRYSTAL TECHNOLOGY - Fluids which change color with temperature are utilized to form temperature indicating devices.

9 Photo Products Division

THE 3M TRIMAX SYSTEM - A new system of x-ray film and screens has recently been introduced. This system and related developing technology represents the joint efforts of 3M Research, 3M Italia, and 3M St. Paul.

10 B.S. & C.P. Magnetics Project

ACTIVATED MAGNETICS - A plurality of magnetic elements are moved with an alternating current magnetic field for the purpose of cleaning, polishing, and depositing metals on various substrates.

11 Electro-Products Division-Telcomm Department

MS² TESTING - New interface equipment extends MS² technology to rapid testing and pair identification in telecommunications cables.

12 Electronic Products Division

MICRO INTERCONNECTING SYSTEMS - A basic description of circuits shows how this system bridges the gap between the microscopic world of integrated circuit chips and the macroscopic world. These circuits are generally provided in a continuous web with standard movie film formats. Precise location of conductor leads and very tight tolerances facilitate automated customer bonding systems. This provides increased circuit reliability and tremendous cost savings.

13 Duplicating Products

TWO DISTINCT TECHNOLOGIES - A sophisticated microelectronic method of machine control used in 3M imaging systems. A new system producing images directly from electronic signals with a unique 3M dry toner, a stylus array, and a magnetic system of toner display.

14 Engineering Research

PRECISION CURTAIN COATING - This display will feature a precision curtain coating demonstration. This technique produces ultra-thin coatings at speeds up to 1000 FPM.

15 Chemical Resources

CREATIVE NEW USES FROM CONVENTIONAL COMPOUNDS - New uses for butadiene-styrene polymers, components of cashew nut oil, and tetrahyrdofuran will be featured.

16 Traffic Control Products

"OPTICOM" BRAND TRAFFIC CONTROL DEVICES - This system is used to give priority treatment to designated vehicles at signalized intersections. A pulsating light source is used for vehicle to signal communications.

17 Physics and Materials Laboratory

MATERIALS TAILORED TO A NEED - New developments in magnetic materials, catalytic systems, refractory coatings, and injection molding will be shown. The theme unifying these varied areas is a capability of providing material properties needed for new products by combining basic physical understanding with synthetic and fabrication skills.

18 Mincom Division

NEW TECHNOLOGIES IN NEW PRODUCTS - An array of hardware for the Audio, Video, and Computer markets will be on display. Featured will be specialized test instruments, a high speed cassette duplicator, the Data Cartridge drive, the Dolby-modified eight-track cartridge recorder, and a special effects generator with a switcher-fader for video programming with unique wipes and dissolves.

19 Medical Products Division

PATIENT AND ANIMAL CARE - This exhibit will highlight the total system approach to respiratory care and electrosurgical equipment.

20 Magnetic Audio/Video and Data Recording Products Divisions

XRM-IV - A new, high-output magnetic media, whose preparation required the preparation of uniform, submicron metal particles, processing of pyrophoric materials, coating of 0.0004 inch layers of magnetic material, and corrosion inhibition of fine, reactive metal particles.

PROMAT - A low cost, high quality technique for providing rapid and accurate display graphics.

21 Industrial Graphics Division

NEGATIVE ACTING, PROJECTION EXPOSED CAMERA PLATE - Quality offset printing obtained by blowback from negative microfilm, aperture cards, fiche, etc. to a 3M proprietary silver halide plate.

PRESENSITIZED SILK SCREEN STENCIL - This product based upon photopolymer technology will also be featured.

22 Visual Products Division

TECHNOLOGIES FOR TALKING PICTURES - A presentation covering some unique technologies used in the development of products which provide "Talking Pictures", including "Sound-On-Slide", "Live Slides" and "Sound Page" Systems which are used in education, industry, and now in the home. A proprietary 3M technology will also be demonstrated showing the rapid processing of 35 mm color slides especially suited for presentation use.

23 Sound Products

COMMUNICATIONS RECORDING SYSTEM - New products displayed will be voice communication recording and playback machines and a time announcing clock highlighting motor speed measurement, a low torque mechanical clutch, and the Vox circuit technologies.

24 Traffic Control Materials Laboratory

DIAMOND GRADE SHEETING - An all plastic, prismatic retro-reflective sheeting using miniature cube corner reflective elements with performance far superior to conventional glass bead sheeting.

25 Technical Planning and Coordination

SCIENTIFIC AND TECHNICAL COMMUNICATIONS - Two information services are featured. On-line computer searching of several subject fields will be demonstrated. Industrial Standards from Engineering Library will be displayed.

26 Central Research Pilot Plant Development Laboratory

SOLVENTLESS TECHNOLOGIES - A demonstration of several 3M approaches to conversion from solvent to solventless processing, and emphasize our desire to stimulate ideas and help with problems in solventless processing.

27 Nuclear Products Department

NEW APPLICATIONS OF RADIO-ISOTOPES - Some new devices for the elimination of static electricity will be exhibited by our Static Eliminator group.

The Nuclear Medical group will display new radiopharmaceuticals, for diagnosis of disease.

28 Special Enterprises Department

OPTIMIZATION OF 3M'S EPX RESIN - Extension of this basic technology has resulted in several new products such as relective tires, protective rubber coatings, and high traction footwear.

29 Industrial Abrasives Division

TRINATTA PRODUCTS - Displayed will be structured stone aggregate tile, elastomeric simulated wood products, elastomeric exposed aggregate flooring and paneling, and desk and table top items. Films will illustrate how many 3M processes and technologies have been incorporated into these products.

