METALLURGY

Jet Condensation Method For Recovering Magnesium

➤ MAGNESIUM, the featherweight metal that has come into its own during the war, presents one difficulty in separation from its compounds. Like the hitherto more familiar zinc, it evaporates readily, and in its vapor state is apt to come out of the smelter mixed with other gases, from which it must be separated. To accomplish this economically, D. S. Chisholm and Thomas Griswold, Jr., both employed by the Dow Chemical Company of Midland, Mich., have developed what might be termed a jet condensation method, on which U. S. patents 2,381,403 and 2,381,405 have been issued. The two processes are alike in their principal steps, differing only in one detail. The magnesium-containing vapor mixture is carried in a conduit to the top of a tall, narrow tower in which a partial vacuum is maintained. The tower top has a narrow constriction, into which a nozzle squirts a stream of a condensing fluid, rapidly enough to keep the tower filled.

In Mr. Chisholm's method this fluid is liquid magnesium, which though hot is sufficiently cooler than the vapor to condense and thus capture it. In Mr. Griswold's method, some other liquid is used; it is a matter of indifference what, so long as it will not react chemically with the magnesium. Rights in both patents are assigned to the Dow Chemical Company.

Science News Letter, August 18, 1945

BOTANY

Mushrooms Live 35 Years Sealed Up in Glass Tubes

➤ MUSHROOMS, proverbially shortest-lived of plants, have been proven capable of living for more than a generation sealed up in glass tubes under high vacuum, thanks to the unexpected outcome of a near-forgotten experiment started in 1910 by an eminent Canadian botanist, the late Prof. A. H. R. Buller of the University of Winnipeg.

In that year, Prof. Buller, then visiting the Imperial Mycological Institute at Kew, near London, placed in a number of glass tubes the caps of a tough, thin-fleshed little mushroom known botanically as *Schizophyllum commune*, a species that is capable of surviving considerable drought under natural conditions. Air was pumped out of the tubes to a pressure of less than 0.1 millimeter of mercury. The tubes were then sealed off and stored in the dark at ordinary room temperatures. Just to make things tougher, some of the tubes were kept immersed in liquid air for a period of three weeks.

It was Prof. Buller's intention to open these tubes at intervals, up to a final limit of 25 years, and find out whether the mushroom tissue was still alive. For some reason, however, the tubes were set aside and apparently forgotten before the second year was up, when only four of them had been opened.

Recently, Dr. G. R. Bisby of the Institute staff came upon Prof. Buller's notes and the remaining unopened tubes, now approximately 35 years old—10 years over the originally planned maximum time limit. Dr. Bisby has thus far opened four of the tubes and tested the material in them. He found some of the mushroom caps still capable of producing viable spores—considered a satisfactory proof of life in mushrooms. He still has 11 of the tubes, which he intends to keep for future experiments.

Report on the unexpectedly long life of mushrooms under these hard conditions is given in the British science journal, *Nature*.

Science News Letter, August 18, 1945

MECHANICS

Horseshoes Repaired By Electric Arc Welding

➤ HORSESHOEING will be the postwar work of some expert electric arc welders now building ships if a modern method of shoe repairing followed by a veteran blacksmith in Coshocton, Ohio, becomes a general practice.

The welding blacksmith repairs shoes while still on the horse's hoof, building them up or adding spurs to prevent slipping, by arc-welding strips of metal or caulks on them. Most horses do not object to the new procedure.

Old shoes can be built up this way a couple of times, Charles H. Chism, Coshocton blacksmith, has found through tests. The heat of the arc, or of the heated shoe, does not affect the animal. In fact, the shoe during the welding process is not as hot as the shoe in the ordinary fitting process which is placed while almost red hot against the hoof to burn it enough to get a good fit. When the welding is completed, shoe and hoof are cooled with water. Some horses are disturbed by the flash of the arc, Mr. Chism found, but are not troubled if a blanket is thrown over their heads.

Science News Letter, August 18, 1945

IN SCIEN

PUBLIC HEALTH

Protect Children From Tuberculosis

➤ MOST people think of tuberculosis as a disease or sickness. We are particularly likely to think of it as the lung sickness formerly called consumption. Doctors, however, know that the disease really starts when the tuberculosis germs first get into the body and certain defending blood cells, called neutrophils, go into action against them. At this stage of the disease or infection, the patient may not be sick at all. Usually he is not.

Children may get this stage of tuberculosis long before they are 12 years old. Whether the disease develops in their teens or early adulthood to the point of causing illness or death depends on whether reinfection develops.

Reinfections are more dangerous to the child than the first infection with tuberculosis germs. This is because after the first infection, his body tissues have become so sensitized to the protein of the tuberculosis germs that this substance is now a deadly poison to his body.

Such reinfections may come from tuberculosis germs spread by some person in contact with the child. Parents and other relatives, nurses, teachers, and boarders or roomers in his home may be spreading living tuberculosis germs without knowing it. Or the living germs in the child's own body may escape the walls which nature built around them when they first invaded.

All children should be protected from invasion of tuberculosis germs. Children who have had one infection need even more care to protect them from a second infection. Parents, doctors and health authorities can do a better job of this if they know which children have already been infected. This can be determined by the tuberculin test.

Tuberculin testing of school children was a common practice in many communities some years ago. Then enthusiasm waned and efforts were concentrated on X-ray detection. Tuberculin testing of school children, however, should continue, Drs. J. A. Myers and F. E. Harrington of Minneapolis and Dr. E. Garcia Suarez, of Santiago, Chile, declare in a report to the *Journal of the American Medical Association*.

