

Airplanes may be taking their power supply from such beams of radiated energy, which will also guide them. This may sound the height of absurdity in February, 1931, and I would not seriously mention it here, were it not for the fact I have recently heard two of the sanest and most fruitful engineers in the country, each with world miracles to his credit, independently and confidentially propose the early possibility of this very thing!

Electron tubes will effect revolutionary changes in our food supplies. Tubes form the heart of our new

therapeutic aids. Tubes will be major factors in eliminating certain diseases from the human family. We know already that tubes seem to effect hereditary changes and the creation of new species, and possibly they may even predetermine sex.

In fact the sweeping changes which the vacuum tube will effect upon the life of the human race within the next five years and the next few decades may very likely cause this century and period to be known as "The Electronic Age."

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lakes, that dry up during the rainless season, leaving the fish stranded. It burrows into the mud, curls up in a sort of cocoon, and sleeps through the hard times, maintaining connection with the world only through an air channel to the surface.

It is probable that its air-breathing habit has developed as an evolutionary necessity in response to this periodic crisis of waterlessness. At any rate, the fish now lose the use of their gills early in life, and depend for air on relatively simple lungs, coming to the surface every quarter-hour or so.

Prof. Smith found that fish prevented from coming to the surface by being kept down with a wire screen showed signs of great distress. They made more and more frequent attempts to swim to the top, fighting against the barrier and trying anxiously to find some way around its edge. After about an hour they would lose control of their movements, swimming on their sides or looping aimlessly about. In from two to eight hours they were dead of asphyxiation. If partially asphyxiated fish were released they eagerly sought the surface and remained there for longer than their usual breathing period, eagerly gulping air.

The full technical report of Prof. Smith's physiological studies on *Protopterus* is published in the current issue of *Ecology*.

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#### MILITARY SCIENCE

### New Type of Aerial Bomb Developed by Army

**C**AREFULLY guarded from the eyes of the curious, the U. S. War Department's chemical warfare service has been concentrating its experimental work in gas offensive on the development of a combination gas-high explosive aerial bomb.

During the World War gas was used with telling effect by the Germans, and towards the close of the war the U. S. Army chemists were pouring deadly fumes into the German defense, too. Gas attacks from airplanes, however, are strictly a post-war development.

Army chemists consider the perfection of a bomb, which when dropped from the air will spread a gas blanket over the surrounding terrain, to be one of their most important jobs.

Efforts are also being made to cut down the weight of gas masks, and new types which are safer and permit more

#### CHEMISTRY-GEOLOGY

## Synthetic Petroleum Teaches About Oil Formation in Earth

### High Temperatures and Pressures, Alpha Rays and Electric Discharges Make Complicated Oil of Simple Hydrocarbons

**A** CLUE to the way in which the earth formed the riches of petroleum held within its crust has been made known by Dr. S. C. Lind, director of the School of Chemistry of the University of Minnesota.

The origin of oil is one of the major scientific mysteries of today. While oil supplies are overabundant to fill current demands of autos and the many other consuming needs of modern civilization, scientists have looked forward with fear to an oilless future when the oil of the earth is exhausted.

Dr. Lind explains that he and other chemists have found ways of making synthetic petroleum identical in complexity with the natural oil.

Starting with a simple hydrocarbon, such as the familiar methane or marsh gas, ordinary chemical actions at high temperatures and pressures are able to make synthetic petroleum. Dr. Lind found that the alpha rays of radium, which are speeding hearts of helium atoms, can also change simple hydrocarbons into highly complicated ones. Even electrical discharges produce the same effect.

Since the growth of the earth with its twistings of the rock layers and its immense pressures in the depths of its crust must have produced high heats and intense compressions, this suggests one way the natural petroleum could have been formed. Radium and radioactive compounds occur in the crust of

the earth and they too might have been the means of making petroleum.

One question remains that is as yet unanswered. What was the raw material used by the earth in the manufacture of its petroleum. Was it vegetable, animal or inorganic? Is our gasoline distilled essence from the luxurious vegetation such as that which made our coal, or from the bodies of millions upon millions of minute animals of past ages. Or is it a synthesis from mere combinations of carbon and hydrogen that never were alive?

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#### BIOLOGY

### African Fish Dies If Kept Under Water

**A**N AFRICAN fish that must come to the surface to get air, just as a whale must come, and that will suffocate if kept under water where ordinary fish get along easily with their gills, is the astonishing creature described by Prof. Homer W. Smith of the University of Virginia. Prof. Smith has recently returned from Africa, where he collected a considerable number of these fish and brought them back alive to America.

