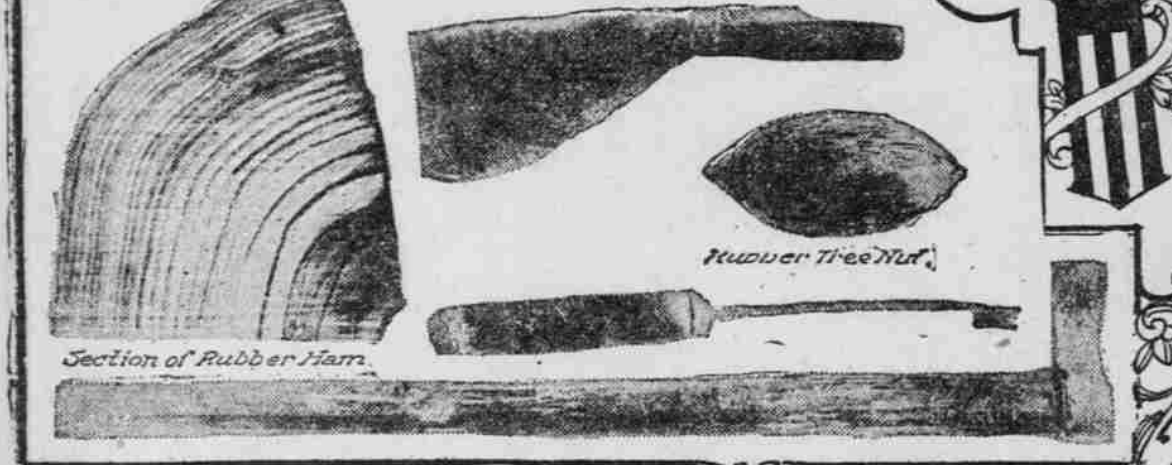


Increasing the Rubber Industry

WHAT AKRON'S GREAT FACTORIES ARE DOING FOR THE ARMY AND NAVY
By FRANK G. CARPENTER.



Section of Rubber Hammock.

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AKRON, O.—Since the outbreak of the great war in Europe, the little city of Akron has become one of the important manufacturing centers of the world. It is the chief rubber city of the United States. It manufactures more than half of all the rubber goods made in this country, and more than one-third of all the rubber made by the world. Just now it is engaged in making rubber supplies for the Army and Navy, and its 25 factories have been speeded up by the demands of the Nation. Rubber is estimated by the officials here as the third great necessity of our armies in Europe. The first necessity is food for the soldiers, the second is guns and ammunition to fight the battle and the third is rubber, which has to do not only with transportation, but with nearly every other branch of modern warfare.

Take the matter of tires. During my trip through the great plants here I have found nearly every one of them making more than five times as many tires as they did a year ago. The total output of the year will be about 20,000,000. There is one company which makes nothing but tires. It is now turning out 15,000 a day, and is building additions to its plant which will make its production 25,000 tires daily. This company manufactures tires of all kinds, from those of the motorcycle used by the scouts to the great trucks which require tires 15 inches wide and strong enough to carry the heaviest loads.

The demand for tires is far beyond the supply. They are among the greatest of military necessities and they are eaten up with the hardest usage. Even the solid tires seldom average more than 20,000 miles and this is less than one-tenth of what is expected of them for ordinary commercial purposes. It is estimated that the allies now have in the neighborhood of 450,000 motor vehicles of one kind or another, and that these machines use several times as many tires as would be consumed under peace conditions. At four tires to the machine, this means that some thing like 1,800,000 tires are now being used and this does not include the increased demands that we are to put on the machine army in Europe. We shall have to supply not only our own tires, but aid in keeping the armies used by our allies in good condition.

