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USE OF FLAX IN AMERICA

The flax plant belongs to the family *Linaceae*. Only one variety, *Linum usitatissimum*, is cultivated for its fiber and seed. The erect-growing plant, with its shallow taproot system, produces a 24 to 36 inch stalk topped with blue or white, 5-petal flowers. The slender stem contains bundles of bast fibers encased in pectin, wax and gum. The fiber is used in the production of linen; a term applied to thread and cloth made from flax. The small, glossy green seed, called linseed, is pressed for its oil and the crushed grain used as livestock feed.

Flax is the oldest plant fiber used by man. Neolithic Swiss lake dwellers fashioned fishing nets from the tough materials of native flax. By 3000 BC people of the Mesopotamia and Nile Valleys cultivated the plant which was useful in making strong and practical twine and cloth. When wet the fibers' strength increases by 20 percent. Its moisture-absorbent qualities and ability to conduct heat make linen a cool cloth for wear in hot climates. Fine linen fabrics became soft, beautiful and lustrous with use.

Through the centuries workers have processed flax in much the same manner. It was a labor-intensive and highly-skilled process not suited to mechanization. Farmers planted the crop in early spring and harvested it in mid-Summer. If grown for seed, flax was sown thinly and left to fully mature allowing the plant to branch and yield more seed. A thickly sown field produced a thinner, straighter stalk which, in combination with the practice of harvesting the plant green, resulted in a finer quality of fiber. In about two months the crop was ready to harvest. Because the fibers ran from the root to the tip of the stem, workers "pulled" rather than cut the crop and spread it in the field to dry. Bolls were drawn through a coarse comb, called a ripple, or struck with a flail to remove the seed from the plant. Stalks were again spread in fields for the dew and rains to rot the natural materials that encased the fibers. Called "retting" the process took several

weeks. Flax was sometimes submerged in water. After retting farmers employed a manually operated, four-legged device, called a flax brake, to pound and crush the woody stem separating it from the fiber. The next step, “scutching” or “swingling,” removed the remaining stem from the fiber. Workers struck the flax as it lay over a vertical board. Fibers were then combed through progressively smaller sets of three hackels (heckles, hetchels) to separate the long fibers (line) from the short fibers (tow). Textile workers spun and wove the line into fine thread and cloths. Tow was used to produce rougher cloth. Clothiers employed various recipes of lye, lime water, buttermilk, and other ingredients, in combination with sunlight, to bleach the linen.

Impressions of linen cloth in pottery point to the use of native flax by the prehistoric peoples of North America. By the time of European settlement, the manufacture and trade of flax and linen were well established in Europe; settlers to the New World brought the knowledge and skills with them. Flax was an important first crop. Family farms grew their own flax, processed the fibers and either wove the fabric or, as roads improved and villages grew, employed local or itinerant weavers. Line was used to make clothing, bedding, table linens and other household textiles; tow for coarse fabrics like feed bags, toweling, clothing and other utilitarian products. Though home manufacture of linen was important, colonists did purchase imported fabrics from Britain.

Bounties and premiums offered to encourage crop production and manufacture of linen goods insured that the knowledge and skills of the processes would not die out in the colonies. By 1640 the Massachusetts General Court directed towns to inventory available flaxseed and identify persons with the knowledge and skills to break, spin and weave the flax and construct looms. They were also instructed to investigate what needed to be accomplished to cultivate the flax, manufacture the cloth and train boys and girls to spin the yarn. With public support and

private subscriptions, leaders organized spinning and weaving schools to encourage the industry and, as was traditionally done in Britain, to employ the poor. Though originally intended by Britain for its own consumption, the colonists utilized most of the locally produced goods. The colonial government continued to offer incentives for the domestic manufacture of cloth throughout the 17th and 18th centuries.

The colonists increasing dissatisfaction with Britain's control of their economy in the last half of the 18th century led to a boycott of imported goods. As residents were asked to favor domestic cloths over imported fabrics, women brought out their spinning wheels and looms to demonstrate their opposition to Britain's taxation and to produce enough cloth for their own needs. Spinning matches were held on public lawns with prizes given for the most linen thread spun. The activity was short lived because, after the American Revolution, merchants again imported fabric which consumers eagerly purchased.

Most of the domestic linen produced in colonial America was woven for household use and was not of the finest quality. In 1718, over 100 Scotch-Irish families from Northern Ireland, a European center for the production of fine linens, set sail for North America bringing their important manufacturing skills with them. They made Londonderry, New Hampshire their home, and the area developed into a center for American linen manufacturing in the 18th century. Londonderry marketed their products beyond the local community and in the 19th century began to produce tow cloth for Southern markets.

The manufacture of linen cloth never became a major industry in North America due to several factors. The geography of the continent, settlement patterns, lack of sufficient labor and the importation of cheaper fabrics discouraged the industry, as did the lack of mechanization. Attempts at mechanizing the process rendered prized long fibers into short tow. By 1800 only the

process of breaking the stem was mechanized. By 1825 manufacturers developed a wet spinning method to produce linen thread, but it required skilled labor. Flax remained a labor-intensive occupation.

On the other hand, cotton was easily picked from the plant and in abundant supply in the South. With the 1793 invention of the cotton gin, a device which removed the seeds from the fiber, and developments in factory spinning and weaving machinery, the manufacture of cotton goods far overshadowed the making of linen. Cotton became so cheap it was impractical and unprofitable to grow flax for fiber. Britain periodically flooded the American market with inexpensive goods making it impossible for domestic manufacturers of linen to compete. By the time America overcame labor shortages in the mid-19th century handmade linen had almost disappeared with only a few companies manufacturing crash toweling, coarse linens, bagging, and baling cloth. The industry more commonly used flax fibers for various twines and threads and exported seed, primarily, to Ireland to be used in their production of fine linen cloth. By the end of the century shoe thread, sewing threads, twines, carpet yarns were the main products of manufacture in America. In the early 19th century millers began to press linseed for its oil, and flax remains an important oilseed crop.

As settlers moved west, so did flax. By 1900, the American northwest emerged as the center for flax production. In the early 20th century, the United States Department of Agriculture experimented with ways to improve the linen industry in America. These experiments in Michigan, Minnesota and Oregon attempted to produce different varieties of flax. In 1930 growers founded the Flax Institute of the United States, headquartered today in Fargo, North Dakota, to promote research into the fiber's use. By 1938 the government began exploring ways to mechanize the growing and processing of flax and designing processing plants.

Today, the United States' Upper Midwest and the Prairie Provinces of Canada are the centers for North America's seed flax. In 1998/1999 Canada accounted for about one third of the global production of flaxseed. In 2000 North Dakota was the leading producer in the United States. Linseed is crushed for its oil and is used as a livestock feed. Straw from seed flax produces tow used in furniture padding and fine papers with cigarette paper being a major product. High in potassium, dietary fiber, and Omega 3 and ALA (alpha linolenic acid) fatty acids, ground flaxseed and cold pressed flaxseed oil has found a market as a health food product.

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