

Long may it wave: As America changed, so did the fabric of its flag, expert says

July 2 2013, by Stephanie Murray

(Phys.org) —The American flag is a common sight across the country on the Fourth of July, and a Kansas State University textiles expert said just as our country has evolved since 1776, so has Old Glory.

According to Barbara Gatewood, professor emeritus of textile science in the university's College of Human Ecology, the American flag has changed considerably throughout the country's history, from the kinds of materials and colorants used in its construction, to the number and ways the iconic stars and stripes are arranged on the flag.

"Early American flags were made from wool, cotton, linen or silk, depending on the availability of materials and the intended use," Gatewood said.

A combination of these materials also was used sometimes. A wool bunting fabric, which was produced in England, was the material of choice for early American flags, she said. This material was favored over cotton, which faded more quickly and didn't unfurl as well in the wind. However, many early American homemade flags were cotton because it was readily available. Linen was a less favorable material, although it was often used to make the stars or to sew flags because of its strength.

"Flags made from silk were more expensive, and thus were used in flags for military purposes and special occasions," Gatewood said.

In 1865, President Lincoln signed a law requiring that the federal

government purchase flag bunting only from American manufacturers, which put an end to the use of the popular English-produced wool bunting material in government flags

The first synthetic dye, Perkin's mauve, was not developed until 1856, so early Americans used natural dyes to create the flag's famous red stripes and blue canton, Gatewood said.

"Undyed and sometimes bleached fabrics were used for the white portions of the flag," she said. "The [red dye](#) was usually obtained from the root of the madder plant, which, ironically, was also used to produce the British Army's famous red coats, or from the female cochineal, a tiny insect that lives on specific cactus plants. The primary sources for blue dye were woad and indigo, two plants that contain blue dye in their leaves."

Today, most flags are made using synthetic dyes and pigments manufactured primarily from petrochemicals, Gatewood said.

Much like their earlier counterparts, the materials used for today's flag usually are determined by the purpose that flag will serve. Gatewood said cotton often is used to make flags that will be displayed indoors or for decorative purposes. Polyester is very durable, so flags made from this material stand up well to the elements. Nylon flags, while somewhat less durable than those made from polyester, are also very popular because they are lightweight, shinier, fly more readily in the wind and produce a desirable "snap" when flown, Gatewood said.

"Additionally, new technology has produced nylon with weather and UV-resistant properties, such as Dupont's trademarked SolarMax nylon, that significantly improve its resistance to outdoor sunlight and weathering," Gatewood said.

The most common method for assembling the American flag throughout history has been sewing pieces of dyed and undyed fabric together and then sewing or embroidering the stars onto the blue material. Designs can also be printed onto flags. This method traditionally produced lower-quality flags, which made them faster and cheaper to manufacture, Gatewood said. Today some very high-quality [flags](#) and banners are produced through sophisticated printing methods.

"As we proudly take part in the long-held patriotic tradition of displaying our national flag this Independence Day, let's reflect on how our flag has evolved and its meaning," Gatewood said. "The U.S. flag is the most well-known national flag in the world and is a symbol of our cherished values of freedom, liberty and justice for all of our citizens."

Provided by Kansas State University

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