As to the demands of the United States troops in Europe, it is estimated that we shall need at least 100,000 motor trucks for the transportation of our guns and supplies, and that the first army of 1,000,000 men will require 40,000 trucks, which means 160,000 tires. These tires are now being made here and at the many other rubber centers of the United States. They will be shipped to the establishments making the trucks, and as soon as possible the business will be shifted to Europe, to be used there as the wear and tear of the service demand.

In addition to the trucks, we shall have to keep up in the neighborhood of 200,000 other motor vehicles, including cars of various kinds, hospital ambulances and motorcycles. The British army is now using about 100,000 motorcycles, and some of them are equipped with sidecars. The use of the little boatlike car used with our motorcycles, which has facetiously been dubbed the "wife-killer." These sidecars are mounted with machine guns, and the weight of the guns rests upon the rubber tires.

One of the plants I visited was making tires for airplanes. The tires are shipped to the various aviation factories and will be used for our flying machines abroad. One of the largest factories here has been making such tires for the French aerial fleets, which are using annually something like 30,000 machines. It is estimated that we shall need more than 100,000 machines every year in order to maintain our force of 20,000 aviators, and the work is now going on in making the tires for the airplanes under construction. Each airplane has two little wheels, upon which it alights when it comes down from the skies. These wheels have to be of the strongest rubber in order to absorb the shock and soften the landing. The very best of rubber is used for the purpose, and that of a nature so springy that an airplane will bounce from 50 feet into the air on striking the earth.

Speaking of rubber for use in the air, two of the biggest factories here are making dirigible balloons for scouting along the shores and for some distance out at sea. These balloons are enormous gas bags of the very best rubber. The larger ones are more than 100 feet in circumference and 175 feet long. They carry wireless apparatus and are of great use in detecting submarines that come near the coast. They are similar to what the British call "blimps."

Some of the blimps are already in use, and it is said that we shall need 300 for our home service alone. These balloons are equipped with pontoons, which enable them to settle upon the water. Other dirigibles, when not inflated, can be squeezed into a small compass, and can easily be shipped to any point where they are needed. And then there are the kite balloons and captive observational balloons, which are in use among the armies abroad and which we shall have to supply for our force in the field. Some of these balloons must be able to fly 35 miles an hour, and that at a height of 6000 feet. They are being built for the Navy. They are testing these balloons somewhere in Ohio and they have a great tool there for testing them. This school is presided over by Ralph H. Upson, who will be remembered as having won the last James Gordon Bennett balloon trophy race, which was held at Paris shortly after the war began. Some of the largest of these dirigible balloons cost as much as \$50,000 each.

It would take a column of this newspaper to print even the names of the different kinds of rubber goods that are now being made for the Army. In one of the large establishments here I saw hundreds of men and women making boots and shoes for the men in the

trenches, and in another place, they were making rubber slickers and ponchos. The trenches are often full of water and hip boots are a part of the soldier's equipment. Some of the men wear rubber stockings, between woolen and cotton ones, and some of the officers have rubber sheets upon which they sleep to keep out of the wet. Every man we send to Europe will have to have a rubber coat or slicker and rubber shoes and boots required will be numbered by millions. In one of the factories here I saw them vulcanizing hundreds of pairs of boots at one time. The boots were on steel frames which were about two feet taller than the workmen who pushed them into the great ovens or retort lines with iron pipes, where this was accomplished. A touch of a button dropped the steel door of the oven, when the steam was turned on and the vulcanization began.

But before I go farther, let me tell you something as to how the crude rubber is turned into the manufactured rubber of commerce. The first rubber manufacturers were in the shape of balls, which Columbus found used by the Indians on the West Indies islands shortly after he discovered America. A little later Cortes was taught by the Aztecs in Mexico, to spread it over the coats of his soldiers to keep out rain, and about 24 years before our Declaration of Independence a Frenchman brought some of the juice of the rubber tree from Ecuador to Europe in the shape of rude bottles. The first manufacture of rubber by civilized man was by Dr. Joseph Priestly, an English scientist, who came to the United States while George Washington was President. Dr. Priestly made the first rubber erasers. They were cubes much smaller than the kind we now buy for a nickel. They were half an inch long and sold for 75 cents.

