NUCLEAR PHYSICS

New Atomic Furnace Plant

Somewhere in the West a new atomic power field station will be constructed where new kinds of nuclear reactors will be built.

➤ AN ATOMIC furnace factory where machines for releasing atomic energy will be manufactured and tested is planned for construction somewhere in the West, Dr. Robert F. Bacher, scientist-commissioner of the U. S. Atomic Energy Commission, disclosed.

The Commission program for the development of machines for harnessing atomic energy, called nuclear reactors, was unveiled by Dr. Bacher to the American Academy of Arts and Sciences in Boston. It calls for operation, construction or investigation of nearly a dozen different kinds of atomic machines.

Three kinds of nuclear reactors were built during the war: chain-reacting piles at Chicago and Oak Ridge, Tenn.; and the big reactors at Hanford, Wash., for making the synthetic atom bomb element, plutonium. A high-energy atomic furnace has been put into operation at Los Alamos, N. Mex., since the war, and a more conventional chain-reacting pile is nearing completion at Brookhaven National Laboratory on Long Island.

Four new kinds of reactors will be built in the near future. They are:

1. Materials testing reactor for testing materials for use in atomic machines. This high-energy, small-space reactor has been under design for two years at Oak Ridge National Laboratory.

2. Naval reactor to be constructed by Westinghouse will be a land-based prototype for a shipboard atomic power plant. Plans are being developed at Argonne National Laboratory near Chicago, and construction will be started in about a year.

3. High-energy experimental breeder or fast reactor being designed at the Argonne Laboratory. It will operate with high energy atomic bullets, or neutrons, like the present Los Alamos pile, but will be more powerful and use uranium 235 instead of plutonium for fuel.

4. An "in-between" reactor operating with neutrons at intermediate energies, between the slow neutrons of the wartime piles and the high-energy pile at Los Alamos. The intermediate reactor will be built at Knolls Atomic Power Laboratory operated by General Electric at Schenectady, N. Y.

Both the materials testing reactor and the land-based Navy plant will be built at the new atomic power field station "in the western part of the United States," Dr. Bacher said.

He described the new station as a "field facility" of the Argonne Laboratory, major center of the Commission's nuclear reactor work.

When it is selected, the new site will come under the secrecy regulations which govern the Hanford plant in Washington state, Dr. Bacher indicated. In addition to the two reactors scheduled for construction at the yet-to-be-picked location, others will probably be manufactured at this atomic furnace factory, he indicated.

In addition to the four new types of reactors now moving from the drawing board to construction stage, four other new kinds of atomic energy machines are under study.

They are:

1. Still in the study stage, but getting lots of attention, is nuclear reactor for aircraft, being investigated in a project called NEPA (nuclear energy for propulsion of aircraft). A survey of this field by the Massachusetts Institute of Technology is now being studied by the Commission.

2. A power plant using natural uranium for fuel. The Hanford plutonium-making reactors use natural uranium, but harnessing this fuel for power production is a job for the future.

3. Homogeneous reactor in which the fuel and materials for cooling, moderating and reflecting would all be mixed together instead of having fuel embedded in the other materials.

4. A simple, low-cost reactor for scientific research and training of new technical people in atomic energy.

End products of this program of atomic machine research and construction may be economically useful electrical power from atomic energy, Commissioner Bacher concluded.

Science News Letter, February 19, 1949

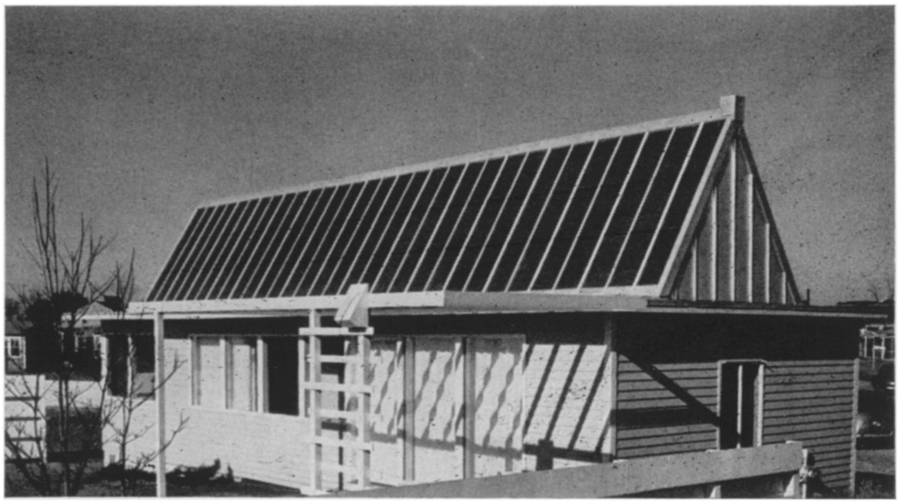
ENGINEERING

New Solar-Heated House

➤ SUN-HEATED water is to be used in an experimental house just completed in Cambridge, Mass., to determine how effectively solar heating may be used to replace coal and oil in keeping the dwelling comfortable in the cold weather of a New England winter.

