CHAPTER VIII

STUDY OF LINEN MATERIALS

Linen. — It is difficult to tell just when or where linen was first used, but historians agree fairly well that Egypt probably first discovered the value of the flax plant as a source of linen. The earliest picture writings show that the linen industry was well developed. Genesis 41:42 tells us that Pharaoh arrayed Joseph in vestures of fine linen and there are other references to flax in Egypt. This was about 1715 B.C. The reference to "fine linen" would indicate that the industry had reached a high state of development. Mummy cloths 4,000 years old show linen of quite a fine quality.

From Egypt linen culture spread to Babylon, to Greece, and to Rome. Great encouragement was given to it in Italy, and guilds were later formed to regulate and protect the linen trade. All over Europe during the Middle Ages, and until the invention of power spinning, linen was used almost entirely where we use cotton today. Since the industrial revolution, cotton has replaced linen for many purposes. It can never
replace linen for table service and many other purposes because it lacks luster, smoothness, and the splendid laundering qualities.

Ireland, Belgium, Holland, Germany, Russia, France, parts of the United States and Canada are raising large quantities of flax at the present time. Russia produces more than one-half of the world’s supply, but Ireland and Belgium rank first in quality. Flax culture must be divided into two branches, culture for fiber and culture for seed. In the United States flax is raised almost entirely for the seed. The relatively small amount of flax manufactured is imported and used largely for coarse fabrics, twine, and thread.

The flax plant requires a temperate climate and a rich soil, if it is to be used for fiber, as the growth must be rapid. An even, moist temperature and low altitude produce the best grades of fiber.

The seed is sown early in May and it is grown and ready to pull by the last of June. The plant grows to from a foot and a half to three feet in height and bears a delicate blue flower. Before the seed is entirely ripe, and when the stalk of the plant has turned yellow about two-thirds of the way down, the flax is harvested. It is pulled instead of being cut to save all the available fiber.

Linen is the bast fiber of the flax plant, and
FLAX IN DIFFERENT STAGES OF ITS PREPARATION FOR WEAVING
to separate it from the rest of the plant is a long and tedious process. Weaving linen is rather more difficult than weaving cotton. The fiber is not so elastic, and when there is a sudden strain breaks instead of stretching as cotton does. Coarser linens, such as Russian crashes, are still woven on hand looms by peasants in different countries. Fine damask, woven for so long on hand looms, is now done almost entirely on power machines.

Bleaching may be done at one of two different times: (1) immediately after retting, or (2) after the cloth is woven. If it be done most carefully it requires a combination of many washings, treatments with bleaching powder, rinsings, grass bleaching—processes requiring not only weeks of time, but proper fields upon which the cloth may be spread and favorable weather to do the grassing.

The modern process in the United States is accomplished almost entirely by chemicals. It is treated with sodium carbonate, bleaching powder, and dilute sulphuric acid successively, being thoroughly washed between these operations. Ireland, famous for its beautiful linens, uses the first method.

Linen loses from 25 to 30 per cent in bleaching and becomes weaker as it becomes whiter. The loss of tensile strength is much more marked when chemicals are largely used than
when the natural agents, sun and air, do the work. This partially explains the great difference in wearing quality between the old homespun and the modern machine-made linens. After bleaching, the material is washed, dried, starched, and ironed to give it a glossy appearance. The heavy pressing after the addition of sizing materials not only gives a good finish but also makes it possible to handle the linen in the store without destroying its finished appearance. Sizing, when added in excess, makes a poor grade of cloth look well, but after washing, the material often disappoints the buyer.

**Physical Characteristics of Linen Fiber**

Good flax fiber, when separated from the stalk, should be from 12 to 20 inches in length, and will vary greatly in fineness. It is stronger than cotton but lacks elasticity. Under the microscope the flax fiber is seen to be a long, cylindrical tube with transverse markings or nodes at more or less regular intervals. (See illustration.) The fiber is composed of cells consisting almost entirely of pure cellulose. The color varies from yellowish white to brown and from pearl to steel gray, the best quality being pale yellowish white. The variation in color is due quite largely to differences in the process of retting.
The ability of linen to absorb water without feeling damp is low, varying from 5 to 8 per cent, but the absorptive power is unusually high. It is this quality which makes linen an especially valuable material for towels.

Flax Fibers

Luster is one of the most prized assets of linen and is retained as long as the fiber lasts. The process of retting may affect the strength and luster to some extent if allowed to continue after the resins are dissolved.
Compared with the other textile fibers linen is the best conductor of heat and electricity. It is this property which makes linen feel cool to the touch.

Toward mordants and dyestuffs, linen does not react so readily as cotton, therefore it is more difficult to set dye in linen cloth.

