blowpipe method. Before then synthetic sapphire was opaque. Verneuil dropped finely powdered aluminum oxide through the flame of an oxy-hydrogen inverted blowpipe. The powder melted in the flame and small droplets fell on a fire-clay rod placed below.

Several crystals formed, but soon one began to grow at the expense of the others. As more powdered corundum was added this larger crystal became an inverted, clear, pear-shaped mass or boule. Commercial methods were developed later from Verneuil's earlier work.

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CHEMISTRY

Army Insecticide

New aerosol dispensers for protection of the Army overseas from malaria mosquitoes use Freon and pyrethrum, a concentrated flower extract.

➤ MOST of the pyrethrum supply arriving in the United States is now going into the new aerosol dispensers for protection of the Army from malaria mosquitoes in critical overseas areas.

Little pyrethrum will be available, the Agricultural Insecticide and Fungicide Association told its membership, for agricultural use and almost none for the familiar household insect sprays. Other materials must be substituted for these purposes.

The supply of Freon, a non-poisonous gas used for refrigerating systems, is also used for the dispensers and can now be released only for essential refrigeration systems. The number of aerosol dispensers sent to the fighting fronts is very large, according to OWI reports.

The aerosol dispenser for control of insects is a new product. According to reports from the Agricultural Insecticide and Fungicide Association, the dispenser is a hand-size steel cylinder containing highly compressed Freon gas, a highly purified and concentrated pyrethrum extract and some sesame oil. The soldier unscrews a valve. Immediately a fine jet of gas and pyrethrum extract shoots out, resembling light smoke or fog, which kills mosquitoes. The finely-divided, fog-like particles are what is called "aerosol."

It takes only an instantaneous "shot" from the dispenser to get rid of mosquitoes inside a pup tent. A somewhat longer time will serve inside a bomber or transport plane. The one-pound dispenser can discharge the aerosol for almost 15 minutes and meanwhile treat a space 200 by 100 by 10 feet.

Of the chemicals shot from the dispenser and combining to make the aerosol, the most familiar ingredient is the pyrethrum. The pyrethrum flower is one of the oldest insecticides known. For several thousand years, the dried and powdered flowers of the plant, *Chrysanthemum cinerariaefolium,* have been used for insect control. Modern insecticides used in household sprays have been based largely on a concentrated extract from the flower, and such a concentrate is used for the aerosol.

The other major element in the aerosol dispenser, Freon, is the chemical dichloro-difluoro-methane. Used in peace time as a safe refrigerant, this chemical is non-poisonous and non-inflammable Since the pryethrum extract is also not irritating to humans, although fatal to many insects, it is possible for soldiers to remain inside the tent or native hut or wherever the aerosol is being used. This is important in malarial war zones.

Science News Letter, October 30, 1943

GEOLOGY

Hot-Water Mining Method For Potash Salt Invented

➤ POTASH for war supplies and fertilizer can be more completely and efficiently extracted from the depths of the earth by hot-water "mining" than by the present shaft-mining system, is the claim of Dr. Roy Cross, Kansas City chemical engineer, who has just been granted U. S. patent 2,331,890 on his new method.

The potash mining industry is relatively new in this country. At the time of World War I, we were completely dependent on the German potash mines, so that American industry and agriculture were hard hit until emergency sources could be developed. Since then, great potash deposits have been opened up in the Southwest, and we are completely self-sufficient in this important chemical.

Potash ores are at present extracted from underground beds in essentially the same way as coal, which involves the loss of great quantities of the mineral by leaving it in pillars to hold up the roof.

Dr. Cross' method is adapted for the extraction of one kind of potash mineral, sylvinite, which is mainly potassium chloride. It consists in driving a shaft into the bed, running a superheated solution of the chloride down through a pipe, collecting the saturated brine that rises in the return flow, and crystallizing out the potash salt. Common salt, or sodium chloride, which is present as an impurity in the mineral, is eliminated from the final product by suitable manipulation of the crystallizing temperature and concentration.

The method can also be modified for use in beds that have already been partly exploited by the old room-and-pillar mining.

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METEOROLOGY

Infra-Red Rays Penetrate Smoke in the Atmosphere

➤ WHEN THE AIR is full of smoke, much more infra-red radiation reaches us than visible or ultraviolet. In fact, infra-red rays penetrate a smoky atmosphere much better than formerly realized, it appears from a report made by Irving F. Hand of Blue Hill Observatory to the American Meteorological Society.

Calculations were made of the relative amounts of radiation that should be received of sunlight and light composed of only the longer wavelengths. These checked closely in the case of a smoke-free atmosphere, but differed noticeably when there was smoke, Mr. Hand stated.

"The range between the maximum and minimum values of total radiation during a ten-minute period in the presence of smoke was 2.3 times as great as the range between the maximum and minimum values of infra-red radiation," Mr. Hand pointed out.

Local forest fires which raged 20 miles or so west of the observatory furnished an excellent opportunity to study the change in radiation reaching the earth. Simultaneous measurements were made immediately before and during the passage of the smoke cloud.

Science News Letter, October 30, 1943