The building was erected by the Massachusetts Institute of Technology and is to be used in connection with solar heating investigations to determine to what degree the sun can compete with conventional methods of heating. The construction of the house and the research directly associated with it is a project directly under Edmund L. Czapek, research associate in architecture.

The completed house is a one-story affair with five rooms. It resembles ordinary modern small dwellings except for the roof structure. The south slope of the roof, with heat collector, inclines 57 degrees to the horizontal, presenting an area of 400 square feet on which the sun's heat is received. Water, warmed by the sun in a special "flat plate" collector located on the roof of



SOLAR HOUSE—This is a view of the south exposure showing the areas of the heat collector on the roof of the house.

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the house, is used for storing and distributing the heat.

Once warmed by the sun, the water is pumped into an insulated tank in which it is held for use during sunless hours. The tank has a capacity of 1,200 gallons of water which should, during an average January day, rise in temperature a few degrees more than it falls at night, thereby storing heat energy for sunless days.

The heat-storing equipment is designed to keep the house at 68 degrees Fahrenheit night and day. However, supplementary heating has been provided by means of electric heaters which will go into operation if the inside temperature drops to 65 degrees. One room of the building is used for recording instruments to keep a continuous record of the temperatures. The other rooms are to be used as a home for an institute student and his family.

The parts of the entire system include the roof collectors, an attic storage tank, a radiant ceiling heating unit, two circulating pumps, and controls. Whenever the sun heats the water in the roof collectors to a temperature above that in the storage tank, a pump circulates the water from storage tank to roof and back. At other times the flow is cut off. Warmed water for room heating is circulated by the second pump.

Science News Letter, February 19, 1949

NUCLEAR PHYSICS

Tips To Uranium Hunters

➤ AMERICAN scientists and atomic prospectors hunting for the atom bomb element uranium got some tips from behind the Iron Curtain.

A relatively simple mathematical formula for telling how much uranium is concentrated in rock, using a Geiger-Mueller counter, was reported in SCIENCE (Feb. 11).

The authors are A. Szalay and Eve Csongor, Hungarian physicists at the University of Debrecen, Debrecen, Hungary. Their findings were made during a search for uranium in the Velence Mountains in Hungary. They do not discuss whether or not they found important new deposits of the radioactive element in their survey.

But they do believe they have discovered an important aid to uranium hunters, which they are passing on to Americans.

Geiger-Mueller counters, usually known only by the first name, are essentially tubes with a delicate electrical balance and amplifiers for giving off a sharp click when radiation strikes the tube and changes its electrical charge. The Hungarian scientists point out that the counter is used in prospecting for uranium to reveal the presence of radioactive materials.

The problem they claim to have solved is determining from the number of clicks, with the aid of mathematical formulae, how much uranium is in the rock.

Here's the way the Hungarian physicists advise prospectors to find out in a hurry how much uranium is in rock:

Shield the Geiger counter tube—any commercial tube size—with a thickness of two millimeters (about eight-hundredths of an inch) of lead. Place the counter against the rock. Cosmic rays from outer space will make the counter click, even with no radioactive material in the neighborhood, so the clicks of the counter minus the cosmic ray count will give "x" times the cosmic ray count. That is, if the cosmic ray count is 10 and you count 30 clicks, "x" is two (10 cosmic clicks and 20 uranium clicks).

The quantity of uranium in the rock is "x" times 25 grams of uranium per metric ton of rock ("x" times nearly nine-tenths of one ounce of uranium for about each 2,205 pounds of rock). If "x" is two, the rock would have only about one and eight-tenths ounces of uranium in each metric ton.

This fairly simple method is suggested by the Hungarian scientists for use by uranium explorers who want to cover lots of ground in a short time.

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The principal food of *wild hawks* is destructive rodents, not chickens as many believe.

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