The first waterproof cloth was made by an Englishman in 1797, about the time that John Adams was inaugurated President of the United States, but it would not stand the heat, and it was not until the Presidency of John Adams that Charles Mackintosh, a Scotchman, discovered how to dissolve rubber in naphtha, and make a liquid which, spread upon cloth, caused it to shed water. That was the birth of the slicker and the rubber coats of all kinds that our men will wear in the field.

The greatest of all rubber inventions, however, was made by an American. This was Charles Goodyear, who covered the process of vulcanization. Goodyear was a Connecticut Yankee, who began life as a hardware man. He became interested in the study of rubber, and when he saw some shoes made of the pure gum, which had been imported from Brazil, he conceived the idea of making something of the kind for the trade. He used pure gum, which was then cheap, but the shoes softened during the summer and gave out. He had often heard of a process to harden the rubber by treating its surface with nitric acid, and he was able to improve it thereby. He then tried mixing it with sulphur, but the process was not a success until one day when he was baking a mixture of sulphur and rubber on his kitchen stove, some of the gum fell out upon a hot iron. Instead of melting, the stuff hardened like leather, and he discovered that great heat would make rubber hard. He took the rubber outside and nailed it to the wall of the house to see whether it would stand the cold. There was a frost that night, but the next morning the pieces of rubber was as elastic as ever, and it had none of the brittleness of the cold rubber he had previously made. He then went on until he learned just how the gum should be treated and the amount of heat needed for vulcanization. He took out his first patent in 1844, and upon that patent has grown the great rubber industry of today. Various improvements have been added to make vulcanized rubber soft, and we have it in various shapes.

I wish I could take you over one of these big rubber factories and show you the many processes through which the crude rubber goes before it comes out in rubber gloves, automobile tires, diving suits and in the thousand other shapes in which it is used by the consumer. The establishments are enormous. They have hundreds of acres of floor space and there are thousands of which employs in the neighborhood of 15,000 men and women. I went through one of the largest, touching only the high spots. The time spent was several hours and my trip was a Sabbath day's journey, or as far as from Bethlehem to Jerusalem. In one room, covering an acre, I saw hundreds of spindles moving around like those of a great cotton mill. They were making insulated wire for telephonic and telegraphic use and for various kinds of electrical machines. In other places they were making rubber gloves to be used by electricians while handling live wires, and in others insulators for wireless outfits, and rubber packing for the periscopes of the submarines. The very torpedoes that the shot by the submarines have rubber arrangements which control their depth in the water, and rubber is also used in laying the submarine mine. The crews of our submarines have rubber boots, hats and overalls, and they have escape helmets which contain a great deal of rubber.

In one part of the factory they were making rubber sheets, which were sent out as a part of the Red Cross supplies, and rubber operating aprons to be used by the doctors. The Government is now asking for something like 30,000 doctors to go to France and each of these must have an extensive rubber equipment, including tools that are largely made of rubber. We have already six base hospitals in France, and these have in the neighborhood of 10,000 beds. The hospitals have hot-water bags, ice bags and rubber pillows and mattresses. The nurses use rubber gloves, and the attendants have rubber-tired wheelbarrows for carrying the patients. All of these supplies will be enormous increased when our great Army has gone to the field.

In going through the factory described, I started at the basement, where there were acres of rooms filled with rubber as it comes from the

Native Tools and Products from the Wilds of the Amazon.



Making Tires for Airplane Wheels

plantations, and I followed the rubber hams and crepe rubber through their many processes into goods of one kind or another. The first process is softening the rubber and crushing the lumps between great corrugated rollers of steel. The softening is done in vats of hot water. Then comes the crushing, which brings the rubber out in great sheets. It is next washed by streams of running water until all the dirt and grit are removed and then rolled out into thin, porous sheets. It is moved back and forth between the rollers, kneaded and worked over and over and mixed with a binding material, so that when it is finished it is in rubber sheets about a quarter of an inch thick, and it may be white, black or red, according to the coloring matter that is mixed with it. The necessary sulphur is then added for vulcanization and it is treated with other ingredients, according to the kind of product desired.

