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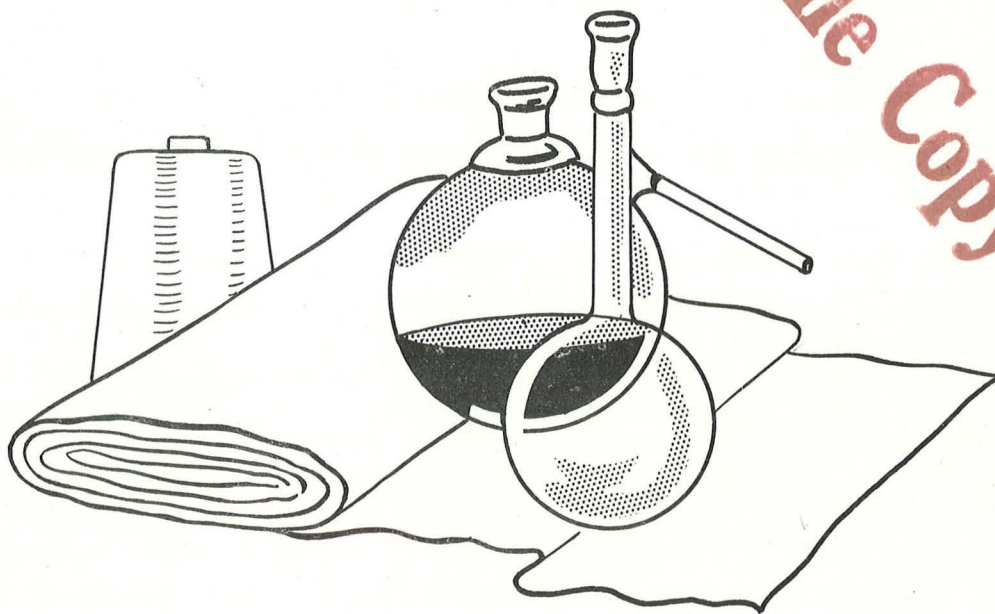
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Man Made Fibers and Fabrics

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MAN-MADE FIBERS AND FABRICS

Helen Rocke

As science produces new fibers and develops new finishes for the old ones, it is almost impossible to tell by look or feel what kind of fiber makes the fabrics we wear and use.

In order to get real satisfaction and service from the modern fabrics, all of us need to know more about these fibers and the cloth made from them. What are their special qualities, what can we expect from them, how should we care for them?

How the Fibers are Made

The first man-made fibers, rayon and acetate, were made from cotton linters or wood chips. The newer ones are made from a combination of chemicals. These fibers are nylon, Orlon, Dacron, Dynel and Acrilan. Another, Vicara, is made from the protein of corn.

Although each of these fibers is made from different substances, the basic processes in making them are similar:

First the material is made into liquid form;

Next the liquid is forced through a spinneret to draw it into a fine stream;

Then the streams of liquid are forced into a chamber of air or into a hardening bath and are changed into solid form, called filaments.

Kinds of Yarn

From these filaments different yarns are made. A single filament may be used and is known as monofilament yarn. Several filaments may be twisted together to form multifilament yarn.

The long filaments can be cut into short uniform lengths, called staple fibers. These are spun together to make spun yarn. Fabrics made from them are spoken of as spun nylon, rayon, etc. Spun fabric is usually softer, may have a wool-like feel or napped effect, while fabric made from filament yarn is smooth and even in texture. With the exception of Dynel, Acrilan and Vicara, all man-made fibers may be used in either filament or spun yarns. These three are used only in spun yarns.

A new process called texturing may be applied to many textile yarns. Tiny loops are mechanically introduced in each filament. The process adds bulk to filament yarns and makes them more opaque.

Fibers Have Different Qualities or Characteristics

While the man-made fibers are alike in some ways, each has some special characteristics which makes it better for some uses than others. There is no one perfect fiber--natural or man-made. Nor do we wear or use fibers as such. They must be made into cloth and clothes, or home furnishings. The development of man-made fibers has come rapidly. Their best use in fabrics and for wear purposes is still being determined.