Science News Letter, August 18, 1945

CE FIELDS

CHEMISTRY

Less Vitamin A Is Being Produced

➤ ONLY about half as much vitamin A, obtained commercially from the livers and other viscera of fish, is being produced in the United States today as two years ago, according to the Fish and Wildlife Service. Various specimens of shark furnish about 75 per cent of the total output.

Early last year a decline in the number of valuable soupfin shark caught began to be apparent, and during the first five months of this year only 7.7 trillion units of Vitamin A were secured from this source, as compared with 15.9 trillion units during the same period for 1943. This decline has been partly offset by an increase in the fishery for dogfish, another small shark, but dogfish liver oil is much less potent than that obtained from the soupfin shark.

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CHEMISTRY

Splitting Uranium Atom May Yield Many Elements

➤ SPLITTING the uranium atom produces atoms of other chemicals. Just what other chemicals result depends upon how the splitting takes place.

Up to 1939, not long before the war emergency put a blanket of secrecy over all atomic research, six chemical elements had already been identified as resulting from the splitting of the uranium atom. They are: barium, lanthanum, strontium, yttrium, xenon and caesium.

Uranium exists with several different atomic weights. These different forms of uranium are chemical twins—they are exactly alike in every way except for weight, and are called isotopes. The isotopes of uranium found before the war to be most promising for the atom-splitting work were uranium 235, uranium 238, and uranium 239. Uranium 235 was the one found in nature which was most useful in research on the bomb.

When the splitting occurs, the resulting atoms must have hearts whose protons would add up to the correct number for uranium, 92.

Thus, if uranium 235 were split in two equal parts the resulting atom would have about 46 protons. The chemical having the number nearest to this is paladium. But this is difficult to do.

Barium, the first element actually identified as resulting from uranium splitting has an atomic number of 56. The element which would bring the total up to 92 would be the inert gas krypton.

Light elements such as strontium, with an atomic number of 38, and yttrium, with atomic number of 39, may appear if the uranium atom is split into three parts instead of two. These numbers if combined with the number for phosphorus would add up to about the right number for uranium.

But it is not necessarily true that one atom of each element would be secured as the result of the splitting. Two atoms of strontium might be obtained, in which case the element needed to make up the additional number would be silicon.

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PHYSIOLOGY

Flying Is Suggested As Best for Relaxation

➤ FLYING is suggested as the one sport guaranteed to take a doctor's mind away from medicine. Fishing allows too much time to think, golf may involve others with whom he can discuss "interesting cases," and even just a visit with friends often calls for minor medical advice.

Flying along three or four thousand feet above sea level, away from telephones, offers a chance for the physician to see the forests instead of the trees. Irritations that seem large at the office or home fade away as one looks at the magnificent scenery. And for the blase, the Rocky Mountain Medical Journal suggests tailspins. There are few doctors who, in the process of tailspins, could think of anything else but tailspins.

Science News Letter, August 18, 1945

ENGINEERING

Rubber as Binder For Grinding Wheels

➤ A RUBBER emery wheel might sound like a contradiction in terms, yet this is the invention on which patents 2,381,267 and 2,381,268 have been granted to Charles E. Drake of Bloomfield, N. J. Rubber, either natural or synthetic, is used as a matrix or binder for the abrasive particles, together with enough sulfur to effect the necessary vulcanization. Rights in the patent are assigned to the United States Rubber Company.

Science News Letter, August 18, 1945

CHEMISTRY

Paintbrush Bristles Are Made From Milk Casein

➤ THE LOWLY hog has another rival: paintbrush bristles can be made from casein, a principal ingredient of milk. Casein, a protein, has been successfully made into artificial bristles for paint brushes that have good paint-carrying capacity, make smooth films and have good wear resistance. The present shortage of pig bristles and other coarse animal hair is responsible for the development. Nylon bristles are already in use, but the civilian supply is still short.

The development work was carried out by scientists of the Eastern Regional Laboratory of the U. S. Department of Agriculture, at Philadelphia (*Industrial and Engineering Chemistry*).

These scientists developed a relatively simple method for making suitable bristle material, using commercial acid-precipitating casein. They mixed the casein with water, heated the mixture to a plastitc mass, and then forced it through a die with holes of suitable size. They then streteched the fiber and hardened it with quinone alone, or with quinone followed by formaldehyde. With this latter treatment the fiber is further hardened and is made more risistant to water, they report.

The paint brushes made with this casein bristle are resistant to oils and fat solvents, but soften when allowed to stand in water.

Science News Letter, August 18, 1945

CHEMISTRY

Bone Removes Excess Fluorine from Water

➤ THE ELEMENT fluorine in drinking water, which is good for teeth when present in exceedingly small amounts, is very bad for them when there is too much of it, causing an ugly, disfiguring, mottled appearance. To reduce the fluorine to a safe level, in regions where there is an excess of it in the water, is the objective of patent 2,380,800, granted to Howard V. Smith and Margaret C. Smith, of Tucson, Ariz.

They use a filter containing crushed bone, which has a strong affinity for fluorine. The bone is first treated with an alkali, to remove what fluorine is already present, then with an acid, to wash out the alkali and the fluorine which it has chemically captured, finally with another acid to neutralize the bone, after which it is put into use.

Science News Letter, August 18, 1945