

## Rubber Trade's Phenomenal Growth

Over 400 years ago Columbus found American Indians wearing waterproof shoes of rubber, yet that remarkable material did not become an article of commercial importance until less than 60 years ago, although since then the growth in its use has been phenomenal, and to-day America's export of rubber footwear totals 2,800,000 pairs a year, worth nearly \$6,000,000, while the world's annual consumption of the raw product has mounted to 290,000 tons. These striking facts are brought out in a comprehensive study of the history and trade development of rubber issued by the National Bank of Commerce in New York.

The Bank's statement says that the U.S. now consumes about two-thirds of the world's raw rubber, and statistics are presented showing that a huge portion of the world's export rubber business in all parts of the world has shifted to the United States from other countries as a result of the war. The statement says:

The story of rubber is replete with the romance of man's inventiveness and daring enterprise in the far places of the earth, risking his life in the wilds of tropic lands in quest of rubber or in mastering its cultivation. How recent and how rapid the growth of the rubber trade has been may be gathered from the fact that while the annual production was only 54,000 tons as late as 1900, it has mounted to 290,000 tons in the last year. While the war was the principal factor in this vast increase, the world's consumption having been only 108,000 tons the year before the conflict opened, the uses for rubber are constantly growing, and the tremendous development of the automobile industry has exerted the greatest stimulating influence on the production.

The story of rubber in the growing and in the experimental stage of its mechanical development is also most fascinating. Although up to twenty years ago the world's supply came from wild trees and shrubs, man has mastered the secret of its growing, and to-day eighty per cent. of the product is the output of cultivated plantations. This achievement has made rubber one of the few commodities, the price of which has notably declined.

From \$2.81 per pound on May 1, 1910, up-river fine Para fell to 55 cents in December, 1917. It is now 68 cents, as fixed by the United States War Trade Board on May 1, 1918. The field for development of its various peaceful manufactures is far from being exhausted, the limit of its future applications depending on how low a price the raw commodity can stand and remain a profitable crop to grow.

The United States consumes about two-thirds of the world's raw rubber product, but has had little part so far in producing the crude material. British capital controls about ninety per cent. of the plantations, and most of the remainder of the capital invested in the industry is Dutch. British control is partly due to the fact that the chief production areas lie in the middle East and, therefore, to a considerable degree, in British territory, and partly to the fact that British capital foresaw the possibilities of plantation methods of cultivation.

The United States, however, occupies a position of great geographic advantage, from the standpoint of transportation, and the prospects of developing rubber growing in the Philippine Islands are already attracting the attention of experts and capital. Climate and soil are asserted to be admirably adapted, and the labor supply abundant, for development of plantations there. More than 50,000 pounds of the best quality were produced on the island of Basilan in 1917, where there are 72,000 trees, of which 22,000 have come into bearing. Two American plantations in eastern Mindanao have about 90,000 trees, and Castilloa rubber is being used by the government in reforestation. A most promising start, therefore, has been made toward making this country independent of the danger of restricted output, embargoes or export exactions imposed by controlling outside countries.

The world's rubber supply comes in part from Ceylon, Malaya, South and Central America, Asia and Africa, but the "Middle East" is really the great rubber area, and Singapore, Penang, Batavia and Colombo the chief rubber ports of the world. Before the war a large proportion of our supply reached us indirectly via England, and London was the world's real rubber market. But that has been changed, and now two-thirds of all rubber imports come to us directly from the ports of the British

East Indies. Brazil, which in 1912 supplied us with more than two-fifths of our rubber, now supplies but one-ninth. This shift is due largely to the change from wild to cultivated sources of supply.

While the United States may be dependent on outside sources for its crude rubber, in the business of manufacture it stands pre-eminent. Nowhere else has india rubber been manufactured into so wide a variety of products, and nowhere else have manufacturing organizations of such size and skill of management been based on rubber as a raw material. So great, however, has been the expansion of the use of articles made of rubber, especially automobile tires, in this country, that the excess product for export purposes has been relatively very small.

The latest census of manufactures, that for 1914, shows that the value of the products of the rubber industry that year in the United States was \$300,994,000, and in the fiscal year ending June 30, 1915, our exports of rubber manufactures were valued at about one-twentieth of this amount, the remaining nineteen-twentieths being retained for use in this country. Our export of manufactured rubber goods had shown a steady growth for many years before the war. Their total value in 1903 was \$4,674,202, while ten years later it was nearly three times as much. From 1912 to 1915 they remained practically stationary, amounting annually to between \$12,000,000 and \$14,000,000.

The first year of the war had little effect, but for the fiscal year ending June 30, 1916, and for each year since, the total value of our exports of rubber manufactures has been between two and three times their value during the three years immediately preceding 1914. The total for 1918 is given as \$33,343,181. Although augmentation occurred in all the manufactured rubber lines, the increase was especially marked in automobile and other tires and in rubber boots. These were the articles most in demand for war use. The statistics show that the growth in trade was a real increase in quantities and not chiefly a reflection of rising prices.

Increased exports to Britain, France and Italy account for the major portion of the remarkable growth. The value of our exports of rubber manufactures to several neutral countries also increased greatly. Apparently, American rubber goods replaced those formerly imported from Germany and Great Britain, while it is also likely that the use of articles made of rubber is gradually expanding everywhere. Especially notable was the increase in our rubber exports to Argentina, from about \$150,000 per year before the war, to \$1,800,000 in 1917; and to Chile, from the pre-war figure of about \$150,000 to \$715,000 in 1917.