Often the advertising and sales promotion of new fabrics is based on laboratory tests and performance of the fiber. How these products will perform in actual wear depends upon more than the fiber used. Factors that determine the performance are: the construction of the yarns and the way the cloth is made, the finishing processes used, the dyes, and the actual construction of the garment or article itself. Sometimes mistakes are made by spinners, weavers, finishers, dyers, or cutters, but it is usually the fiber that is blamed.

Blended and Combination Fabrics

Blended fabrics are made from yarns in which two or more fibers are mixed together before the yarn is spun.

Combination fabrics are those made of a combination of yarns. Each yarn is spun entirely of one fiber.

All of the man-made fibers can be blended with natural fibers or with other man-made fibers. This makes it possible to choose and combine fibers whose properties supplement and complement each other and make a fabric which has more desirable qualities than that made of a single fiber.

Nylon, blended with rayon, improves the wearing quality of the fabric and makes it easier to care for; while the rayon makes it more absorbent, easier to dye, and lower in cost.

The amount of a fiber to be used in a blend must be worked out individually for each fabric by the manufacturer, depending on the qualities wanted in the fabric, and its end use. For example, 10% of nylon mixed with wool may be enough to increase the strength of the wool appreciably, while it may take 50% of Orlon blended with the wool to give it the property of "permanent" pleating.

Progress in blending fibers means that fabrics can be made to certain specifications which will give them properties that fit them for a definite purpose or use. In the future, it will probably be more important for the consumer to find on the label such statements as "washable, shrink resistant" or "wrinkle resistant, moisture repellent" than to know the exact fiber content.

Properties of Man-Made Fibers

All man-made fibers are alike in the following ways;

- The quantity of fiber can be controlled
- Quality of any one fiber does not vary
- Fibers may be of any desired length, and the thickness or diameter of fibers may be varied
- The luster of fibers may be controlled, so they are bright or dull
- Fibers may be smooth or crimped

The newer man-made fibers have these common qualities:

- Are light weight
- Absorb little moisture--wash easily--dry rapidly
- Resist moths, mildew, insects
- Are damaged by high heat in ironing
- Resist wrinkling
- Produce static electricity
- Are difficult to dye

SOME PROPERTIES OF MAN-MADE FIBERS

	Outstanding	Limitations	Use in Blends
Rayon	Comparatively inexpensive Good draping qualities Easy to dye Comfortable to wear Absorbs moisture	Weak when wet Dries slowly Wrinkles easily unless specially treated	Adds comfort because it absorbs moisture Reduces cost
Acetate	Absorbs little moisture Lighter in weight and dries faster than rayon White remains white Comfortable to wear	Melts at moderate temperature	Adds softness, draping qualities, and stability Unusual color effects through cross dyeing
Nylon	Strong Resists wear and abrasion Exceptional elastic recovery Non-flammable Can be heat-set for permanent pleats, etc.	Weakened by sunlight Yellows Pills in spun goods May wear other fabric against which it rubs	Adds strength and abrasive resistance
Orlon	Excellent resistance to weather and sunlight Acid resistant More permanent white than nylon Soft texture Can be heat set	Difficult to bleach and dye Less resistant to alkalies than nylon	Adds bulk without weight Gives crease and shape retention
Dacron	Stretch resistant Shape retention and wrinkle resistance, wet or dry Crisp--good elastic recovery More comfortable than nylon in hot weather	Hard to dye Tendency to pill Difficult to mold	Helps to hold shape Adds wrinkle resistance

SOME PROPERTIES OF MAN-MADE FIBERS

	Outstanding	Limitations	Use in Blends
Dynel	Wrinkle resistant Resilient Doesn't flame Warm, soft to the touch Resistant to acids and alkalies	Melts at lower tempera- ture than any other Not available in bleached form	Adds warmth and bulk without weight
Acrilan	Light in weight Soft and warm to the touch Holds pleats when wet Good weather resistance Resists spotting and perspiration Resists pilling Doesn't sag or stretch	Hard to dye and bleach Burns readily	Adds strength and bulk without weight
Vicara	More like animal fiber than most man-made Softness Especially adapted to blending Easy to dye--easy to sew Comfortable to wear	Weak when wet Used only in blends	Adds softness, absorbency, drape Increases wrinkle resistance Reduces static
Fiberglas	Fireproof--strong Good electrical resistance Absorbs practically no moisture	Brittle--difficult to dye Irritating to skin	Used for curtains, draperies, indus- trial uses

Special Finishes

All fabrics are given finishes to improve certain qualities. In addition, many types of special finishes are being used to give new and different characteristics to some fibers and fabrics. Good textile finishes add to the durability and usefulness of the fabric and simplify its care. Other finishes may produce a fabric which requires special care, or may decrease the strength of the fabric or make it uncomfortable to wear, while increasing its glaze, stiffness, etc., for the sake of appearance.