30 Electronics and Optics (CRL)

DETECTORS AND SENSORS - Plastic films are used to convert pressure and temperature changes into electrical signals. Methods were developed to produce continuously poled films which are piezoelectric and pyroelectric. Prototype devices such as motion detectors, smoke and CO detectors, thermal shut-offs, imaging systems, weight detectors, strain gauges, throw-away thermometers, flame detectors, and traffic velocity meters will be displayed.

31 Decorative Products Division

FROM FILM TO FORM - Two decorative forms via film technology involve simulated veneer and injection molded "Matina". Simulates veneer finishes and looks like expensive furniture veneer. Molded "Matina" offers quality reproduction of various textured masters.

32 Traffic Control Products Division, Safety Systems Department

REFLECTIVE GARMENTS FOR NIGHT TIME SAFETY - This display will show both daytime and night time slides and samples of reflective stripes on garments and totally reflectorized garments.

33 Industrial Specialties Division

VIBRATION DAMPING AND SOUND ISOLATION - The application of the basic principle of constrained layer damping has resulted in new products such as saw blade, ski, seismic, and bridge dampers. Action displays will demonstrate this principle.

34 Advanced Research Programs Laboratory

BLOOD RETICULOCYTE COUNTER - This display will demonstrate a prototype for analyzing blood smears. Coherent optical processing with Weiner-Kolmogoroff filtering is used to estimate the reticulocyte count. Reticulocytes are immature red blood cells. An abnormally high count is useful in the diagnosis of anemia and internal hemorrage. Manual counting is tedious and expensive. The prototype is as accurate as a medical technician and about 300 times faster.

35 Paper Products Division

3M BRAND ACTION/MARK PAPER RESPONSE SYSTEMS - Stimulus/response teaching systems, for any educational level, utilizing paper based feedback systems, comprising "visible" information and "invisible" feedback responses. Special imagers reveal the feedback response only when desired.

36 Commercial Chemicals Division

ANTI-STAT, SOIL-RESISTANT CARPET TREATMENT - The properties of these treatments will be demonstrated in action displays by a treated-untreated sample pair on the floor, humidity conditions will be attempted to show antistatic properties, as well as resistance to oil and water borne stains.

POLYURETHANE LATEX (PUL) APPLICATIONS - This display will show the PUL's used in waterproof coatings, carpet backings, upholstery backcoats, and as KNEEGUARD for overalls.

37 Technical Ceramic Products Division

CORRUGATED CERAMICS - 3M's THERMACOMB Brand corrugated ceramics are being developed for air to air heat exchange applications. Ceramics provide numerous advantages over other materials as they are resistant to corrosion, have low thermal expansions, and can operate at high temperatures. In corrugated form ceramics provide low pressure drop, high surface area, and low density.

38 Industrial Mineral Products Division

PATCHWOOD BRAND WOOD REPAIR - A complete and fully proven two part polymer synthetic patching system now used by plywood, wood molding, and millwork producers.

39 Riker Laboratories

ACUPAN - A NEW ANALGESIC - The various stages of development of Riker's new analgesic drug, ACUPAN, will be illustrated. This drug is a novel analgesic which is superior to many of the currently used agents. The design and synthesis, evaluation of safety and efficacy, metabolism, dosage form development and clinical evaluation will be displayed.

40 A.C. & S.

JET MELT BRAND HOT MELT ADHESIVES - A presentation of hot melt adhesives including performance, application equipment, and a discussion of new technologies.

41 Packaging Systems Division

PACKAGING FOR TOMORROW - Four new packaging concepts will be displayed: SCOTCHPILLOW, an on-site inflatable dunnage cushioning; Portable L-clip Applicator, applies an "L" clip of filament tape for closing and reinforcing shipping cartons; SCOTCHSTRAP, polyester strapping for bundling, unitizing, and palletizing applications; SCOTCHTAB Cone Closure, a pressure-sensitive can closure system designed to package carbonated beverages.

42 Industrial Tape Division

WATER DISPELLABLE HOT MELT ADHESIVES - The new water dispellable hot melt adhesive technology will be displayed and several applications of the subject material will be described.

43 Film and Allied Products Division

PRODUCTION WEB INSPECTION - A device using laser scanning for flaw counting and classifying will be demonstrated.

TRIPLE MANIFORD DIE - Co-extrusion in this device offers a new dimension to web product design. This will also be a working display.

44 Environmental Engineering and Pollution Control Department

RESOURCE RECOVERY BY ENVIRONMENTAL ENGINEERING - This display will include two models of pollution control processes employing recovery of solvents or heat. Description of several other pollution control resource recovery systems will also be depicted in flowsheet schematics. A film demonstrating departmental functions and efforts towards resource recovery will be continuously show on a backlit movie screen.

45 Chemical Research Laboratory - Central Research

NEW NOVEL MATERIALS - Four novel materials to be displayed include hard abrasion resistant coatings for plastic, stabilized vinyl films, flexible inorganic membranes and uniformly sized biodegradable microspheres.

SPECIAL INSTRUCTIONS

1. This brochure, along with your company pass, will admit you to the Building 224 Auditorium - Universe Room anytime during the show hours.

May 22	9:00 A.M. - 5:00 P.M.
May 23	9:00 A.M. - 2:30 P.M.

THE NAME ON THE BROCHURE AND
THE PASS MUST BE THE SAME

2. Please retain the GREEN card attached to this brochure and turn it in at the door so that we can keep track of attendance.
3. Since we expect an increase in the amount of food service in the Building 222 Cafeteria, we ask that you indicate where you will take lunch. Please check and return the enclosed PINK card.
4. Parking facilities will be strained by the large number of visitors to "Technologies for Tomorrow". Please do the maximum amount of walking or car pooling.
5. The Carleton Awards will be on Thursday, May 23rd at 3:00 P.M. in the Building 222 Cafeteria. The displays will be closed for these awards.

