CHEMISTRY

Purify Atomic Fuel

➤ THE WAY to purify atomic fuel manufactured from thorium, a cheaper and more plentiful atomic source than uranium, was announced to the world by the United States at the International Conference on the Peaceful Uses of Atomic Energy.

Dr. Alan T. Gresky of the Oak Ridge National Laboratory made known the method of separating fissionable uranium 233 from the thorium 232 and the protactinium 233 from which it is converted in breeder reactors.

While it has been known that thorium, a fairly widely distributed element, can be changed by neutron bombardment into a kind of uranium that can be used for atomic power, the way of getting it separated from debris and non-burnable material has hitherto been kept secret.

First the thorium is placed like a blanket around an energy-producing core within which atomic fuel is "burning." Excess neutrons are captured by the thorium to convert it into a kind of uranium that is fissionable. The result is that 115% of the original fuel is obtained, a breeding gain of about one-seventh.

Separating this new fuel from the unchanged thorium and the fission products has been a stumbling block.

Dr. Gresky told how this can be done chemically. Nitric acid is used as a solvent and organic solutions are used to separate the uranium and the thorium. The atomic fuel is purified by ion exchange and evaporation so that it can be handled without danger of exposure to intense radioactivity from the fission products.

New Uranium Extraction

➤ NEW METHODS of recovering uranium, the atomic energy metal, from ores that cannot now be used economically were announced by Dr. George C. Marvin of the U. S. Atomic Energy Commission's division of raw materials.

Kerosene is used in one process while ion exchange resins in the form of plastic beads is used in another. Such methods are quite new to the recovery of metals from ores.

Dr. Marvin explained that as in the older processes, the first step is dissolving them with acid or alkali. The resins used are not unlike those used in large-scale commercial water-softening to remove minerals from water. In uranium concentration they seize the uranium and remove it from both clear solutions and from suspensions of solids as thick as mud.

The other new method adds unannounced chemicals to kerosene-like liquids which are agitated with the uranium solution. The atom metal transfers to the petroleum from which it is recovered easily.

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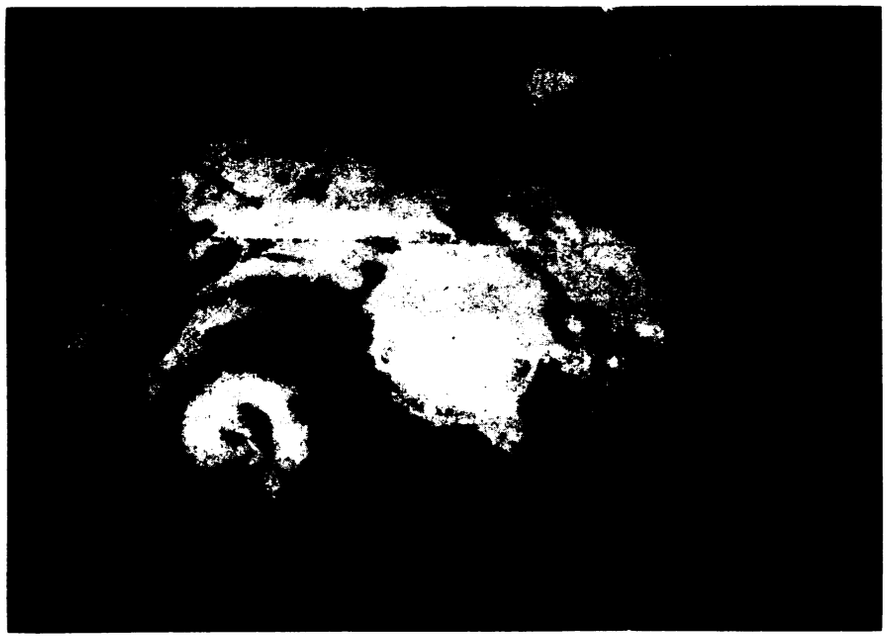

HURRICANE CONNIE—For the first time, the U. S. Weather Bureau received pictures of a hurricane by radio facsimile. This photo shows hurricane Connie as picked up at a distance of 72 miles by the new radar installed at Cape Hatteras, N. C., barely in time to start tracking the damaging tropical storm.

METEOROLOGY

Hurricane Families Take Similar Paths

➤ HURRICANES COME in families. Hurricane Diane was the second member of August's tropical storm family in which hurricane Connie was the first-born.

How many sisters hurricane families have cannot be predicted, but it is not surprising that two or more hurricanes should follow "roughly similar paths," Jerome Namias, head of the Weather Bureau's extended forecast section, said.

The more westerly paths hurricanes now seem to be taking is probably tied in with the general mildness of recent East Coast winters, he believes. This mildness has been associated with a greater-than-normal movement of air from north to south.

Since 1933, when fairly dense upper air information has been available, blocking of the normal eastward motion of hurricanes has occurred with "surprising frequency." When this occurs, Mr. Namias said, hurricanes tend to take more westerly paths.

The same pattern that caused July's heat wave over most of the northern part of the nation set the stage for the mass air movements steering early August's hurricanes.

Finding that hurricanes take roughly similar paths does not mean that where hurricanes will strike can be pinpointed days or weeks in advance, but that it is "not uncommon" for most hurricanes in a certain month or season to follow tracks usually within about 200 miles of each other.

Reason for this is that hurricanes are steered by the world-circling band of air known as the planetary wave. Important in this steering, Mr. Namias' recent studies have shown, is a high point, or ridge, in the planetary wave usually found high over northwest Canada.

As this ridge builds up to become stronger than normal, a wave pattern is set up downstream, or eastward, that captures and steers the hurricane.

The northwestern Canada ridge, 10,000 to 40,000 feet above the surface, is equalled in importance by the high point in the planetary wave found high off the north Atlantic coast. When one ridge strengthens, so does the other.

Such a strong high-level pattern, Mr. Namias said, increases the surface-level flow of air pouring southward from polar areas. Hurricane paths seem to line up just in advance of the upward-rising trough between these two high points.

Mr. Namias has also been investigating hurricane genesis. Where tropical storms are born, he believes, is also determined by the world-wide air flow patterns. Pointing out that much more research is needed, Mr. Namias said he thinks the stage is set for hurricane birth by injection of cool polar air into warm moist tropical air.

Such cold air penetrations tend to occur at the southernmost points in the troughs of planetary waves.

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