Trade names for special finishes are often used on garment labels. Sometimes the trade name includes more than one special quality in the finish. For example, a fabric with a certain trade mark might be crease and spot resistant, and resistant to shrinkage and stretching.

There are many different finishes with as many different trade names. As new ones are continually coming into use, it is difficult for the consumer to know the meaning and purpose of each. If the trade name for a finish is not familiar to you, read the label on the article, which may give an explanation of the purpose of the finish--or ask the salesperson for the meaning of the trade name. If you buy a fabric or garment with a specified finish, check its performance during use or wear, to help you decide if such a finish is satisfactory for the use you expect of it.

Finishes to Control Shrinkage

These are among the first special finishes and are used on a number of fabrics so that shrinkage will be less than 1% or 2%.

For cotton this may be a purely mechanical process, and with cotton a shrinkage of not more than 1% can be guaranteed.

With rayon the shrinkage control is a chemical process through the use of resin or caustic soda which stabilizes rayon against shrinking or stretching.

Shrinkage is controlled in wool with either a chemical or resin finish. The shrinkage process is used on wool fabrics and garments (especially knitted garments) which are intended to be washed.

Crease-resistant Finishes

These are applied to give resistance to creasing and wrinkling in fibers and blends which otherwise have little or no resistance to wrinkling. Some crease-resistant finishes are more durable than others, and some add other qualities, as resistance to soil and spotting, shrink resistance, and easier laundering.

Embossed Finishes

Embossing is used to add interest to the texture of cotton fabrics. Various embossed effects on cotton result from the application of resin coatings to the fabric.

Insulating Finishes

These are made by spraying a coating of tiny, metallic particles in a colorless plastic solution on the back of coat lining. The purpose is to add warmth without weight.

Gas-Fading Inhibitors

Acetate fabrics are sometimes treated with a finish to prevent change of color in the fabric from action of gas fumes.

Anti-static Finishes

These are used to reduce static electricity generated by the newer man-made fibers. Resins used for crease-resistant finishes and shrinkage control on cotton, linen, and rayon also cause static.

Some anti-static finishes are only temporary, while others are more permanent. Anti-static rinses for home use are available.

Moth-resistant Finishes

These are used both commercially and in the home to prevent moth damage of wearing apparel and blankets.

A mothproof rinse for home use has recently been developed by the U.S.D.A. This rinse was originally named "EQ-53" and is now being sold under various trade names. Washable woolens rinsed with EQ-53 and stored away will remain mothproof for a year. If clothing is worn, the protection will last one season--unless washed or dry cleaned.

Flame-retardant Finishes

These finishes are still in the experimental stage. Fabrics treated with such a finish will char, but not burst into flames. Legislation is now in effect which requires dangerously flammable fabrics to be treated with a flame-retardant finish.

Water-repellent Finishes

These are made in both a durable and non-durable finish. The durable withstand dry cleaning and laundering.

Water-repellent finishes do not change the appearance of fabrics or make them as uncomfortable as waterproof finishes do.

Waterproof Finishes

These finishes coat the fabric and fill the spaces between the yarns so air and moisture cannot penetrate. Coatings may be of latex or vinyl resins.

Other New Developments in Fibers and Fabrics

A new type nylon yarn which stretches to fit and conform to almost any shape--used for socks, underwear, gloves.

Opaque nylon, a new opaque dull nylon yarn to be used in both knit and woven fabrics.

"Fiber E" - a form of rayon which is permanently curled and crimped into a fuzzy, wool-like fiber by treating it with a chemical. It is used for coatings, suitings, sweaters, upholstery, slippers, and in plush used for toys.

Dope-dyed and spun-dyed are terms used for a method of dyeing in which dye is added to the solution before the fibers are formed. Spun-dyed fibers are said to have better color fastness to washing, sun, sea water, and gas fading than the same fibers dyed after weaving.