

thicknesses of material, making a waterproof garment. This was the beginning of the rubber garment industry that to-day sends its products all over the world.

But crude rubber has very serious faults. It grows soft in hot weather and gives off an unpleasant odour, and in cold weather it gets so hard that it is brittle. It did not become an important article of trade until T. Hancock of London and Charles Goodyear of America, about 1844, independently discovered the process known as *vulcanization*, by which it is combined with sulphur at a moderate heat. On this process the great rubber industry of to-day rests, for it furnishes a product that is the same under all ordinary degrees of temperature, and does not rot when it is exposed to light and air, as crude rubber does.

From Various Plants

Trees and vines producing the milky rubber juice are found all over the world. They range from the great *Hevea brasiliensis* (sometimes 12 feet in circumference) and *Castilloa* trees of the Amazon basin, which were the original sources of the highly valued Pará rubber, and the *Landolphia florida*, a vine of Africa which for years supplied Europe with much of its crude rubber, to the scraggy *guayule* bush of the arid plains of northern Mexico. The *Hevea* and *Castilloa* have not only supplied the greater part of the wild rubber, but have been used almost exclusively for the big plantations as well. The household rubber plant (*Ficus elastica*), which belongs to the fig family, is an important Asiatic source of supply.

The limitations of Brazilian rubber, when Brazil was the chief source of supply, emboldened the authorities of

BALL OF CRUDE RUBBER



Pará rubber is prepared for market like this. The rubber milk is poured on the growing ball while the stick is twirled over a smoky fire thus causing the milk to coagulate.

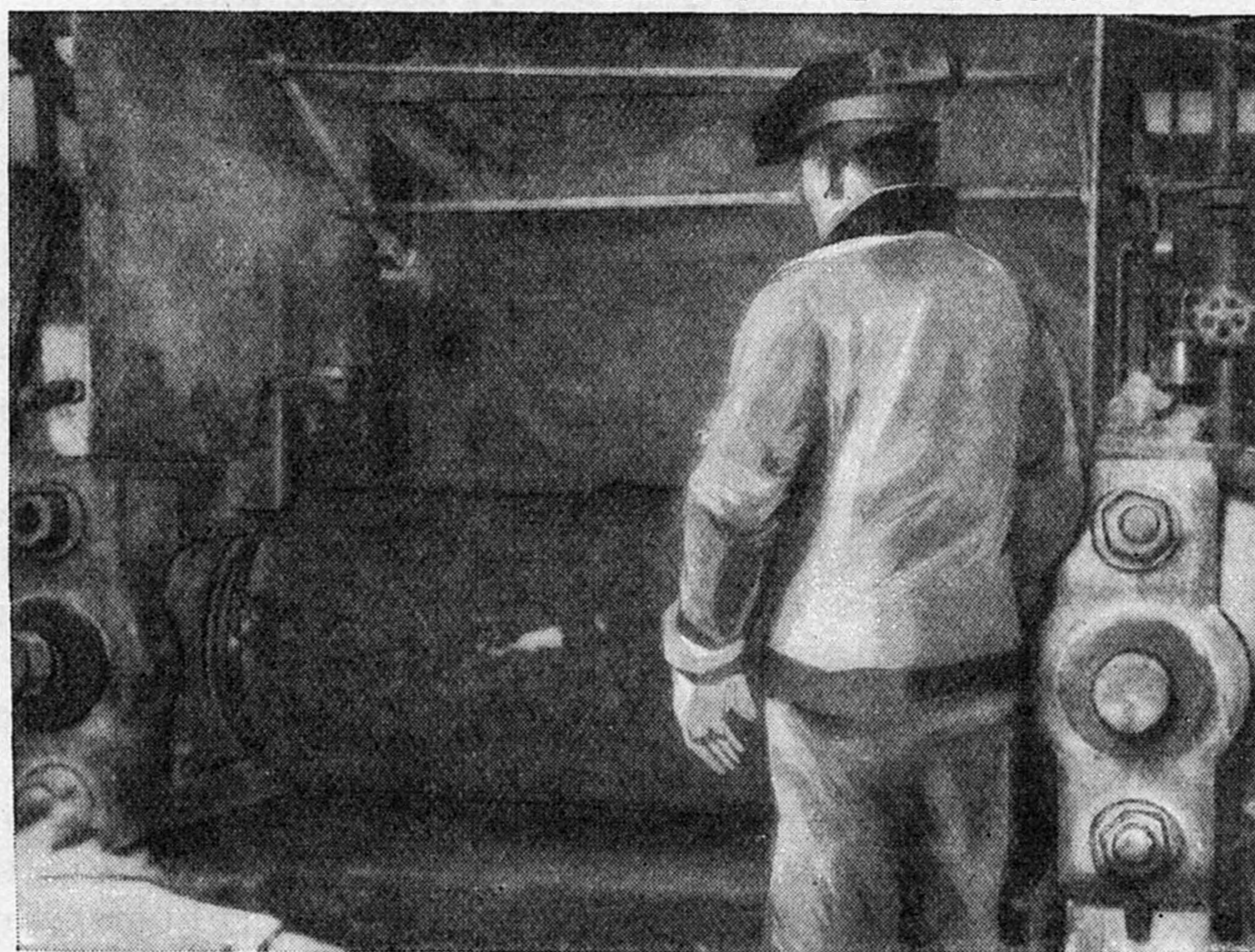
Kew Gardens, London, to make a daring experiment. A party was sent out to the Amazon district to collect rubber seeds. These were brought home and carefully planted in Kew Gardens. In due course seedlings from these original plants were sent out to Ceylon and Singapore, and so successful was the experiment that plantation rubber is grown now in practically all our British possessions in the East, thus enormously increasing our source of supply.

Gathering Rubber

The wild rubber trees of the Amazon River district, sometimes 60 feet high, grow in swampy forests far from civilization. Here the rubber gatherers, largely Indians, negroes, and half-breeds, are hired by an *aviadore*, a man who has secured a grant from the government to tap the trees, for most of the rubber lands of South America are government-owned. Each of the gatherers is given a section of forest to work. In places the undergrowth is so thick that he must cut a path from tree to tree. Sometimes the water is deep enough to float the collector's canoe, but often he has to wade in deep mud. He starts out very early in the morning, for if the sun is hot the juice quickly hardens.

Various methods are used to tap the trees. Formerly the natives cut four troughs down the

"KNEADING" THE RUBBER DOUGH



Big milling machines work the rubber and the minerals that are mixed with it into a perfect blend. The rubber emerges from this process in great sheets.

sides of the tree, or four large V's which met in a common central trough, or sometimes little gashes round the tree, with a cup beneath each gash. But these overtaxed the trees and eventually killed them. The common method used to-day is the herring-bone system, in which a vertical trough is cut down the length of the tree, and from this trough alternate side troughs, slanting at an angle of