CHEMISTRY

Army Reveals Its Method Of Making Better Charcoal

Ordinary Wood Dried, Compressed, and Slowly Heated, Replaces the Coconuts and Peach Pits of World War

THE ARMY'S method of making superior activated charcoal for gas masks out of ordinary wood—a process for the last ten years kept a military secret of the United States—has at last been made public by the issuance of Patent No. 2,162,366 to Major Maurice E. Barker and chemist Robert S. Brown of the Chemical Warfare Service.

Activated charcoal is the agent in gas masks which absorbs poison gases and filters them from the air. During the World War coconut shells provided much of the raw material for such charcoal but the demands were so great that nationwide collections were made of peach pits, as many will recall.

By the new Army method America's vast supplies of wood—any wood—can be turned into highly absorptive charcoal granules that will fill gas mask canisters for soldiers and civilians in the next war.

The invention of the Chemical Warfare Service experts, now disclosed, takes two-inch cubes of dried wood, dehydrates them with chemicals, dries them again and finally compresses them under pressures of from 10,000 to 20,000 pounds to the square inch.

The blocks, made dense by the severe squeezing, are then charred at relatively low temperatures in air for 24 hours and then placed in an atmosphere of carbon dioxide and heated slowly to temperatures of 1472 degrees Fahrenheit. Finally the charcoal cubes are cooled in a carbon dioxide vapor. When finished they are ground into coarse granules ready for use in gas masks.

The gas retention of this special charcoal is about double that obtained by any methods previously known, states the patent.

From the military point of view, explains the Chemical Warfare Service, a charcoal for gas masks must be very, very dense and yet retain the largest possible volume of gas. Ordinary charcoal could be used in gas masks but it might be necessary to carry a bushel of it around to get the necessary effect. The Army's charcoal, in contrast, gets an equal effect with a very small volume.

England, in her present hurry to create gas masks for all her civilians as well as her armed forces, makes her charcoal out of a combination of peat, lignite and coal which is ground and carbonized with heat. It is then mixed with a binder material, compressed, and run through dies from which it emerges as long spaghetti-shaped strips that are sliced up into granules for the masks.

The commercial art of making charcoal is gradually approaching the methods long used by the Chemical Warfare Service so that it has been decided to make the long-secret process public property.

Science News Letter, July 1, 1939

PHYSICS

New Stress Study Method Aids Machine Design

See Front Cover

A NEW method of "freezing" stresses in rapidly rotating disks so that they may be analyzed and studied as an aid to more accurate machine design has been developed by R. E. Newton of Washington University.

Transparent, synthetic resin models of bridges, machine parts, and other structures have been used extensively by engineers in determining how they should be designed. If the model is illuminated with polarized light the stresses produce fringes from which the amount of stress can be determined.

There are difficulties in applying this technique to machine models spinning at high rates of speed, although this can be done through the use of the stroboscope, large amounts of light and extremely accurate synchronization.

Mr. Newton avoids these complications by using in making his model a kind of synthetic resin that permanently records the centrifugal stresses set up in a rotating disk of the material. The disk is heated to somewhat above the boiling temperature of water and then slowly cooled while it is still revolving. Instead of having to make the strain analysis from the transparent model while it is in motion, the desired information can be obtained from the specimen removed from its mounting and studied while at rest.

The new method is expected to aid greatly in the design of machine parts.

Science News Letter, July 1, 1939

MEDICINE

New Ideas On Immunity To Infantile Paralysis

NEW ideas about immunity or resistance to infantile paralysis have developed from studies made by Drs. E. W. Schultz and L. P. Gebhardt of Stanford University. The ideas have not yet reached the stage where they can be applied practically to control of this dreaded childhood plague. They are interesting, however, because they offer a possible explanation of why or how some children and adults can resist infection with the virus of the disease.

The ideas developed from experiments in which the scientists sought not only to trace the route of the virus through the body to the brain but also to determine the amount of virus that accumulated in various nerve cells before paralysis set in. Details of these experiments were reported to the Society for Experimental Biology and Medicine.

Virus production and nerve cell damage do not altogether parallel each other, they found. Fairly large amounts of virus may be formed without apparent damage to the nerve cells. Both the concentration reached by the virus, that is, the amount of it developed in the cells, and the susceptibility of the invaded nerve cells may be involved in actual destruction of nerve cells. It may even be that the amount of damage to the nerve cells depends more on the concentration the virus can build up within the cell than on its cell-invading ability.

It seems possible to the Stanford scientists that there may be strains of infantile paralysis virus which do not lack power to invade nerve cells but which always remain at what scientists call a low titer—that is, they never are able to build up a high enough concentration within the cells to damage even the more susceptible cells. These strains of the virus may be quite distinct from the ones which cause epidemics of the disease in paralytic form. But exposure to such strains may give an individual natural immunity to the disease which will see him safely through an epidemic.

Science News Letter, July 1, 1939