

ber saved by the use of carbon black, but the carbon black compounded into tires actually extends the life of a tire at least five times.

When formed, millions of carbon particles cling together in fluffy clusters like bunches of grapes. To break down the clusters, various mills or mixers are used in paint, ink, rubber, paper and other industries.

**Carbon Black Size Varies**

There is a wide variety of carbon blacks to meet varying demands. Just as carbon black varies in color, so it varies in size. Carbon black particles range in diameter from 10 millimicrons to 300 millimicrons, where a millimicron is a thousandth of a micron or 1/2,500,000,000 of an inch. A blond hair is 50 to 100 microns across, and thus gigantic in comparison. The size of the particles varies with the material used and method of manufacture.

Burn a fresh Brazil nut or a piece of rubber band, and black smoke rises from it. This is soot just as much as the fluffy black material that collects over an oil burner or inside a chimney. It all results from the incomplete burning of oily hydrocarbons such as gas or oil. Intense heat or incomplete combustion cracks up the hydrocarbon molecules and strips off their hydrogen.

Carbon black can be made from anything that releases carbon. Insufficient air, which causes a gas or oil burner to smoke, is the clue to its manufacture. Cost of the raw material pretty much determines the material from which carbon black will be made.

**Different Production Methods**

Turpentine, for instance, would be an excellent source of carbon black were its cost low enough. Most carbon black is produced from natural gas or oil. Thus carbon black factories are located in the Southwest, right in the natural gas and oil fields.

Carbon black is produced in a number of ways. In making soot with a candle, it was the cold metal surface of the spoon which collected the carbon black. An elaborate form of this is the impingement process. It employs many small flames which

strike metal channels or rollers that collect the carbon particles from the flame. These small flames produce the finer carbons.

The furnace process, in contrast, employs relatively huge flames confined in furnaces. The thermal process, which uses gas, employs heated furnaces in which the hydrocarbon gases are decomposed into carbon and hydrogen. In the lampblack process, which produces coarse carbon black, oil is burned in open pans and collected in settling chambers.

Up to a few years ago, practically all the carbon gases are decomposed into carbon the United States. Even today, more is manufactured in the United States than in all other countries combined. Research is now under way to develop finer carbons tailored to meet specific needs. Also there is a concerted effort to increase manufacturing efficiency so more carbon black will be produced for the gas and oil used.

*Specimens of carbon black, products using it and a candle for making a little have been collected for you by Science Service. A total of eight specimens, and suggested experiments to perform with them, are included in a kit which you can secure for 75 cents per kit or three for \$1.50. Write Science Service, 1719 N St., N.W., Washington 6, D. C., and ask for the Carbon Black kit.*

Science News Letter, October 11, 1952

**MEDICINE**

**Rapid Thawing Best As Frostbite Treatment**

➤ **BEST TREATMENT** for frostbitten feet, legs or hands is rapid thawing in a warm bath at a temperature of 95 to 113 degrees Fahrenheit, Drs. Martin A. Entin and Hamilton Baxter of McGill University, Montreal, reported to the American College of Surgeons meeting in New York.

"To be most effective, the thawing must be immediate, rapid and penetrating," they declared. Warm water or diathermy are recommended for the warming. The temperature should not go above 113 degrees Fahrenheit.

Rapid thawing is painful, they pointed out, so sedatives should be given.

Delayed thawing is really mild warming of already thawed tissue and may be harmful, they pointed out. Exposing a frostbitten limb to temperatures higher than 122 degrees Fahrenheit is harmful, their studies showed. Neither ACTH nor another drug, hexamethonium, were found of enough use to be considered practical for treatment of frostbite cases.

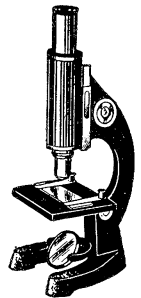
In some of the experiments, rats were precooled before their legs were frozen, to simulate the condition of acute frostbite in a foot of an injured soldier following prolonged exposure to the elements on a battlefield. The rats in such experiments lost more tissue than the controls, showing that frostbite is worse in a person who has already been chilled all over before frostbite set in.

Science News Letter, October 11, 1952

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