lack of water in soil and subsoil is common from western Iowa across Kansas and Nebraska and eastern Colorado.

By DIRECTOR L. E. CALL, Agronomist, Kansas Agricultural Experiment Station

DROUGHT in Kansas is only now approaching a critical stage. Good rain during the fall of 1935 supplied subsoil moisture through central and eastern Kansas that carried the crops through the early spring months. Rainfall in May, especially heavy in central and western Kansas, supplied moisture that was needed to mature the wheat crop, to produce a good growth of native pasture grasses, and to assure good stands and early growth of row crops.

The crops have therefore passed through the month of June, which has been excessively hot and dry, without serious loss except to wheat and barley in the western sections of the state where these crops were immature and have suffered more from high temperatures than from drought.

General, well-distributed rains, followed by lower temperatures, would assure excellent crops of corn and sorghum. These crops, however, are now reaching a critical condition. A continuation of present high temperatures and drought will result in serious losses.

Crop production up to this time assures a less critical feed shortage than occurred in 1934. More grain has been produced, pastures are better, and row crops fully as promising. July and August rainfall will determine the production of these crops. It is not too late to produce an average crop in Kansas.

By PROF. PAUL B. SEARS, Ecologist, University of Oklahoma

PLANT life in a grassland region depends largely upon moisture stored in soil before the growing season begins. At the beginning of this growing season, the soil was drier than in many years, having been depleted by successive dry years.

In places the growing of alfalfa has had to be abandoned because it depletes soil moisture reserve even in favorable years. It will take more than one year of good rain to restore soil moisture reserves.

East of the short-grass area in Oklahoma, spring rains have favored wheat, but much of it was stunted and shriveled, and corn is now in danger. Along the mountain front in Colorado, abundant snow insures irrigation and well-filled reservoirs this year.

Managers of large tracts agree that native grassland is their most dependable source of income, because it is adjusted to drought and other hazards. Extensive restoration of native grasses and restriction of field crops to areas of favorable soil moisture should be good drought insurance.

Studies of weather records and tree rings here show that recurring groups of dry years are a normal phenomenon in grassland states, and must be taken into account in any permanent policy of land use.

Science News Letter, July 11, 1936

CLIMATOLOGY

U.S. Climate Not Changing—We Are Just in "Dry Phase"

By J. B. KINCER, Chief of the Division of Climate and Crop Weather, U. S. Weather Bureau

IT HAS been said that the usual weather is unusual; and the only trouble with our recent weather is that it has been more unusual than it usually is unusual.

The unusual happenings in recent years include these:

1. Extremely high summer temperatures.

2. Many warm winters, to be followed by an extremely severe one in 1935-1936.

3. Recent, unprecedented floods in the East.

4. Disastrous tornadoes in the South.

5. Three drought years, 1930, 1934, and 1936, establishing new records for dryness over large areas, all of which were of tremendous national significance.

Because of these things, many people have grown alarmed and express fear for the future.

We have weather records for more than 5,000 different localities in the United States, but unfortunately a very few are for periods as long as 100 years. Our longest records indicate that there has been no permanent change in climate. Rather, we are going through a dry phase of our normal climate.

Climate Doesn't Change

Climate is the general run, or sum total, of weather, and that sum total does not seem to be undergoing any fundamental changes. Weather is the phase of climate that we experience from day to day, from week to week, or even year to year. Therefore, as everyone knows from reading the Weather Bureau forecasts, as published in every daily newspaper in the country, weather varies, often markedly, from day to day, due to vast changes in air mass movements.

When the run of weather conforms to the general climate of a region, that is, when it is about normal, it receives very little attention or discussion. But when it varies greatly from the normal in heat, cold, destructive floods, drought, and the like, it at once becomes of popular interest, and in some cases of national concern.

Now, we readily observe that different weather phases—warm, then cool; cloudy and rainy, then sunny and dry—follow one another at intervals usually counted in days or weeks: that is, at short intervals. This we call weather trends.

Dry, Warm Phase

There are climatic trends of a similar nature, the yardstick being years instead of days. In recent years, we have been going through a dry, warm phase of climate and unusually frequent drought is the result.

These up and down trends in rainfall make, when the record is smoothed, a wave-like pattern, but the length of the periods appears to be too irregular to justify a definite long-range forecast as to what will happen in the future. If records were available for a thousand years instead of from 50 to 100, we possibly could discover a definite law of succession.

The Bible, in the story of Joseph and the dreams of Pharaoh, gives us the first historical reference to this important characteristic of rainfall—the tendency of a number of successive years having comparatively heavy rains to be

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 widespread 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.

Science News Letter, July 11, 1936

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 coastline 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 comparatively 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 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.

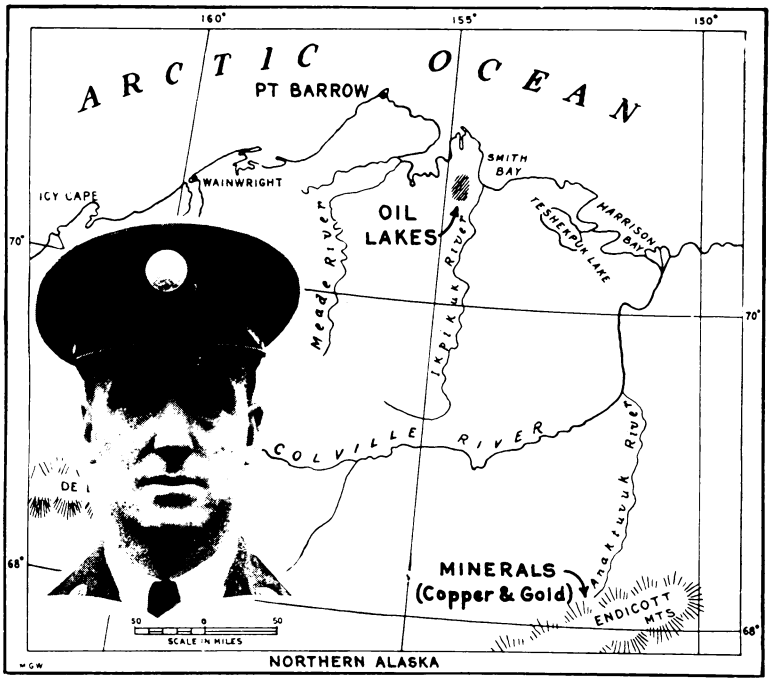
The snowmobile is an ordinary auto rigged with skis forward and tractor treads aft.

Science News Letter, July 11, 1936

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.