Such data show how substantial a footing the rubber manufacturers of the United States have secured in the foreign markets and the promise for future expansion there. While the articles embraced in the export tables cover the full gamut of rubber products, tires for automobiles form the largest single item, mounting to a value of \$13,977,671 in 1918. Perhaps it is too much to hope that we can maintain after the war such a high level of tire exports to the chief European countries, all equipped to do their own manufacturing, and ambitious not only to supply their home markets, but to extend their own exports. Yet the foreign dealer and consumer have had a fair taste of Yankee quality, and the opening is one of vast commercial benefit and opportunity to the rubber manufacturers of this country.

From the standpoint of our trade future, of course, the most promising countries for our expansion in this particular line of effort, are those where use of the automobile is rapidly increasing as roads improve, and the population becomes accustomed to motor travel, but where manufacturing organization is as yet incomplete. Yet this is but one phase of our rubber prospect. The list of our exports includes, for instance, these items in the schedule for the present year: belting, hose and packing, to the value of \$4,578,396; boots and shoes worth \$5,774,341; reclaimed rubber, \$576,278, and other manufactures of rubber \$7,079,061.

It would be a mistake to conclude that because our domestic demand has increased like our exports of rubber manufactures, the war has not been the stimulating influence. The equipment of our armies, when sent abroad on transports, is not counted among our exports, but swells the enormous domestic consumption. Even before we joined the belligerents the war had so speeded up our industrial life that we were using much more rubber than ever before.

Moreover, war conditions had been forcing rubber more and more into consumption as a substitute for leather and other material less available. Motor truck tires, rubber electric insulation, rubber soles for shoes, rubber floor coverings and many other rubber products were in unprecedented demand in our booming industries. Coming of peace will mean a curtailment of this demand, of course, but having once existed it has opened new avenues of use and application that will never be closed, but promise to lead to ever expanding requirements of manufacture and trade.

These material details mask the romance of rubber that lies in the story of its origin and making, and in the rapidity of the development of its uses and manufacture. Columbus and the Spanish and Portuguese missionaries who followed him found the American Indians using crude rubber for balls, for ornaments and for certain articles of clothing, among them shoes which were proof against the wet. Yet not until 1862 was rubber deemed of sufficient moment to be reported in American import statistics.

To Europeans rubber had been known as a curiosity for 200 years before any serious scientific interest was taken in it or effort made to utilize it in an industrial way. The French were pioneers in this virgin field. In the first half of the eighteenth century, the French naturalist, La Condamine, discovered the native gum in the Cordilleras of the Andes. The natives called it "caucho." From this came the French word for rubber—caoutchouc, which is practically the universal name for the material outside English speaking countries. French scientists became interested, and soon the study of rubber was also taken up in England and the United States.

Joseph Priestly, the English chemist, discovered that rubber would erase pencil marks, and so came its English name, derived from this property. Many names are interwoven with the growing story of rubber's romance; that Macintosh, who perfected a method of waterproofing fabric in 1825; Charles Goodyear, Nathaniel Haywood and Thomas Hancock, who were successful in discovering the secret of vulcanizing. The use of rubber tires was first suggested by Hancock in a book published in 1856, but the pneumatic tire was not patented by Dunlop until 1888. So, from these comparatively recent discoveries have multiplied the various uses which rubber has come to fill.

Up to 1873 the world's supply of rubber came from the "Wild." In that year, however, seeds from the native Brazilian trees were successfully planted in experimental gardens at Kew, England. By 1914 plantation rubber had come to take leading place in the world's output, and in the present year it is estimated that eighty-three per cent. of the entire production will be from such sources. Ceylon, the Federated Malay States, the Dutch East Indies, Borneo and the Pacific Islands are the centres of the plantation rubber industry, although there are some plantations engaged in growing the commodity in India.

The word "rubber" has a perfectly definite, technical meaning, although it is frequently used very loosely. Its essential constituent is caoutchouc, a soft, solid, elastic substance, a pure hydro-carbon, existing in liquid globules in the juice of certain trees, shrubs or vines. The uses of rubber have been vastly increased by the demands of war. Tires for motor trucks, aeroplanes, motorcycles and other vehicles have called for an enormous supply. Rubberized fabric for balloons has become of great importance. Large quantities of rubberized goods are required for all air men.

In order to make life endurable in the trenches, rubber clothing is demanded for the soldiers, including such articles as slickers, ponchos, rubber hip boots, and rubber stockings. Because of the nature of the processes involved, rubber garments are essential for some workers in munition factories. Effective gas masks are not possible without rubber, while the requirements for surgical and medical uses have greatly increased. It may be said, in short, that the war has vastly accelerated all peace-time demands for rubber, a fact that has proved a material stimulus to improvement of methods of manufacture as well as quantitative production.

While our export trade in rubber manufactures has enjoyed an abnormal expansion as a result of the great world conflict, there is no reason why the United States should not reap very material future benefit if our manufacturers avail themselves of their opportunity. We have developed the manufacturing skill and organization necessary to meet every requirement. Those European countries which have been involved in war have been shocked out of conservative habits, and their need for rubber will de-

(Continued on Page 15.)