We hope that all of you will take the time to visit this event.

The 1974 Tech Forum Annual Event Committee

Ken Biederman — Chairman
Wes Bruxvoort — Security
Dave Bucheck — Souvenir
Shirley Collins — Facilities
Steve Johnston — Publicity
Ross Serold — Focal Display
Roger Smith — Divisional Displays

"CASE STUDY OF AN IDEA - NON-WOVENS"

Almost $100 million annually from one idea -- sound unbelievable? It's not. Today, non-wovens in their various forms account for many millions of dollars in sales from several divisions at 3M. Names like Sasheen, Scotch Brite, Micropore, Rescue and Fibremat mean non-woven technology. How did it start?

In 1940, the Tape Laboratory needed a non-corrosive backing for an electrical tape that was inexpensive and patentable. Several unsuccessful attempts were made using a "wet" approach similar to paper manufacture with synthetic fibers. The "dry" dispersal approach by Al Boese yielded the first non-wovens -- an inexpensive new process for web manufacture. A carding machine called a Garnett which is commonly used in the textile industry was purchased to "comb" the fibers into a web. By proper choice of fibers, a heat bonding technique for the web was developed to "cure" the fibers into a non-woven substrate. However, the web had insufficient strength to be used for a tape backing, so the project was terminated. The initial objective was not accomplished. Thinking that non-wovens had a place at 3M, "entrepenuer" Boese bootlegged a continuing laboratory effort for non-woven technology and market potential.

In 1942, Boese displayed his wares to management, convincing them to reestablish the non-woven laboratory under a new wartime objective to develop a non-abrasive, lint free lens cleaning tissue. Under Dick Drew, the Product Fabrication (Profab) Laboratory was organized to include a non-woven project. Initially, John W. Pearson, Warren Hurd, Vic Potter and Boese experimented with non-wovens to develop new 3M products. A lens tissue, "Mistlon" was manufactured, as well as a light diffuser for photographers. In 1944 the "Trimite" Polishing Cloth, developed for Western Electric, utilized a soft abrasive on a non-woven backing. While never expanding into a million dollar market, "Trimite" is still manufactured today.

Also in 1944, the first ribbon was developed and marketed in the old "Golden Rule" (Donaldsons). Non-wovens as ribbon were cheaper and more easily printed than colored cloth. To broaden the scope of fiber technology used for non-wovens, an exploratory program was established with Hercules Powder to spin new fibers for achieving various properties. Howard Hoover and Galen Meirs spent six months perfecting techniques for the unique fibers which later became the basis for "Lacelon." This was 3M's entry into fiber spinning which is now a business primarily for the BS & CP Division. From 1946 to 1949, ribbon was the successful non-woven from the Profab Lab. "Mistlon", "Sasheen" and "Lacelon" were marketed as 3Ms first decorative products. Unsuccessful non-wovens included bookcovers, draperies and window display material.

The early '50s saw the ribbon group split to form the Carfab Lab (carded non-woven fabrication) which soon became the Gift Wrap Division under Al Redpath. "Decorette" ribbon was added to the product line. In 1955, the original objective of an electrical tape was accomplished by the introduction of a thermally bonded polyester web. Polyester also allowed for non-woven electrical insulation (Fibremat), dusting fabrics and other profitable products. By impregnating the fibers with resins, the molded products could be manufactured -- the first being bra cups and shoulder pads. The marketing of products such as these was a new challenge which could not be overcome at that time. However, the bra cups moved up to become dust masks in 1959 with medical and weather masks a few years later.

The Profab Lab continued their non-woven development under Ralph Oace using an air deposited web (Rando technique). From the mid '50s through the '60s, the Profab Lab was charged to expand non-woven technology to new products for many divisions.

Until 1956, non-wovens had been manufactured from light denier fibers treated in two dimensions. With heavy denier fibers, the third dimension could be combed forming a new, soft abrasive called "Scotch Brite." With fiber and web technology multiplying, several divisions discovered non-wovens as solutions to their problems. Printing Products needed a dampening sleeve for the litho presses -- non-wovens were the answer. A press pad for the "209" in Duplicating could only be made of non-wovens. Tapes and dressings for medical use were patented from non-woven technology. Blown microfine fibers for sterile medical masks allow for further diversification of non-woven products. The list goes on and on. Non-wovens can do the job neither cloth nor paper can do. They can be made from heat shrinkable fibers, water soluble fibers and even from metallic fibers. The webs can be reinforced, needled, laminated or molded. They can be porous or dense, rigid or stretchable. Most all of the synthetic fibers can be used as a basis for non-woven webs. Non-woven technology and techniques are obviously very versatile. This technology is by no means dead. Almost daily someone is finding a new variation of fibers or a new treatment method for the web to solve a problem or create a new product. Non-wovens may be an answer to an objective on which you are working.

In 1940, "non-woven" was a Technology for Tomorrow. It has blossomed from one idea into many products. It has solved many problems while creating profits for many divisions. The "Non-woven Focal Display" at the 1974 Annual Event is a case history of an idea. Are your ideas today going to become tomorrow's technologies? In a decade from now, will your work have a similar story? As Mr. Herzog stated, "We expect all our projects to become departments, all our departments to become divisions and all our divisions to become groups." Stop at the Annual Event for the full non-woven story.

