

## TECHNOLOGY

# Non-Woven Fabrics Coming

**The Army is testing disposable paper uniforms. Industry is producing non-woven fabrics for use in cars, clothing, drapes, shoes, filters and insulation.**

THE ARMY is throwing clothes away.

Relax, taxpayers! Do not write your Congressman, for this is part of an evaluation program for cheap, disposal paper uniforms.

The Army Quartermaster Corps is sending soldiers scrambling over obstacles, crawling through pipes, and generally giving their paper uniforms a rough going over. The QMC is finding out how much wear the paper garments can take before they must be discarded.

Doctors and nurses at Fort Sam Houston, Texas, are wear-testing paper-based surgical caps, gowns, masks, boots and bibs. Army technologists see in the new paper products an unparalleled versatility. For example, surgeons' gowns may be made in layers, each layer performing a specific function, the inner one absorbing perspiration and the outer one absorbing blood.

All of this is a small part of a burgeoning fabrics industry. Besides paper, there is an entire new group of non-woven fabrics, including cotton, nylon, Dacron, acrylics, polyesters, and other synthetic materials.

Just 14 years ago, production amounted to less than 15,000 pounds. In 1958, non-woven production amounted to 100,000,000 pounds. Predictions for this year are as high as 125,000,00 pounds.

## Replacing Other Materials

The manufacturers hope the non-wovens will prove themselves for use in outer clothing, but this prospect is in the distant future. For the most part, the new type of fabric presents numerous problems.

However, such fabrics are used as backing for automobile interiors. Draperies, curtains, sewing patterns, towels, polishing cloths and lamp shades are being made of non-wovens. Shoe manufacturers are applying them as innersoles and interliners. Non-wovens, in some cases, are replacing other materials in such toys and novelties as cowboy hats, doll dresses, and costumes.

At present, their greatest application is in industry as backing, filters, wiping cloths, insulation, and in bagging and packaging.

Non-wovens fall into three broad classifications, parallel-laid, cross-laid and random-laid. In the first, the fibers are laid out lengthwise and then are bonded. The major uses include tapes, ribbons, draperies and curtains.

The cross-laid type consists of fibers laid out in more than one direction. Such non-wovens are found in filter backing, clothing and tufted carpets.

The third, or random-laid, type is bonded after the fibers are more or less thrown together without any thought as to pattern.

The random non-wovens are believed to have the greatest potential. They are more versatile, and can be incorporated in the whole range of non-woven products.

Non-woven fabrics were produced commercially in the late 1930's on a limited scale. First production was in the cotton industry which was looking for ways to turn waste fibers into something salable.

Actually, depending on the way you look at it, non-wovens may be considered among the oldest of materials. Felt fabrics provided clothing and shelter for some of man's earliest ancestors. Made of fur, hair or wool, felt is an important, widely used product today. But, for the sake of discussion, let the non-woven industry have its beginning two decades ago.

The first cotton non-wovens were cheap and intended for one-shot use. And, cheap, indeed, they were. Some practically fell apart when touched by water.

About 1950, some imaginative chemists began to experiment with synthetic fibers, and the non-wovens started to take on a new character. Rather than performing as cheap, inferior substitutes for wovens, they acquired merit of their own.

In the early 1950's, the Pellon Corpora-

tion introduced a non-woven fabric to the clothing industry that has had an interesting boom-bust-boom life. The fabric was a blend of 75% nylon, 25% cotton and rayon, with a butadiene-acrylonitrile latex binder. Used as an interlining for apparel, it was resilient, lightweight, uniform and strong.

Along came the "natural look" in men's suits and devastation to the interlining market. Flare skirts gave non-woven interlinings a boost until the rise of sack and sheath dresses. Flares are reported to be making a comeback.

Although non-wovens have a future, the present is not rosy. Woven cottons, synthetics, wool and hair perform too well and cost too little.

## Industrial Uses Tested

One of the greatest promises of the non-wovens is for inexpensive products that perform well once or a few times and then may be thrown away. Throw-aways may include industrial and laboratory frocks, party clothes and costumes, and aprons, as well as Army and hospital uniforms.

Although non-wovens have had a sudden rise in popularity, they presently account for less than two percent of textile fiber production. One of the reasons for this is a lag in technology, especially in the fiber-binder relationship.

High-priced synthetics are out of economic range of many people. Synthetic



**PAPER UNIFORMS**—These soldiers, clambering over a training obstacle, are testing experimental paper throw-away uniforms. This U. S. Army photograph, taken at Fort Lee, Va., shows only one of the rigorous tests to which the uniforms are being subjected.

fibers can add heat-, chemical- and water-resistance; strength and toughness, elasticity, and other properties to non-woven fabrics. Because of expense, waste nylon is the only synthetic fiber used to any great extent.

As for binders, organic solvents are ruled out because of the fire hazard. Low-cost adhesives—such as starch, gums, casein and others—are brittle and lack wet strength.

Butadiene-styrene latex binders have many worthwhile properties, but also exhibit poor stability to light, and poor laundering and dry cleaning properties. Butadiene-acrylonitrile binders often discolor and give off odors on aging. Attention currently is swinging toward acrylic esters. They have good color and odor stability, but are not as elastic as the others.

Before the non-wovens can expect to be accepted, they not only must come down in price, but they must be given improved properties, particularly elasticity, crease-resistance, drapability (for drapes and certain clothing), and cleanability. Technological and scientific research is the only way to bring the fullest blossoming to their great promise.

Science News Letter, October 17, 1959

**METALLURGY**

**Aluminum Rockets Show High Strength**

TESTS on rocket engine cases made of aluminum have upset an earlier notion that aluminum is "too weak" to contain the riot of forces in a solid-propellant rocket motor.

The year-long tests, conducted by the Aluminum Company of America jointly with a major propellant manufacturer, showed that aluminum is actually stronger than steel on a weight basis.

In addition, aluminum proved to have a "volumetric expansion" of five percent—meaning that under severe stresses an aluminum engine case could "give" five percent without exploding.

Science News Letter, October 17, 1959

**Questions**

**BIOLOGY**—How great an achievement is it for the mound-building ant to build a mound about 16 inches in height? p. 256.

**MEDICINE**—How wide is the use of the "artificial kidney"? p. 254.

**OCEANOGRAPHY**—Why is the "red tide" not prevented ahead of time? p. 251.

Photographs: Cover, Ryan Aeronautical Company; p. 251, Raytheon Company; p. 253, McDonnell Aircraft Corporation; p. 255, Department of Defense; p. 258, U. S. Army; p. 264, W. R. Grace & Co.

*Do You Know*

Menier's disease affects the semi-circular canals of the ear so that the sense of balance is lost.

Prematurely white hair may be due to hereditary factors, diet, a change in the chemical functions of the body, or "nerves."

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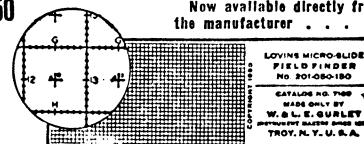
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