**Household linens.**—Because of its smoothness of texture, its brilliancy, and its excellent wearing and laundering possibilities, linen is the one fiber best suited for the table and the toilet. The very fact that it does not take dyes easily makes it easier to remove stains from linen than from cotton, and the satin smoothness of the cloth keeps it clean longer than another material.

**Table linen.**—Ireland, Scotland, and Germany supply us with most of our table linens. Irish linens are the best and likewise the most expensive, running from $0.75 to $3.00 a yard. The John Brown linen, with the shamrock trade-mark, is one of the well-known brands of dependable quality. The Scotch linens have excellent patterns and run from $.50 to $2.00 and over per yard. German damask, which is very durable owing to its having a closer, harder twisted thread than the others, runs from $0.50 to $1.50 a yard. French damask is noted for its exquisite designs and effective appearance; the thread is fine and round. There is a wide range
in quality from the most expensive to cheaper grades.

When buying linens, rub between the fingers to remove the starch and choose those which are firm and heavy with not too fine a thread. A consideration of the pattern is not only important from the standpoint of design but of wearing quality as well. A large figure with long overshot threads will not wear so well as the one with a smaller design and shorter threads on the surface. The reason for this is very obvious but is often forgotten when purchasing table linen.

Bed linen.—Although most attractive in appearance and most durable, linen is not the most satisfactory material to use for sheets and pillowcases as it is so easily wrinkled and furthermore feels damp and chill when brought in contact with the body. The high price of linen is also a point against its common use in this way. Linen sheeting ranges in price from $1.50 to $2.50 per yard. Hemstitched linen sheets may be purchased for about $7.50 per pair. The tubing for pillowcases ranges in price from $1.00 to $1.25 per yard and the ready-made pillowcases from $1.25 to $2.00 per pair.

Toweling.—The quality of easily absorbing moisture which is a characteristic of linen makes it suitable for use as towels. The checked glass toweling is excellent for drying
silver and glassware, while for heavier dishes medium weight crash will give satisfaction.

Hand towels of Irish huckaback give the best satisfaction, being fine and soft and yet firmly woven. The familiar cotton Turkish towel is now duplicated in linen which after one or two launderings to remove the harshness is a delight to use.

Because linen brings a much higher price than cotton, and because cotton may be finished to resemble linen, dishonest dealers frequently deceive the buyer into paying for a product which she does not receive. Sometimes the two fibers are mixed, and again cotton alone is heavily starched and given a linen finish which is hard to distinguish from the true fiber.

**Distinguishing Between Cotton and Linen**

1. Linen feels smooth, cool, heavy, and leathery, compared with cotton. It is more lustrous than cotton and takes a greater luster in ironing.

2. Untwist a cotton and a linen yarn. Pull apart slowly and steadily. Ends of cotton fibers curl, linen fibers remain stretched and pointed.

3. Tear material and compare edges. The torn edge of linen is more irregular.

4. Apply glycerine or oil. Cotton remains opaque and linen becomes translucent. Place
over dark background or hold up to light to make the difference more apparent.

5. Burn material. Burnt end of cotton is tufted, and same of linen is rounded.

6. Ink dropped on linen is quickly absorbed and makes a spot with a regular outline; while on cotton the absorption is slower and the remaining spot has a much more irregular outline. Often ink will be drawn out along the separate cotton fibers for some distance. This is due to a difference in the capillary attraction of the two fibers.

This test involves somewhat the same principle as the old test of moistening the finger and putting it under the material but is much more satisfactory.

Note.—No one of the above should be taken as absolute. Try several before making final decision. Wash the samples thoroughly to remove the dressing before applying the tests.

Manufacturers have become so clever that they are able to treat cotton so as to make it look and react very much like linen.

Test several samples of linen and cotton and label as your judgment indicates.

Suggestive Review

1. Linen—history, growth, and manufacture. Historical references to linen. Main processes
in the preparation for spinning. How is linen bleached—two ways.

Where is flax raised on a commercial basis for seed? For fiber? Plant some flax in a large sponge. Keep it moist and the flax will grow quickly, furnishing some attractive green for the schoolroom. The children will be interested in seeing it grow and flax and linen will thus be made more real to them.

2. Appearance under the microscope. (See illustration.) Properties as to heat conduction, luster, elasticity, tensile strength, and absorption. Review appearance and properties of cotton fiber, comparing it with linen. Tests for distinguishing between linen and cotton.

3. Household linens—reasons why linen is preferable for table linen and towels. Kinds of table linen and toweling. Get together as many good sized samples as possible to illustrate varieties and qualities. Emphasize the value of learning to judge by appearance and feeling. This means experience with materials and while not always reliable is a valuable aid in determining the quality.