OBJECTIVE: NON-CORROSIVE BACKING FOR ELECTRICAL TAPE
① PATENTABLE
② INEXPENSIVE

1943-1946

1947-1974

1939 — "Wet" dispersal of synthetic fibers (paper making method)

"Dry" Dispersal of Light Denier Synthetic Fibers on Garnet 1939

Non-Woven WEB
- fibers
- first web

Lens Tissue 1943 — + abrasive → Trimite 1944
- perfected web
- first marriage of "printing" abrasives and non-wovens

- window display
- curtains
- bookcover

Ribbon 1944
- Samples
- Brochures
- fiber spinning 1943
- "fiber" extrusion 1947-1950 → Lacelon 1948
  - + blown microfine fibers → FilTron 1964
  - + new resins → Nomad 1967
- Mistlon 1946 — + filaments and bonding → Sasheen 1950
  - + film backing → Scotchply 1955
  - + aligned filaments on film backing → Filament Tape 1952
  - + aligned filaments and stretchable fibers → Coban 1968
  - Magic Bow 1954 → Decorette 1956 → Reinforced Steristrip 1969

1949 — Polyester Fibers - 1953 Original objective accomplished

Garnett Carded Nonwoven Webs
- + heat bondable fibers → Fibremat 1954
  - + molded third dimension → Bra Cups 1955
  - → Aseptex 1957
- + grass seed → Seed Mat 1956
- MAP & ART FABRIC 1960
- + solution treatment → Littman ECG Pads 1969
- + adhesive → Micropore + Hairset Tape 1958

Rando Webber Air Laid Fiber Web
- Heavy Denier Fibers → Scotchbrite 1956
  - + sponge → Rescue 1960
  - + scrim → Blend 'N Finish 1968
- + needle tack → Microdot 1963
  - + resin → Empor 1963
- + solution treatment → Antistatic Web 1970
- + shrinkable fibers → Dampener Roll Cover 1960

Saddle Cushion 1969

Case Study of an Idea - Non-Wovens

1939-1974

THE 3M COMPANY

SPECIAL TO THE FAIRMONT SENTINEL

The story of how 3M decorative ribbons began centers around a high school dropout who put a ten cent comb to good use.

The dropout is Al Boese, who quit St. Paul Mechanic Arts high school in 1925 after a year and a half and after flunking everything except stage design.

He went on to work as a bell hop and drug clerk, among other jobs, and was hired by 3M for three days in November, 1930 to run off inventory on a duplicating machine.

"I just stayed," says Boese, explaining what happened after that.

He continued as an office boy until 1933 when he got to know Richard Drew, inventor of "Scotch" brand masking and cellophane tape. Drew put him in the tape laboratory as a helper.

-more-

When Drew became interested in new fiber backings for electrical tape, Boese voluntered to assist and spent most of the summer of 1939 reading about fibers in the Home Economics library at the University of Minnesota.

Boese learned that cellulose acetate was the only fiber that would meet 3M's needs, but back in the laboratory it was found that conventional methods of bonding these fibers wouldn't work and the idea almost died.

One day in 1940, Boese was walking by a heated rubber calender in the laboratory with a handful of acetate fibers. On impulse, he tossed them into the calender. He found that the fibers softened in the heat and bonded together to form a paper.

That was the key to invention of the first 3M decorative ribbon.

Boese was then able to produce a non-woven light fiber webbing in the laboratory. About the same time, the Japanese attacked Pearl Harbor and the project died. In 1943, it was re-activated as 3M used Boese's process to develop a lint free lens cleaner for the armed forces.

Giner Rogers, star of the movie "Midnight Lady", then entered the picture. At the Emporium department store in St. Paul, this movie was used as a theme to advertise evening clothes for women in

a window display. Streamers of light fabric were displayed to give a cloudy-dreamy effect.

Boese, who was interested in stage design anyway, was attracted to the window. He thought his light fiber webbing could be used in such a display and managed to get the store to use some of it for other window displays in succeeding months.

He also dyed it (finding the right dye out of thousands was a project in itself) and slit it into two inch widths for sale as ribbon. This ribbon was named "Mistlon" as the result of a "you name it" contest among employees. Mistlon was doomed, however, because it lacked both tensil strength and sheen.

So, in 1949, the ribbon project almost died again.

In a last "do or die" effort, Boese remembered an earlier idea he hadn't pursued. His idea was to lay yarn lengthwise on the Mistlon -- bonding it on with a heated roller.

At a nearby St. Paul dime store Boese bought a ten cent fine tooth comb and brought it back to the laboratory for his experiment.

Using white yarn on a bunch of sewing machine bobbins, he ran the yarn through the comb and lengthwise onto the ribbon, pressing the yarn down with a heated roller.

It worked!

The new process gave birth to today's "Sasheen" brand ribbon -- a much stronger and more attractive ribbon than Mistlon, which now became the base material for Sasheen. The problem of transferring the basic principles of Boese's makeshift experiment to production scale equipment remained, but this was achieved with relatively little difficulty.

In 1950 a pilot production plant was set up in an abandoned building at the old arms plant in suburban New Brighton, Minn. Shortly thereafter, the Korean war broke out and 3M was given six weeks to move out because the plant was being reactivated.

The smell of death was suddenly in the air again for Boese and the ribbon project. But at the same time, the 3M abrasives converting operation was moved out of Fairmont. A few months later, former Mayor Ed Duffey and Einer Nelson agreed to put up a new building and the 3M ribbon project was saved again.

Sales of the new Sasheen ribbon took a jump upward during the Christmas season of 1950 -- and the rest is history.

Where is Boese now?

-more-

He has become a research associate in the 3M New Business Ventures division at 3M Center in St. Paul and is doing research of a company wide nature. And, yes, he still wraps his own Christmas gifts with "Sasheen" ribbon.

