

followed by a series of harmfully dry years, especially in regions with normally scanty moisture.

In the United States, local droughts may be expected practically every year, but they are seldom of nation-wide importance. Prior to 1934, three wide-

spread droughts are worthy of mention as seriously affecting production of staple farm crops in the United States. These droughts of national importance occurred in 1894, 1901, and 1930. The fourth, in 1934, broke all records.

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cloaked in the mystery of the northland, but they undoubtedly have been there for hundreds or thousands of years. No one has ever measured their depth, but Sergeant Morgan says a scientific expedition has been proposed to explore the bottom of the lakes for prehistoric fossils.

He also says he has plenty of concrete evidence that the Endicott Mountains, south of Barrow, are highly mineralized with copper and gold. He believes that development of his oil fuel, along with snowmobiles for transportation, will open the Arctic coast to mining pioneers.

The snowmobile is an ordinary auto rigged with skis forward and tractor treads aft.

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CHEMISTRY

Discover Way to Burn Novel Alaskan "Lump" Oil

BLACK gold and yellow gold—these may combine to make the bleak Arctic coast, America's last frontier, a modern Eldorado.

So, at any rate, believes Master Sergeant Stanley R. Morgan of the United States Army Signal Corps, who has announced the successful completion of experiments in "breaking down" heavy surface oil found in vast lakes under the shadow of the North Pole.

Sergeant Morgan, whose quick action in reporting the fatal crash of Wiley Post and Will Rogers last fall resulted in promotion and a long leave from his radio station at Point Barrow, is now in Seattle awaiting the breakup of the Arctic ice pack in July so that he and his family can go "home."

While in Seattle, he has been working on experiments with this strange northern oil. It is so heavy—virtually a solid—that pieces can be broken off and burned.

Fuel is the big problem of both natives and whites on the Arctic coast. The whites (only 25 on the entire coast-line of more than 1000 miles) burn imported coal at the rate of \$45 a ton. The Eskimos use whale oil, but the whales are rapidly diminishing. When the supply is gone, the natives will move or die out. There is no timber at all for hundreds of miles around.

As a result of Sergeant Morgan's experiments, the Bureau of Education of the Interior Department is contemplating the installation of a plant at Point Barrow to refine the Arctic oil, which, because of its seepage nature, is difficult to burn in its natural state.

Refining Process Simple

"The process of refining this oil is necessarily simple," Sergeant Morgan says, "as the natives could not afford an expensive plant or process.

"The oil contains approximately 40 per cent residue and moisture, but I have found that it separates under com-

paratively low temperature (250 degrees Fahrenheit) through a boiling process. The oil is then drawn off, given an inexpensive acid treatment, allowed to settle 36 hours, and is ready for use."

The residue, carbon resin and silt, also is usable—in the form of briquets.

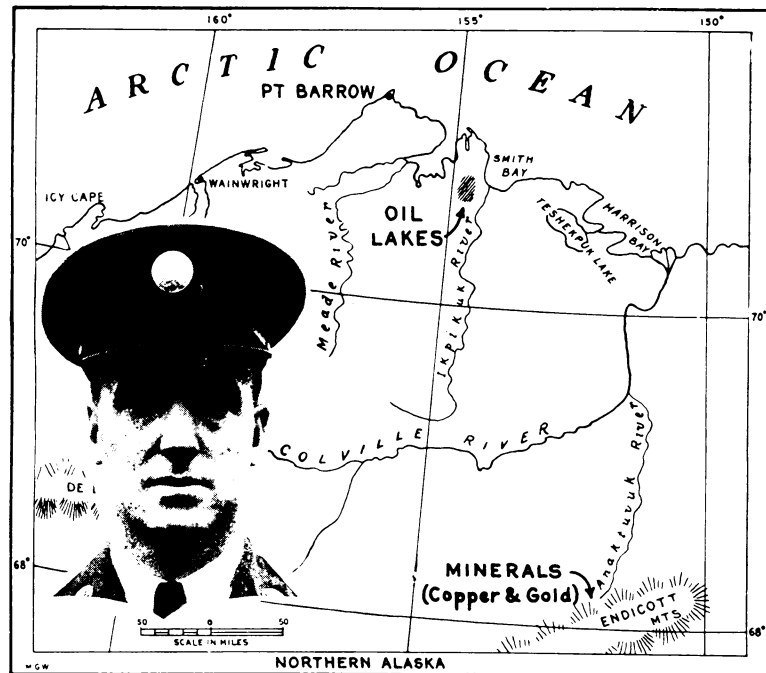
A stove actually burns the oil in Sergeant Morgan's laboratory. The burner, of a gravity feed natural draft type, is so simple that the Eskimos will manufacture their own.

The oil supply is "unlimited," lying in lakes about 50 miles southeast of Point Barrow. One lake is five miles in diameter, and there are at least two other smaller ones. Their origin is

ASTRONOMY

Stars Are Factories For Making Radiated Energy

THE INSIDE of a star is a factory which makes complex elements out of the simplest element of all, namely, hydrogen. This is the point of view presented to the meeting of the American Physical Society in Seattle by Dr. R. M. Langer of the California Institute of Technology. (Turn to next page)



WHERE LUMP OIL IS FOUND

Far north in Alaska and within 50 miles of Point Barrow are the strange seepage oil lakes from which native Eskimos and the few white settlers obtain the heavy "lump" oil which offers a potential source of fuel in the Arctic. The insert shows Master Sergeant Stanley Morgan, who has developed a simple stove for burning the "lump" oil.