In the making of tires, a mixture of cloth and cord is used to build up the fabric, each factory having its own methods of manipulation and construction. The men are saving money and 50 per cent of them now own their own homes. One company is building 1500 houses. Another has a plan by which its employees have become stockholders and share in the profits of the business and nearly every establishment does more or less welfare work for its employees. Indeed, I know of no place where the labor seems to be more contented, and is more universally prosperous.

I find also a high degree of patriotism exhibited in connection with the war, both on the part of the companies and of the men in their employ. The larger factories have subscribed extensively to the liberty loan, a big percentage of the men buying the bonds on the installment plan. The companies are working together and assisting each other to get out the war orders. Shortly after our declaration of war one of the largest of the plants here

was asked to supply thousands of a certain article, the name of which I am not permitted to give, within seven days, in order that they might be given to General Pershing's Army when it started to Europe. The article had never been made in this country, but the factory took the patterns and turned out the order within six days, although it had to shut down five of its busiest departments to do so. A few weeks later the Government sent out an order for several hundred thousand of the same article, distributing it among a number of factories in order

Women's Fancy Turns to Stouter Street Shoes.

Directions Given for Making Trot-About-House Frack.

SINCE the soldiers are so stoutly booted, woman is fancying well soled, sturdier looking boots for wear with sport and tailored clothes. The sturdiness is rather a pose, however, for the new laced oxfords and shoes of tan leather are quite pretty enough to please anybody with their long, narrow lines, blind eyelets and qualities of perforated trimming on the toe. Heels are low and broad and a manish suggestion in the general lines of the shoe gives that sensible look which is very smart just now.

But sensibleness has no favor in fashion's eye when it comes to dress-up footwear. The low-heeled lace shoe of tan leather would utterly spoil the effect of a formal tulle or dainty afternoon costume. This type of dress demands the pretty buttoned boot with its graceful lightness of effect and its more or less high heel. Seven inches is the height beyond which feminine boots may not tower just now by order of Uncle Sam, but all the daintiness necessary can be put into a seven-inch

Crepe Rubber as it Comes from the Plantation

No partiality might be shown. The company that filled the first order not only did not object to this, but it sent its skilled workmen and specialists to aid its competitors in starting their work on the Government orders. I have talked with officials of the chief plants here. They tell me that the rubber industry is mobilized and that it will work together throughout the war. They say that there will be

no famine in rubber and that the world supply will be ample for ourselves and our allies. They say that the crude rubber is practically controlled outside of Germany and that the industrial plants we now have are large enough to satisfy every demand. There will be no increase of prices as to most materials, and all other work will be set aside, if necessary, to supply Government orders.

buttoned top of cloth; and most of the Fall dress toots have cloth tops.

No special pattern is needed to make a trot-about frock these days. One cuts an ordinary waist pattern several inches longer than the natural waist-line and joins to this elongated bodice a pleated skirt made of four perfectly straight widths of material. The pleats are measured and laid first and basted top, bottom and midway of the skirt. Then the pleats at the upper edge may be lapped each the slightest bit, until the pleated material fits around the edge of the bodice. A long slash of the material, passing twice around the body, draws in the unfitted bodice to graceful lines. Flocks of this sort, of mohair or wool poplin may be made in the home sewing-room for about-the-house wear all winter.

If you own a yard of very handsome brocade, Chinese embroidery or metal embroidered velvet, make a matinee hat of it. A delectable model of the sort, just from Paris, is of brown velvet embroidered with dull gold threads. The crown is high and melon shaped, sloping toward the back and around the narrow brim is a tiny band of fur.