CONTACT: Lowell Ludford
Department of Communications
3M Company, 3M Center
Saint Paul, Minnesota 55101
or Telephone: 733-6154

7/10/68

Bonded Fabric Development

The creation in a broad sense of the non-woven fabric industry has taken place in the last 12 or 15 years.

While it is true that battings or webs of non-felting textile fibers bonded with adhesives have been known and used for many years, these fabrics are not of the type which constitute the products of this new industry. These older materials depended for their characteristics on a heavy proportion of filler material applied in adhesive form, and it is the combined properties of filler material and fibers which constitute the quality of the finished product. The parent natural product which suggested the desired qualities to be strived for in these fiber-adhesive combinations was probably leather.

Therefore, with this background, the suggestion of non-woven fabric development was only remotely connected.

What then is meant by the term, non-woven fabrics?

To reduce it to a broad generality, I believe that a non-woven fabric can be defined as a web or sheet of textile type fibers, bonded together by the application of narrow stripes or patterns of adhesive material, or by autogeniously bonding the fibers through activation of the surface, either by chemical action, or heat if thermoplastic fibers are used.

The main point is that expanses of the web have freedom of fiber movement because the bonding material is in minor proportion to the fiber content or the adhesion is self-developed from the fibers themselves.

The fibers, by their nature, constitute the quality of a sheet of this type, and the unification material serves only to hold the fibers in place so that advantage can be taken to the fullest extent of the physical properties of the fiber. Webs of this type would have certain physical properties of a textile nature through the use of textile fibers, and would have paper-like properties which are a contribution of the bonding or unifying method and the materials employed. These properties preclude classifying the products so developed as papers or textiles because the unique combination, in a broad sense, of bonding and raw materials used give a sheet material with properties that can not be exhibited by either of the previously mentioned products.

I believe it would be well here to briefly summarize the important methods of manufacture, and products developed, which are used commercially in the non-woven fabric field today. Most of the processes use either garnetts or cards for the production of the fiber bats. Variations of these machines are used in some instances, such as doffing by air or suction, and a new type of bat forming machine designed by Frank Buresh and produced by Curlater Corporation is used in some instances to improve cross strength.

The relationship of strength in the longitudinal to the tranverse direction also varies with the arts developed by the manufacturers; however, in the main, the tensile strength is greater in the longitudinal direction.

Generally present day non-woven fabric materials fall into two classes of unification: Class 1, Autogenious Bonding, and class 2, Adhesive Bonding.

There are two types of autogenious bonding,

1. Bonding by means of chemically activating the surface of the fibers to an adhesive state.
2. Activating the surface of thermoplastic fibers through the application of heat.

A means of compressing the fiber webs so activated is necessary for both methods. In the chemical ap lication one method would be to pass the fiber bats through a sulfuric acid bath of proper concentration and temperature, followed by compressing with a calender, washing, and drying.

By heat bonding, it is possible to use the various thermoplastic fibers produced today, and unification is accomplished with heat and pressure.

As an example, "Plastica" brand fibers produced by the Tennessee Eastman Corporation can be softened and unified on a hot calender in one operation.

Conditions of temperature and pressure must be closely controlled for satisfactory results.

By either process, the blending of various types of fibers which will be inert to the process involved opens a wide field for the production of fabrics with greatly differing characteristics.

Adhesive bonding is accomplished by the application of adhesives such as vinyl acetate, etc., in stripes or open patterns. As one example a diamond shaped pattern could be applied by means of a printing roll.

Proper spacing of the adhesive stripes and design of the pattern are both very important in determining the quality of the finished product, and will determine to a great extent the strength and texture of the sheet, the quality and type of fiber used contributing as does the flexibility of the resin employed.

The operating speed is in the range of carding or garnett speeds, and is therefore a very important contribution to the relatively low cost of manufacture.

Chemically bonded fabrics made of cellulose fibers have a tendency to be stiff and boardy. While this is true of the heat bonded fabrics also, this stiffness can be reduced considerably and good drape and hand developed by incorporating a percentage of inert fibers such as viscose or cotton.

Viscose, of course, gives a cleaner web and produces a fabric of much higher quality than is possible with cotton.

However, in some instances cotton would be superior; for example, to give better absorbency or moisture-retaining qualities.

Adhesive-bonded fabrics have a better drape and softer texture than chemically bonded fabrics, but have a tendency to pipe easily in the direction of the bonded stripes.

As you may note from the above brief description, the non-woven field produces numerous varieties of webs and it would not be possible to give technical data on all.

However, some generalizations can be made.

Tensile strength is ordinairly in direct relation to the types of fibers used and the weight.

The fabrics are much more porous than most woven fabrics or papers but, compared to textiles, the fiber coverage is very good at high porosities.

Other qualities needed for specific jobs can be and are incorporated according to the projected use.

Non-woven fabrics find applications in many fields today such as reinforcing for plastic laminates, disposable napkins and table cloths, shoe polishing cloths, milk filters, gas and chemical filters, polishing cloths, bandages, applicators for finishes, casket-liners and covers, decorative ribbons, fabrics, and many others.

Many of these fabrics can be laundered and dry cleaned. Some have to be washed by hand, and others can be washed in normal home washing operations. Ironing can be accomplished if conditions of heat and pressure are carefully controlled. The temperature should be determined by the type of fabric and fiber content, as is the case for textiles today. At present none of the fabrics are used for clothing insofar as the writer is aware except for baby diapers.

However, it is conceivable that with the use of new high strength fibers and improved spreading of the fibers to increase cross strength, some uses in the clothing industry are possible.

