NUCLEAR PHYSICS

Atom Fusion Gives Energy

Fusion of atoms gives more energy than fission of them. Atoms must be accelerated to a much greater degree than has yet been possible.

➤ FUSION of small atoms to make bigger ones would give more atomic power than splitting large ones like uranium; yet present day atomic fission gives out only one part in a thousand of the potential atomic power, declared Dr. Samuel C. Lind, dean of the University of Minnesota Institute of Technology, at the Remsen Memorial Lecture at the Johns Hopkins University in Baltimore.

For every gram of uranium split, whether in bomb explosion or by slow fission, Dr. Lind said, 999 parts of the heavy metal remain unchanged. Whether we will ever be able to convert the rest of the mass to energy by complete annihilation is, in the opinion of the Minnesota professor, at the present time pure speculation. But fusion of small atoms to make heavier ones, with a gain of about ten times the energy we are now able to get from fission, would be brought about if the problem of accelerating these small particles to a much greater degree than has yet been possible could be solved.

Speaking on the subject of "Fifty Years of Atomic Research", Dr. Lind traced the discoveries of the present century and predicted greater ones to come. At the beginning of the century the atom was considered only a theoretical idea. Belief in it as a real object was one of the contributions to science made by the late Dr. Ira Remsen, first professor of chemistry at the Johns Hopkins University, Dr. Lind stated.

At the beginning of this century, he said, the doctrine of the atom as a real particle was under attack by the German scientist, Prof. Wilhelm Ostwald. Dr. Remsen, who at about that time gave up his chair of chemistry to become Johns Hopkins' second president, felt that, in spite of certain illogical conclusions to which the theory of the atom at that time led, the idea was symbolic of great truth, and urged its continued use to explain the then newly discovered radioactive phenomena.

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AGRICULTURE

Munitions Bring Hunger

Main munitions elements are also important fertilizers. Even after a war it takes time to convert them to making food instead of gun powder.

➤ ONE OF THE main reasons most of the world is hungry, with no immediate likelihood of getting enough to eat, is the ironic fact that the three principal fertilizer elements—nitrogen, phosphorus and potassium,—are also important ingredients of munitions. So when a war comes, we all have to tighten our belts so that we may more effectively blow each other to bits. Even after a big war, it takes a long time to reconvert this all-important chemical triad to the ways of peace.

This is dramatically brought out by Dr. D. A. Fitzgerald, in his report as Secretary-General of the International Emergency Food Council.

Situation is worst, probably, in nitrogen fertilizers. The once gigantic nitrogen-fixing industry of Germany, which before the war produced 700,000 tons, 100,000 tons of which could be exported, will turn out during the current year less than half that quantity. Germany will have to import 40,000 tons of nitrogen fertilizers. Like situations prevail also in Japan and Korea, which in prewar days produced their own nitrates.

With the notable exception of mineral nitrates exported by Chile, most of the nitrogen fertilizers that reach the market are made synthetically out of atmospheric nitrogen. Two compounds are synthesized, ammonia and nitric acid. These can be combined, as ammonium nitrate, which is an excellent fertilizer. Trouble is, war-time needs placed both American and German ammonia and nitric acid plants far apart. Demobilization in this country, and industrial disarmament in Germany, have thus far prevented a shift from munitions nitrogen to food-making nitrogen. There are only five nitrogen-exporting countries now (of which the United States is not one)—and well over a score of countries that need to import this indispensable element. To make matters worse, the countries needing it most are least able to pay.

World production of potash is up: 3.1 million tons as compared to the prewar figure of 2.7 million. The picture would be almost cheerful, if only Germany were able to resume its prewar place as world's leading producer. But the biggest German potash beds are in the Russian occupation zone, so German potash exports are expected to fall short of the needed figure. French potash production was cut by delay in delivery of American mining machinery, shortage of coal, and the severe winter. Spanish potash production is also below par.

Phosphorus production prospects give reason for moderate optimism. Phosphate rock production in the United States and North Africa is big and getting bigger. Missing from the picture is the Pacific island phosphate rock production, disrupted by the ruin of the Japanese empire. Soluble phosphates also are on the upgrade, except in Germany and Spain.

Key to a large part of all fertilizer troubles is industrial energy, and in most places that means coal. And, for Europe at least, coal means getting British production up, and above all getting the Ruhr mines going full blast again. Once that is done, there is a better chance of square meals on Europe's tables.

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ENTOMOLOGY

Fog of DDT Gets Under Surfaces

See Front Cover

➤ TO TAKE the sting and bite out of going to the races, a superfine fog of DDT is sprayed on the grandstands to kill flies and mosquitoes. It envelops everything in its path. The particles are so fine that eight of them can be laid across the edge of a razor blade.

DDT fog is also good in dairies and on farms; it makes happier cows that are not pestered with flies to flick off.

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