Old-Fashioned Johnnycake.

If we want to do our bit till "Johnny comes marching home" we must eat all the johnnycakes we can and leave the

wheat to go over the water. At the same time we must remember that while corn is rich in oil it contains not quite so many mineral salts as wheat.

Therefore, if we confine ourselves exclusively to corn diet, we must drink plenty of milk with it and eat a little more heartily of peas and beans.

The Southern army fought for five years on a corn diet, and it is as good to golf on or hike on as it is to fig on. Here is a good old-time recipe for johnnycake which, as the old lady who made it said, "tastes like more". One pint buttermilk, one pint meal (white), one teaspoonful salt, three eggs, two tablespoonfuls melted butter, one light teaspoonful soda. Beat the eggs together till light, add the buttermilk and then the meal sifted. Beat well together. Dissolve the soda in two tablespoonfuls of boiling water and add this and the butter and salt to the batter, stirring well together.

Pour into a greased, shallow baking pan and bake in a moderately quick oven for half an hour.

FOR TALK'S SAKE.

Haslett.
People do not seem to talk for the sake of expressing their opinions, but to entertain an opinion for the sake of talking.

A good-looking woman ought to make a successful detective.



Avoid Operations

Statistics show an appalling increase, every year, in operations performed upon women for some derangement of the feminine organism.

It is perfectly true that some of these troubles may reach a stage where an operation is necessary—but it is also true that many women have escaped the necessity for an operation by removing the trouble with

Lydia E. Pinkham's Vegetable Compound

even after an operation has been advised as the only means of recovery.

These Three Letters Prove That Statement.

Tennille, Ga.—"I want to tell you how much I have been helped by Lydia E. Pinkham's Vegetable Compound. About eight years ago I got in such a low state of health I was unable to keep house for three in the family. I had dull, tired, dizzy feelings, cold feet and hands nearly all the time and could scarcely sleep at all. The doctor said that I had ulceration and without an operation I would always be an invalid, but I told him I wanted to try Lydia E. Pinkham's Vegetable Compound, and it has entirely cured me. Now I keep house for seven and work in the garden some, too. I am so thankful I got this medicine. I feel as though it saved my life and have recommended it to others with benefit."—Mrs. W. E. LINDESEY, R.R. 3, Tennille, Ga.

Des Moines, Iowa.—"Four years ago I was very sick and my life was nearly spent. The doctors stated that I would never get well without an operation and that without it I would not live one year. My husband objected to any operation and got me some of Lydia E. Pinkham's Vegetable Compound. I took it and commenced to get better and am now well, am stout and able to do my own housework. I can recommend the Vegetable Compound to any woman who is sick and run down as a wonderful strength and health restorer. My husband says I would have been in my grave ere this if it had not been for your Vegetable Compound."—Mrs. BLANCHE JEFFERSON, 703 Lyon St., Des Moines, Iowa.

Bellevue, Pa.—"I suffered more than tongue can tell with terrible bearing down pains and inflammation. I tried several doctors and they all told me the same story that I never could get well without an operation and I just dreaded the thought of that. I also tried a good many other medicines that were recommended to me and none of them helped me until a friend advised me to give Lydia E. Pinkham's Vegetable Compound a trial. The first bottle helped, I kept taking it and now I don't know what it is to be sick any more and I am picking up in weight. I am 20 years old and weigh 145 pounds. It will be the greatest pleasure to me if I can have the opportunity to recommend it to any other suffering woman."—Miss IRENE FROELICHER, 1923 Manhattan St., North Side, Bellevue, Pa.

The strongest and most trustworthy letters come from women who have escaped this terrible ordeal by the timely use of Lydia E. Pinkham's Vegetable Compound. Unless an operation is necessary at once, try this famous old remedy first. It can do no harm and in many cases it has been a blessing. The Lydia E. Pinkham Medicine Co., Lynn, Mass.