The output of the factory is not complex elements but energy which is radiated away as the star shines a few billion years. The complex atoms are left behind mostly in the form of iron. Only a minute fraction of the energy of a single star, the sun, is caught by our earth and this energy is what makes our factories work to make complex things out of simple ones.

The stellar factory would blow up in its enthusiasm for energy production were it not for the stabilizing effect of the complex atoms. Of these the most important stabilizer is heavy hydrogen. When things get too hot heavy hydrogen breaks up into a neutron and an ordinary hydrogen atom and things are back where they started.

It is this accident of the balance between neutrons and deuterons which determines how hot the star becomes and how long it lives. The internal temperatures are about half a billion degrees and the life is several billion years. According to Sir James Jeans the stars shine much longer than that but few agree with him. No process known to

happen is competent to keep a star going over ten billion years. No process known is able to heat a star over a billion degrees, Dr. Langer pointed out, because the radiation at that temperature would exhaust any process ever suggested before that temperature would be reached.

At these high temperatures matter is quite different from the matter we know. No compounds exist. No solids or liquids are possible. Neutrons, positive electrons, and deuterons, all newly-discovered and rare on the earth, abound. Above all and predominating everything, photons of light fierce as X-rays rage to and fro. Nothing is safe from their influence. They create matter and are created by matter. Things are so lively that we can never hope to make any direct experiments under these conditions. Yet the basis for Dr. Langer's calculations are the experiments which are being made in many laboratories with comparative ease shooting atoms at one another at high speed and scoring the hits.

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MEDICINE

Sunbaths Declared Not Likely to Cause Cancer

WITH the opening of the vacation season comes the reassuring news that prolonged exposure to sunlight via the popular sunbaths is not likely to cause cancer. This opinion is expressed by Drs. Howard H. Beard, E. Von Haam and Thomas S. Boggess of the Louisiana State University Medical Center in a report to the *American Journal of Cancer* (June).

Cancer does occur in rats after prolonged exposure to ultraviolet rays, either from the sun or artificially produced, the Louisiana scientists report. Their experiments confirm similar results obtained by scientists elsewhere. However, they point out that these experiments do not justify the widely publicized conclusion, reached by a committee of the Academy of Medicine of Paris and other scientists, that sunlight and sunbaths may have dangerous cancer-producing possibilities for the human race. Rats and men do not respond in the same way to sunlight, they point out.

"Since the normal habitat of the rat is darkness, it is to be expected that this animal would be more sensitive to the ultraviolet rays than would man," the Louisiana scientists state. "It is generally believed that one year in the life of the rat is comparable to thirty years in the life of man. It required, on an average, about seven months of continuous irradiation to produce cancerous changes in the rat, which would be equivalent to twenty hours daily ultraviolet irradiation for about eighteen years in the case of man.

"Moderate amounts of sunlight have been shown to be essential to health. Only after results similar to those recorded (cancer production in rats by ultraviolet light) have been obtained on animals which are as accustomed to, and as greatly benefited by, sunlight as is the human being, can the evidence be considered sufficient for similar conclusions."

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Moose have the right of way on tracks of the Alaska railroad serving Mount McKinley National Park, and trains slow down to let them amble off the tracks.

The epidemic of amebic dysentery which started in Chicago in 1933 has been the only known extensive epidemic of this disease in a civilian population.

MEDICINE

Advances in Cancer Fight Are Reported by Scientists

THREE significant advances in the fight against cancer have just been reported by medical scientists. (*American Journal of Cancer*, June.)

A difference between the blood plasma in healthy persons and in patients suffering from cancer can be detected by the use of an instrument of modern physics, the spectrograph, Alexander J. Allen, Rachel G. Franklin and Edward B. Sanigar of the Biochemical Research Foundation of The Franklin Institute, Philadelphia, reported. Similar differences were found by this method in blood plasma from cancerous and normal animals. The difference is considered due to an increase in the fibrinogen-globulin content in the blood in cancer.

Occurrence of both cancer and leukemia in mice following injection of the cancer-causing coal tar compound, water-soluble 1:2:5:6-dibenzanthracene, was reported by Drs. Harold Burrows and J. W. Cook of the London Free Cancer Hospital. Occurrence of leukemia is the interesting feature, since this fatal disease characterized by greatly increased numbers of white blood cells

is thought to be similar to cancer. The experiments were preliminary ones designed to determine the cancer-causing potency of a new dibenzanthracene compound. Consequently the British scientists believe it is too early to state that this compound caused the leukemia, though this seems possible.

Further information on the role of hormones in the causation of cancer was obtained in studies by Drs. V. Suntzeff, E. L. Burns, Marian Moskop and Leo Loeb of Washington University School of Medicine, St. Louis. Long continued injections of the female sex hormone, estrin, increases the incidence of breast cancer in mice, these investigators found. The effect varies directly with the size of the dose and the hereditary tendency of a given strain to cancer. Cancer of the mammary glands was produced "at least as readily" by injections of female sex hormone in male mice of high tumor strains as in non-breeding females of the same strain. This shows that the breast of male mice is hereditarily at least as predisposed to cancer as the female gland.

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