

MINING

Fuel from Oil Shale

Scotland is now in its one hundredth year of crude oil production from shale. America entered this production late because the U. S. has had much natural petroleum.

► SCOTLAND next July will celebrate the hundredth anniversary of its oil-shale industry, and its production has been continuous during this period, Dr. Simon Klosky, oil-shale chemist of the U. S. Bureau of Mines, stated in Washington, D. C.

Dr. Klosky spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia Broadcasting System. He reviewed the production of gasoline and heating oils from shale in Western Europe, giving information acquired during a recent inspection trip.

"In this 100 years of the Scottish oil-shale industry, it has had many ups and downs," he stated. "From a flourishing start in 1850, to a temporary depression around 1880 due to importation of American petroleum, it passed to a relatively steady existence, relieved only by the demands for more liquid fuel products brought on by the two world wars."

He described a process in Sweden by which petroleum vapors and gases are obtained without mining the shale. Holes are drilled deep into the earth and into the natural layers of shale, and electric heating elements are lowered in the holes. After weeks of heating, petroleum vapors are collected from other holes. The process, he said, seems practical where plenty of cheap electricity from hydroelectric plants is available, and the price of gasoline is relatively high.

Three plants in France, visited by Dr. Klosky, were described. One has been in operation since about 1880. This refinery was operated with great difficulty during the recent German occupation, but "it managed to keep going and to sequester enough of its products to refuel American combat tanks when they arrived."

Although unable to visit oil-shale industry behind the Iron Curtain, information on Estonian and Russian reserves was obtained by other means. Estonia in prewar days produced more crude oil from shale than any other country, and Russia produced almost an equal quantity. Estonian shale deposits extend eastward well into Russia proper, and the Soviets have large deposits on the Volga river and in other places.

America's entrance into the production of oil from its vast deposits was delayed behind European activities merely because the United States had vast quantities of natural petroleum. Now the point has been reached where liquid fuels from petroleum

must soon be supplemented by synthetic fuels from coal and oil-shale. Dr. Klosky described two plants of the U. S. Bureau of Mines now in operation, the plant at Louisiana, Mo., for production from coal, and the plant at Rifle, Colo., where liquid fuels from oil shale are now successfully extracted.

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METEOROLOGY

Skyhooks of Plastic Aid Weather Forecasts

► TO help forecast weather for airways and ground-dwellers alike, giant balloons—skyhooks they are called—will be floating about 20 miles high over the oceans when plans being made in Washington, D. C., are materialized.

Made of a new plastic, polyethylene, and standing 129 feet high when inflated, the outside, tear-drop-shaped balloon has been

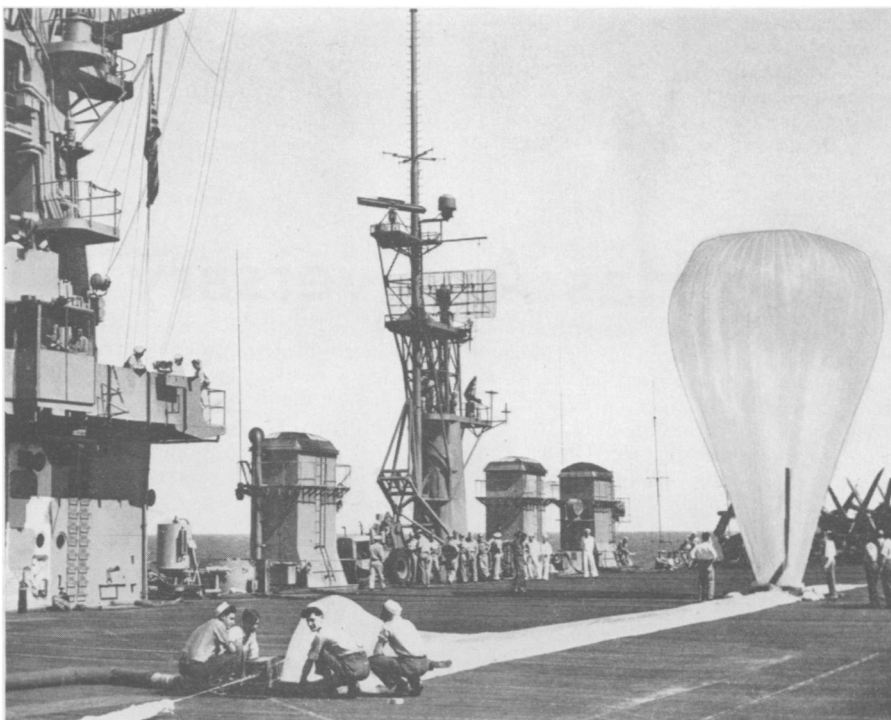
developed by the U. S. Navy for use in catching cosmic rays and observing the sun's spectrum from outside most of the earth's atmosphere.

