

## Rubber and All Its Uses

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Thousands of years ago, Native Americans living in the rainforests of South America discovered natural rubber. Latex is a milky liquid that comes from trees native to Brazil. Rubber is made from the latex.

Native Americans knew how useful rubber was and used it to keep things dry or to collect or hold water. They made boots, sandals, coats, bottles and waterproof bags from rubber.

Later, a French naturalist named Charles-Marie La Condamine saw the many uses of rubber in South America. In 1751, in Paris, he presented the first science paper on rubber. Scientists were curious about rubber.

### **A Craze For Rubber**

In the late 1700s, Europeans found many uses for rubber. Rubber could be used as an eraser when drawing. In Paris, an entertainer walked across the Seine River wearing inflatable rubber shoes.

In December 1783, a silk balloon coated with rubber lifted off from Paris. It flew 43 kilometers (27 miles). Benjamin Franklin saw it. He said it would be useful for watching enemy troops during a war.

Rubber factories quickly sprouted in France, Austria, Scotland, the United States and elsewhere. Rubber became the latest craze. It was used in a lot of things, especially shoes. Rubber replaced wires as a way to keep gloves from falling off.

Rubber-coated rainwear was made by the Scottish inventor Charles Macintosh. It was such a best seller that his name lives on in Britain as the word for "raincoat."

But rubber also had problems. The rubber in shoes and clothes would turn gummy in hot weather and stiff in cold. Worse, rubber had a bad smell. Charles Goodyear was an inventor and hardware store owner in New England. He tried to make rubber better and he did not give up.

## **Burned Rubber Was Stretchy And Not Sticky**

Goodyear worked hard to find a way to make rubber more stable. In 1839, he spilled some rubber that had been treated with sulfur on a hot stove. Although burnt, it kept its shape and was still stretchy. And now it was not sticky. The steps he discovered were later named vulcanization after Vulcan, the Roman god of fire.

Vulcanized rubber had countless uses. It was used to make tires for carriages and bumpers for train cars. Rubber was in high demand for electrical wires in the 1880s. Rubber is an insulator. It prevents electricity from leaving wires.

Three other inventions added major new markets for rubber: bicycles, cars and airplanes.

Bicycles were first sold in England in 1872. By the 1880s, cycling was all the rage across Europe and the United States. Rubber companies took note. Pirelli in Italy, Michelin in France, the Goodyear Company in Ohio and Dunlop in Great Britain all began by making bicycle tires. These are all companies that still exist today.

Next came the internal combustion engine. It ran on gasoline and powered new kinds of vehicles with wheels. In 1895, a car race from Paris to Bordeaux and back launched the automobile age. In 1901, the first aircraft propelled by these engines made headlines. Cars and airplanes needed even more rubber tires and engine parts.

## **High Demand Leads To Man-Made Rubber**

As demand for rubber soared in the 1890s and the early 1900s, Brazilian trees were transplanted to large plantations in Southeast Asia and Africa. In the lab, scientists worked to synthesize, or make, rubber. Their first attempts were too expensive to use for making large amounts of rubber. In 1940, they invented a cheaper way to make synthetic rubber.

By the 1960s, there was more synthetic rubber being made than natural rubber. Today, about 60 percent of world rubber production is synthetic. But it cannot entirely replace natural rubber. Tires, the biggest market for rubber, work best when they are made from both synthetic and natural rubber.

## **Recycling Rubber**

Natural rubber is a renewable resource because more of it can be made. Trees can produce latex for about 30 years. The trees also help with the carbon balance by using up carbon dioxide in the air.

One problem with rubber is that it is not biodegradable and does not break down in nature. But rubber is recyclable. For example, old tires can be retreaded for

reuse, or cut into strips for shoe soles. They can be used as swings. Scrap rubber can be chopped into small pieces known as rubber crumb. It is used to make padding for playgrounds and carpets.

Quiz:

1) Read the section "A Craze For Rubber."

Select the sentence from the section that shows WHY rubber needed to be improved.

2) Read the section "Burned Rubber Was Stretchy And Not Sticky."

Which sentence from this section supports the conclusion that new technology increased the demand for rubber?