It is interesting to note the wide diversity of interests of the concerns which have entered the non-woven field. Their interests lie in such areas of endeavor as textiles, abrasives, pressure sensitive tapes, sausage casings, and surgical dressings.

What impelled all of these people to set up research facilities to design and manufacture their sheet products?

I believe that primarily it was the fact that new products had been developed or were being considered for development in which paper, felt, or textiles could not answer the needs. This started the research for sheet materials which would have the necessary properties. Some impetus was added, of course, from purely economic reasons, such as utilizing cotton wastes that did not have weaving properties.

This diversity of research and manufacture all acted favorably towards putting the industry on a sound footing in a relatively short period of time.

While it is true that the industry is in a primitive state today as compared with the long established textile and paper industries, I believe that progress is being made rapidly, and consumers are accepting products developed in this field with the same assurance of quality with which they accept the synthetic fiber products of the textile field today.

3M Company has developed and marketed two types of non-woven fabrics, both of which stem from the thermoplastic bonding process.

The trade names are "Nistlon" and "Sasheen".

I would like to describe briefly their manufacture, characteristics, and uses.

A research project was set up some time before the start of World War II to develop unique types of sheet materials to be used in XX products.

Many methods of forming webs and bonding were tried and discarded.

We finally settled on the thermoplastic-bonding method as being the most versatile and offering the greatest opportunity for developing a wide variety of products.

For some time now we have been manufacturing a web which contains approximately 60% "Plastics" (3 denier, 1½" staple) and 40% viscose rayon (1½ denier, 2" staple). The fibers in proper ratio are weighed out in small batches and blended in an ordinary picker. The blend is carded on a garnett machine consisting of two breaker sections, a cross-lapper, and two finishing sections. The final finishing section has a double doffer arrangement. Webs of various weights can be made by taping the doffers and collecting several plies of carded fiber on a series of cross-aprons. The final apron, carrying two or more layers of web, feeds the material into a nip roll in contact with an electrically-heated bonding drum. The partially bonded web travels around the drum, and final bonding takes place at a second press roll. The temperature used is from 340° to 375°F. Finally, the material is wound into jumbo rolls for further processing. Speed of operation is about 40 feet per minute.

The material has been and is being used for many purposes.

In the light weight web of about 4 pounds per 100 square yards it has found ready utility applications such as lint-free lens tissues, polishing and dust cloths, covering for lawns and seed beds to retain moisture and protect the young plants. Incidentally, an interesting characteristic of these fabrics containing acetate is the development of an electrostatic charge through friction when it is used in polishing. The charge has a tendency to pick up and hold small particles and dust on the web.

It can be used for filtering light in photographic work and as a texture screen.

Many other uses are indicated and only await further trial and development.

This fabric, made as described, has a tensile strength of approximately three pounds in the longitudinal direction and one pound in the transverse.

Heavier fabrics have many utility uses such as tape backings, abrasive backings, filters, etc.

Since this sheet is composed of viscose and acetate fibers, any solvents used will have to be governed by cellulose acetate solubility or swelling in the solvent. As these properties are well known, I will not go into detail.

Combinations of wool and vinyon fiber, lightly-bonded, have given excellent performances as air filter media. They have a very low air resistance, high dust retention, and because of this construction produces high loft in finished fabric filters.

The major uses for the "Mistlon" Brand fabrics have been decorative. To make production economically feasible, a continuous dyeing method was necessary.

Our first really successful continuous method of dyeing and finishing this material was to run two or three jumbo rolls at a time, with the webs stacked, through a cold, aqueous dye solution containing a mixture of direct dyes, dispersed acetate dyes, and wetting agents. Excess dye liquor was removed by a set of squeeze rolls and the webs were then run through an enclosed flue with an atmosphere of steam and air at about 180°F. Following the steaming operation, the material was subjected to two washes, a squeeze to remove as much wash water as possible, and drying by means of hot air. During these processes, light to moderate tension was maintained on the webs, and after drying, the layers were separated to produce individual jumbos again. By this process we dyed much of our early "Mistlon" Brand ribbon and all of our light weight windowndisplay materials.

As we developed ribbon and display fabrics in the decorative market, a search was continued for new decorative medias to fulfill the needs.

We found that uniquely decorative fabrics could be produced by introducing various materials for colored or metallic flecks directly into the garnett operation, thereby getting relatively even distribution with just enough variation to produce a custom effect.

The fabrics with metallic flecks were made by passing a sheet of lite weight aluminum foil into the garnett with the fiber. The garnett broke up and distributed interesting uneven flecks of the foil throughout the web, which, when dyed or left white, gave very interesting effects.

Dyed "Mistlon", when passed through the garnett by the same means, distributed oddly shaped colored flecks throughout the web.

Color mixtures and mixtures of color and foil were also made as the samples we have here will show.

Would not decorative materials of this type, slit into narrow widths, and either twisted or in ribbon form, offer a challenge to textiledesigners for use in giving both textures and decoration to fabrics?

Soon after we started the pad-steam method of dyeing outlined above, it was observed that greater tension applied to the material stretched it in the machine or longitudinal direction and at the same time reduced its width. The result was a material of higher weight and greatly improved strength and sheen. Apparently the network of bonded acetate fibers was stretched in length and reduced in width, allowing the viscose fibers to slip within the network and become better aligned. This improved alignment of the viscose fibers resulted in the increased strength and better sheen already mentioned. The "tensilized" variety of our "Mistlon" product has been described in patent number 2,503,024 (A. W. Reese and E. Michl). The fabric we marketed as ribbon made by this process weighed approximately 11 pounds per 100 square yards. Tensile strength was 10-13 pounds per 1" width LW.

Thistype of fabric has very good drape and many other interesting properties.