Its ability to drift with air currents at constant heights well suits the skyhook to weather observation needs, Earl G. Drosler, Office of Naval Research meteorologist, told the American Meteorological Society. It can lift about 80 pounds of recording and transmitting equipment. Its path can be tracked with radar, and being large, it can also be followed visually to great heights.

The disadvantage of balloons commonly used today is that they do not stay at one altitude, and to arrive at weather readings for a given level it is necessary to approximate the information by interpolation.

By increasing the balloon's payload, which can be accomplished by using the balloons in clusters, he foresaw that the recently proposed scheme to adapt the skyhook balloon to a trans-ocean weather observation network might become a reality.

The trans-ocean-sounding system referred to was proposed by Capt. Howard T. Orville of the Office of Naval Research, ex-president of the American Meteorological Society. Capt. Orville suggested that the skyhooks be rigged to drop 'chute-born radiosonde equipment at timed intervals over the ocean to transmit a set schedule



"OPERATION SKYHOOK"—High-altitude plastic balloon which reaches 18 to 20 mile heights is being readied for ascent on the flight deck of USS SAIPAN during recent cosmic ray tests in the Caribbean. When the balloon is full, it stands 129 feet tall or about as high as a 12 story building.

of weather messages to shore listening posts.

Mr. Drossler said that to put such a network into regular routine operation might take as much as five or ten years

more research and development. But he was sure that the new balloon was well suited to the job and could "provide the proper airlift."

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GEOGRAPHY

South Americans Migrate

➤ THOUSANDS of South Americans are now taking part in a migration to the east comparable to the great drive to the west of United States history.

The landless citizens of Venezuela, Colombia, Ecuador, Peru and Bolivia are moving several hundred miles eastward across two mountain chains from the worn-out plateau lands of those countries, Dr. Raymond Crist, professor of geography at the University of Maryland stated.

Taking all they possess with them, including some cattle, they are "homesteading" in the tropical forest regions east of the Andes and in the headwaters of the Orinoco, Amazon and Madeira Rivers.

These regions, Dr. Crist said, were uninhabited 20 or 30 years ago. Now frontier towns of up to 10,000 in population have been built up. The new town of Via Vicenzio in eastern Colombia even has seven or eight rice mills established.

The pioneers are leaving lands which have either been worn out by too intensive agriculture or are incorporated in great estates and thus have not been cultivated intensively enough, Dr. Crist said. The land to which they are migrating, he explained, is almost all government-owned and thus is free for settling.

All five countries are taking a great in-

terest in this migration and have begun to build roads eastward over the mountains. Now, some of the migrating is done by bus, but many still are walking over the Andes to new homes every year.

Dr. Crist, an expert on South American cultural geography, recently returned from a six-month assignment by the Smithsonian Institution to the Universidad del Cauca in Popayan, Colombia. He has traveled in all five of the countries involved many times before.

"It is my opinion that this surge eastward," said Dr. Crist, "will continue and grow. There is great demographic pressure on these people to move away from their plateaus and in most instances they can't move to the west."

