ENGINEERING

# Plan Excavation by Bomb

**New peaceful uses for atomic bombs include excavating harbors, creating large supplies of radioactive isotopes, recovering oil and restoring depleted water supplies.**

➤ PLANS ARE revealed in the semi-annual report of the Atomic Energy Commision for gigantic uses of nuclear explosions, including excavating harbors, creating large supplies of useful radioactive isotopes, recovering oil from oil shales and tar sands; restoring depleted water supplies, and discovering new facts about the earth.

Most imminent use of atomic bomb explosions for excavation on a grand scale is to make a harbor in northwest Alaska where one does not exist. Survey teams are now in the area between Cape Seppings and Cape Thompson, north of the Arctic Circle, determining whether the ocean currents would usefully fill a blasted hole in the coast, whether the radiation created would be dangerous, and whether the mineral resources in the area justify such a large-scale development.

While the underground nuclear "Rainier" explosion of last Sept. 19 was announced as a weapons testing method to eliminate fall-out, its experience aids this current program, known as Project Plowshare.

Oil may be obtained through underground nuclear explosions from two untapped sources, oil sands and tar sands. The heat of atomic explosions could be used to separate underground the oil from the shale and allow it to be pumped. Similarly, the gummy tar materials trapped between impervious rock layers could be so lowered in viscosity as to be extracted. Immense beds of these oil-bearing materials exist in both the United States and Canada.

Another idea is to bury an atomic bomb in a large subterranean salt deposit and surround it with substances to be made radioactive by neutrons produced, thus giving supplies of needed isotopes for industry, medicine and research.

A device for studying the possibilities of harnessing usefully the immense power of the H-bomb was detailed in the AEC report, which brings together progress achieved in producing power from controlled fusion. Called the homopolar device, it was built at the University of California's Radiation Laboratory at Berkeley. It gives promise of showing how to create and confine a thermonuclear plasma of millions of degrees of temperature which would be necessary in fusion power.

The benefits of a fusion reactor fueled with heavy hydrogen if operated successfully some day as set forth in the report are: Fuel costs would be low; fuel supply would be virtually unlimited; fusion power-plant would be extremely safe; radioactive hazards would be low and plant efficiency may be high.

Science News Letter, August 9, 1958

GEOPHYSICS

# "Hams" Tune in on "Moon"

➤ AMATEUR radio operators throughout the world are being asked to tune in on sputnik signals. The object of this world-wide listening is to accumulate specialized ionspheric data which cannot be obtained from U. S. satellites.

The only Russian satellite still aloft, Sputnik III, transmits on 20.005 megacycles. A similar signal is often heard on 40.01 mc., but this is believed to be a harmonic of the other.

The amateurs are being enlisted by the U. S. National Committee for the International Geophysical Year through the American Radio Relay League of West Hartford, Conn. Amateur help is needed, the ARRL says, because there are not enough professional observatories in existence to do the job.

Data being sought fall into three categories:

1. Measurement of the Doppler effect to determine bending of the signals by the upper atmosphere.
2. Determination of minimum-usable frequencies (20 or 40 mc.) by noting times of appearance and disappearance of sputnik signals.
3. Measurement of signals when satellite is out of sight of observer to determine long-distance propagation effects.

The effects to be measured are easily noticed at sputnik frequencies, but considerably less pronounced on Explorer and Vanguard wavelengths.

The ARRL explains that almost any amateur who wishes may take part in the program. Much, however, depends on the quality of the amateur's equipment.

The first category, for example, requires highly accurate frequency-measuring gear, probably available to relatively few amateurs. The second and third categories, on the other hand, require only a radio receiver capable of being tuned to 20 and 40 mc., and selective enough to reject other signals in the immediate vicinity.

Tape recording of the signals is suggested but each amateur is urged to analyze his own taped observations. Forms will be sent to the observers for this purpose.

Reports from as many different locations as possible are needed, including ships at sea, remote military outposts, etc., for maximum geographical coverage. Occasions are cited when observers at high latitudes have heard sputnik signals continuously during several complete trips around the earth.

Inquiries should be addressed to Satellite Ionospheric Observations, ARRL, West Hartford, Conn.

Science News Letter, August 9, 1958

GEOPHYSICS

## Explorer IV Designed To Detect Radiation

➤ THE FOURTH and heaviest United States satellite was launched at 11 a.m., Saturday, July 26.

The 38.4-pound, 80-inch long satellite, which carries some 18 pounds of instruments, is expected to make more accurate measurements and an analysis of a layer of powerful radiation that has been found to surround the earth. This investigation is directly related to the effects of cosmic radiation on future space travelers.

The low point in the satellite's orbit, which is a very large elliptical one that carries it over parts of the U.S.S.R., is 177 miles; the high point is 1,368 miles. It circles the globe once every 110 minutes.

Smithsonian Astrophysical Observatory scientists made one of the early sightings of Satellite 1958 Epsilon, as the "moon" is called, by telescope.

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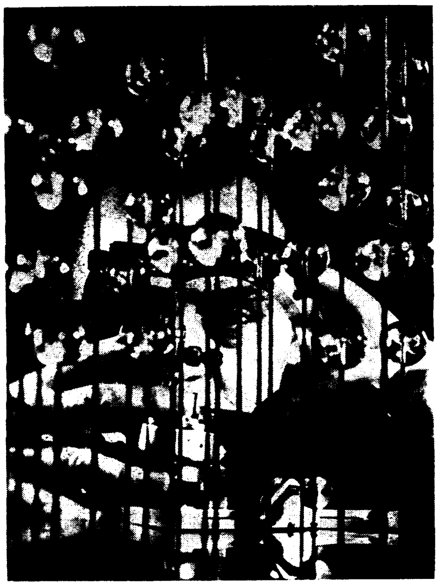

*URANIUM—This plastic model of a uranium crystal is unique in that it shows placement of the atoms at temperature conditions never before simulated in model form. Studies of such crystals are being made at the General Electric Company's Richland, Wash., laboratory to increase understanding of what happens to the crystals undergoing the intense heat inside a nuclear reactor.*