If the fabric is pulled in a transverse direction it will stretch some 30-35% without fiber separation.

By applying tension longitudinally the fibers assume their previous relationship, and the web does not show any disruption. At the present time we are not manufacturing this type of fabric, but we plan to resume activity in marketing these fabrics again in the near future. They have shown desirable qualities for such uses as drapery materials, place mats, napkins, aisle cloths for weddings, display fabrics, and many others.

I might add that much of our ribbon material dyed by this method was also made water-resistant by padding with a wax emulsion between the washing and drying stations of the operation. Also some of the display material was made flame resistant by means of this additional padding bh station on our dyeing range.

By their very nature, these fabrics are subject to rather high flammability due to the amount of surface area exposed. On the other hand, this property increases the opportunities to cov the fabric with flame resistant materials which, because they can cover substantially all

NONWOVEN PRODUCTS HISTORY

1939 -- Tape Laboratory

Objective: To develop a fibrous web of noncorrosive materials as an Electrical Tape backing.

1940

Attempts to form a wet laid paper of cellulose acetate fiber failed through a lack of technical feasibility.

Work started on dry dispersal of fibers.

A sample card was purchased for program.

Heat bonding technique developed (cellulose acetate as thermo-fiber).

Attempts to develop tape backing dropped due to product's lack of strength.

The project continued as a general exploratory effort on nonwoven webs.

1941

Program discontinued at end of year due to the war.

1942

Program reinstated late in year.

Objective: Development of lens cleaning tissues and packaging that would be non-scratching and lint free.

1943

Product Fabrication Laboratory organized under R. G. Drew with nonwoven project.

1944

Sixty inch garnett installed with heat bonding roll.

Backing developed and manufactured for Abrasive Division's Trimite Polishing Cloth.

First ribbon developed and market tested.

1945

First "Mistlon" type ribbon produced and sold as a resale ribbon.

1946

Improved "Mistlon" developed, produced, and sold as a resale item and in long rolls for in-store gift wraps.

1947 to
1949

"SASHEEN" type ribbon developed and Pilot Plant operation set up to produce for sale.

"LACELON" type ribbon developed and marketed.

Ribbon Group split off of Profab Laboratory and was assigned to Central Manufacturing Development under Dr. B. J. Oakes.

1950 to
1952

"DECORETTE" ribbon developed and added to line.

1953

Gift Wrap Division organized -- A. H. Redpath, General Manager.

1955

Developed thermo-bonded Polyester web for electrical applications.

Developed fibrous polyester web laminated to polyester film as electrical insulation.

1957

Molded product development started with objective to develop formed brassiere cups, shoulder pads, etc.

1958

Dust masks developed and test sales started.

1959

Medical mask developed and test sales started.

1960

Weather mask developed and test sales started.

1961

Major effort to develop production techniques and equipment for masks.

. . . . . .

Profab continued work on nonwovens developing the Rando Web techniques of web forming and others.

Products developed in Profab and present Division assignment.

Nonwoven Product	Division	Year Introduced
Fibermat	DM & S	1956
Dusting Fabric	Retail Tape	1957
Scotchbrite	BS & CP	1958
Micropore	Medical	1960
Aseptex Mask	Medical	1961
Dampner Sleeve	Printing Products	1962
Adhesive carrier web used in AF110, AF126, and others	AC & S	1963
Microdon dressing	Medical	1965
Filtron Mask	Medical	1966
Coban Elastic Bandage	Medical	late in 1968
Fabric Drape	Medical	late in 1968
Hairset Tape	Retail	1968

Prepared by: A. W. Boese

Date: May 6, 1968

Nonwoven Product	Division	Year Introduced
Trimite Polishing Cloth	Abrasives	1949
"SASHEEN" Ribbon	Retail Tape	1949
"LACELON" Ribbon	Retail Tape	1949
Electric Matt	Electrical Products	1955
Industrial Mask	Retail Tape	1958

PRODUCT IDENTIFICATION BY PRODUCTION TECHNOLOGY

HEAT BONDED PRODUCTS

SASHEEN Ribbon	Garnett - beam - hot drum
Electrical web	Rando Web - hot drum
Abrasive backing	Garnett - hot drum (Trimite Polishing Cloth)
Masks (one step)	Rando Web - vacuum modling

Resin Bonded

Dusting Fabric	Rando Web - squeeze roll - textilizer
Hair Styling Tape	Rando Web - squeeze roll - embossing
Masks (2nd step)	Drip saturated
Medical Products	Rando Web - squeeze roll - some items textilized
Building Products	Rando Web - impregnation
Carrier web adhesive	Rando Web - squeeze roll
Dampner roll cover	Rando Web - squeeze roll
Filament Tape	Beams yarn resin bonded in matrix to film.

Spun Bonded

LACELON Ribbon	Oscillating spinnerette heads - wet bonded
DECORETTE Ribbon	Oscillating spinnerette heads - wet bonded yarn and "SASHEEN" overlay.