Most of the pioneers are farming or raising cattle. Their crops are for the most part corn and coffee. Cheese comes from a breed of white cattle which gets on well in the tropics and which many of the people brought with them.

Dr. Crist said that there was no similar movement of Brazilians westward to the headwaters of the three rivers. Brazilians, he explained, are migrating more in a southwesterly direction.

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of more than 2,000,000 stars before he finally found Pluto.

The actual discovery of Pluto was a matter of getting the planet to wink at him. Planets, moving in orbits, are always in different positions in relations to the stars. Mr. Tombaugh shot his telescope camera in the general direction of the orbit predicted for the new planet by Prof. Lowell. Then he would take two pictures, made on different nights and place them in a "blink microscope." This was a stereopticon-like machine, which superimposed one picture over the other.

The blink microscope, operated rapidly, could turn first one picture on, then the other. Mr. Tombaugh would get what looked like a continuous image of all the stars. If he got something winking or blinking at him, he would know he had something.

It was on Feb. 18 that he got his first wink, while looking at two plates taken on Jan. 23 and Jan. 28. He immediately checked with two plates taken on Jan. 21—20 years ago—and there was the new planet, sharply defined.

Announcement of the discovery was held up until March 13, 1930, the anniversary of Prof. Lowell's birth. That day was also the anniversary of the discovery, in 1781, of the planet Uranus by William Herschel, then a musician of Bath, England.

A few months later, the new planet was given its name. Pluto was suggested to the professor of astronomy at Oxford by an 11-year-old English girl. The choice of the name is particularly appropriate because the first two letters are the initials of Percival Lowell.

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TEXTILE ENGINEERING

Improved Cottons Compete With Synthetic Fibers

➤ KING cotton, whose empire was shaken by the cellulose revolution that brought rayon into high public favor, is making a bid to win back some of its competitive advantage with the development of new strong-fiber varieties.

Years of plant breeding and research have produced several new types with a much higher fiber strength than any cotton now grown. Thanks to these improved types, cotton can now compete more favorably with the synthetic fibers, states Dr. Charles R. Sayre, a Department of Agriculture research head.

Some of the varieties are so new they have not yet been released, but several including two American-Egyptian hybrids and a high-test-fiber Asiatic-American cross are available commercially.

The new cottons, by providing better cotton at lower costs, may supply the key to more varied and efficient farming in cotton growing areas, he said.

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ASTRONOMY

Pluto Has Anniversary

➤ THE 20th anniversary of the discovery of the planet Pluto occurred Jan. 21. It was from a photograph taken on this day in 1930 that Pluto was recognized, by a 23-year-old astronomer named Clyde Tombaugh, poring over photographs of the heavens at the Lowell Observatory in Arizona.

But the man who had predicted the existence of the planet, who, in fact, had told the scientific world almost exactly where it would be, and who spent many years searching for it, was dead. He was Prof. Percival Lowell, brother of President A. Lawrence Lowell of Harvard. In 1915, one year before his death, he published a paper in which he deduced the existence of Pluto from deviations in the orbits of two other planets, Neptune and Uranus. Prof. Lowell said that these deviations were caused by the gravitational pull of an un-

discovered planet. And he was even able to figure out the probable path around the sun of this heavenly body.

Pluto is too far away to be seen with the unaided eye and it was not until the Harvard Lowell donated a special 13-inch photographic telescope that Pluto was discovered.

When Mr. Tombaugh finally took a picture of the new planet and identified it as such, a search was made of pictures taken along the orbit of Pluto at the Lowell Observatory before Percival Lowell died. Ironically enough, there was Pluto's picture, on photographs which Prof. Lowell might have seen.

The search for Pluto went on at many observatories for years after Prof. Lowell made his prediction. Mr. Tombaugh started looking in March, 1929. It was a laborious task. He had to take hundreds of pictures