Hot Melt Air Blown

Medical face mask filter

Prepared by: A. W. Boese
Nonwovens Project Manager

Date: May 6, 1968

3M TECHNOLOGY AND EQUIPMENT

FIBER HANDLING

Carding

Garnett machine
Rando web

Opening and preparatory equipment

Bonding

Heated drums for thermoplastic bonding
Squeeze roll applicators for resin bonding
Spray bonding for high loft products
Drip flooding (as face masks)
Vacuum bonding (three dimensional or flat goods)

Extrusion bonding

Spinnerette oscillating wet bonding
Hot melt -- air carrier forming on screen

Vacuum molding -- thermo-bonding

Beam lay down

Filament tape -- in resin matrix
"Sasheen" process - heat bond

Physical bonding (experimental equipment)

Needling
Tacking
Tow spreading

Wet process

Paper making
Electrostatic fiber orientation (not used for this presently but 3M Technology)

General (3M Technology)

Calendering
Embossing
Coating
Textilizing -- post web forming of carded web
Fiber spinning

Prepared by: A. W. Boese - Nonwovens Project Manager
Date: May 6, 1968

RESEARCH AREA
Basic Development

Web Forming

1. Rando Web
   Shingling of web -- methods to overcome or modify.

2. Garnett or card
   Layering of web -- methods to get layer unification.

3. Achieve better blends both Rando and card.

Resin Impregnation

1. Eliminate migration

2. Determine value of resin -- fiber adhesion or mechanical anchorage of resin and fiber.

Thermo-bonding

1. Pressing tech. or heating to get bonding without loss of fiber identification.

General

Calendering
Embossing
Textilizing, etc.

Raw Materials

Characteristics and properties of fibers.

Adhesive -- water dispersion -- solvent

New resin systems developed by 3M (or others)

Up-to-date literature and Patent file -- 3M and outside
Up-to-date fiber and chemical files
Up-to-date equipment file.

Prepared by: A. W. Boese
Nonwoven Project Manager

Date: May 6, 1968

Al Boese
Spun & Satin Ribbon Lab.

3M COMPANY tech topics

FOR DISTRIBUTION TO TECHNICAL MANAGEMENT PERSONNEL

SPONSORED BY THE 3M TECHNICAL FORUM

Number 13 December 10, 1952

BONDED FABRICS - By A. W. Boese

Bonded fabrics, otherwise known as "non-woven fabrics" are a relatively new development which has come about in the last 12 or 15 years. These fabrics, in general, can be described as a web or sheet of textile type fibers bonded together by adhesive material, or through activation of the fiber surfaces when thermoplastic fibers are used. The main characteristic of these fabrics is that expanses of the web have freedom of fiber movement because the bonding material is either (1) in minor proportion to the fiber content, or (2) the adhesion is self-developed from the fibers.

The fibers used determine the quality of this type of fabric; the bonding material, when used, serves only to hold the fibers in place so that advantages of the physical properties of the fibers can be realized to the fullest extent.

Present day non-woven fabrics are prepared by two methods of unification; autogeneous bonding and adhesive bonding. Autogeneous bonding is accomplished by chemically activating the surface of the fibers to an adhesive state, or activating the surface of thermoplastic fibers by heat. Adhesive bonding is accomplished by the application of adhesives such as polyvinyl acetate, etc., in stripes or open patterns. As a rule, adhesive bonded fabrics have a better drape and softer texture than chemically bonded fabrics, but have a tendency to pipe easily in the direction of the bonded stripes.

Non-woven fabrics find applications in many fields today such as reinforcing for plastic laminates, disposable napkins and table cloths, shoe polishing cloths, milk filters, gas and chemical filters, polishing cloths, bandages, applicators for finishes, casket liners and covers, decorative ribbon fabrics, and many others. Many of these fabrics can be laundered and dry cleaned. Some have to be washed by hand, and others can be washed in normal home washing operations. Ironing can be accomplished if conditions of heat and pressure are carefully controlled. The temperature should be determined by the type of fabric and fiber content, as is the case for textiles today. At present none of the fabrics are used for clothing insofar as the writer is aware, except for baby diapers and costuming. However, it is conceivable that with the use of new high strength fibers and improved spreading of the fibers to increase cross strength, some uses for clothing are possible.

The 3M Company has developed and marketed several types of non-woven fabrics. The Ribbon Department of the Central Manufacturing Division makes "Mistlon" webbing (no longer sold as such) and "Sasheen", developments of the Satin Ribbon Laboratory and "Decorette" and "Lacelon", developments of the Spun Ribbon Laboratory.

"Mistlon" webbing is made by fusing mixtures of viscose rayon and acetate fibers roughly oriented by 90 degrees. Though no longer sold as such, it is used as backing for the parallel, and continuous acetate filaments of "Sasheen". "Decorette" and "Lacelon" are made by the extrusion of acetate solutions. "Decorette" is laid down by an oscillating motion of the extruding heads, and "Lacelon" by a circular motion.

These bonded fabrics are another example of new products derived from the 3M sheeting and coating technology which originated with the Company's manufacture of sandpaper.

LOCAL TECHNICAL MEETINGS

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS: No meeting scheduled for December.

SOCIETY OF PLASTIC ENGINEERS: Monday, December 15, 1952, 6:30 p.m., Anglesey Cafe, 13 Hennepin Avenue, Minneapolis, Minnesota. Call E. Ulrich (Extension 0-483).
Subject--"Vinyl Sheeting and Vinyl Film"
Speaker--W. J. Connely, Bakelite Company. He will also show Bakelite's latest motion picture color film called "Flight to the Future".

INSTRUMENT SOCIETY OF AMERICA: Tuesday, December 16, 1952. Social evening starting at 7:30 p.m.
Speaker--Gordon Volkenant
For further details contact Del Olson (Extension 0-6715 or 6704).

PATENT MATTERS

Recent 3M Patents

U.S. 2,616,927 (November 4, 1952) E. A. Kauck and J. H. Simons. "Fluorocarbon Tertiary Amines".

U.S. 2,617,817 (November 11, 1952) A. H. Ahlbrecht and D. R. Husted. "Perfluoro Alkyl Isocyanates".

U. S. 2,617,836 (November 11, 1952) W. H. Pearlson and L. J. Hals. "Production of Olefinic C_4F_8".