The fish is known colloquially as a lungfish and technically as *Protopterus aethiopicus*. It lives in the shallow waters along the edges of central African

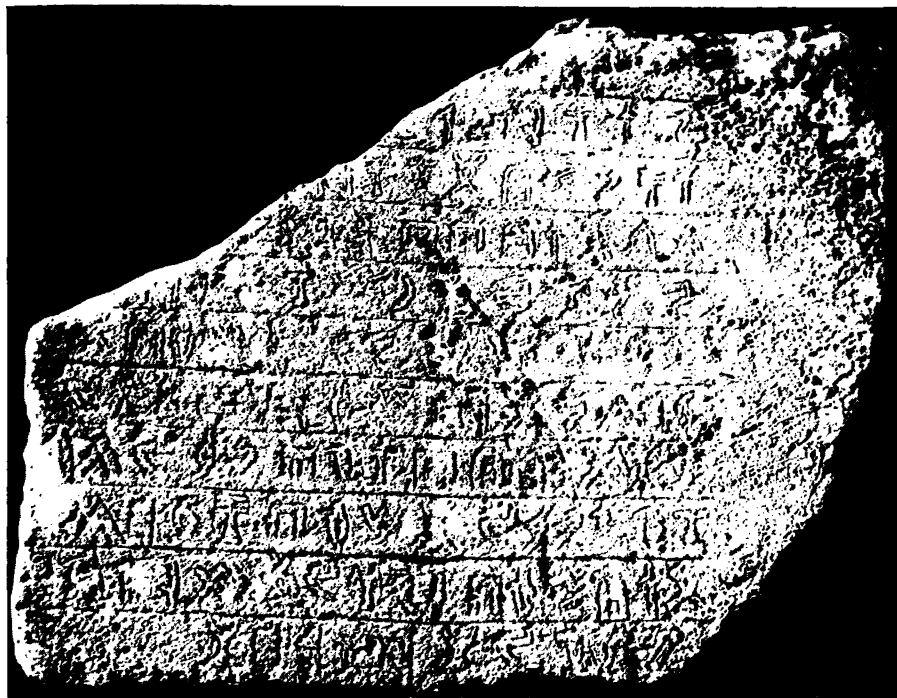
activity on the part of the wearer are being produced. American gas masks are the best in the world, Major General H. L. Gilchrist, chief of the Chemical Warfare Service, believes but he thinks that their weight and bulk are "still greater for foot troops than is desirable."

"The development of gas masks suitable for voice transmission for use with optical instruments such as range finders, field glasses and periscopes is nearing completion," General Gilchrist said. "This mask has a special molded rubber face-piece and is assembled to a canister placed at the back of the head."

Medical attaches to the chemical service are at work, too, officials revealed, on a means of developing a mask which will not give the wearer the headaches experienced by so many soldiers during the last war. Army chemists stoutly assert gas warfare is the most humane type of offensive, and to prove their claims quote from World War statistics to show that gas, while it temporarily disabled an astonishing number of fighters, killed comparatively few.

"A gas casualty has about ten more chances than a high explosive or rifle casualty of coming through whole," Dr. G. A. Rankin, one of the civilian experts employed by the Government for gas experimental work, explained.

Dr. Rankin is one of a number of civilians working in government laboratories to develop chemical warfare. He



#### ALMOST AN ALPHABET

*The alphabet found at Byblos containing 38 different symbols. Below is the third row of letters as a French scholar reconstructs them. Another recent discovery of ancient alphabetic writing is that found at the ruins of the Canaanite royal city of Gezer.*

and his associates have concentrated their equipment at Edgewood Arsenal, near Baltimore, and behind guarded doors are working out new methods for the chemical warfare service.

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Gezer makes it clear that the Sinai alphabet is older than 1600 B. C., probably as old as 1900 B. C. The method of dating the writing, Prof. Butin said, was to ask three experts independently to pronounce upon the age of the pottery fragment. All three said that it belonged to the Middle Bronze Age of Palestine, which was between 2000 B. C. and 1600 B. C.

The three letters on the fragment are the oldest writing ever found in Palestine. The meaning of the letters is said to be "Children of," the rest of the inscription being broken off. The inscription was probably an ownership mark and was similar in character to the familiar title Children of Israel.

The alphabet idea was probably thought of just once, Prof. Butin believes. But after that, it was applied to different forms of script by men who sought to simplify writing.

The Sinai alphabet was one simplification. Two other evidences of the



alphabetizing process have come to light very recently. One is the alphabet found at Ras Shamra, in Syria. The other is a semi-alphabetic writing found at Byblos, in Syria.

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#### ARCHAEOLOGY

## Chance Discovery Shows That Canaanites Used an Alphabet

THREE queer signs cut into a broken scrap of a pottery jar are new evidence of the antiquity of the alphabet, is the conclusion of Prof. Romain Butin, of the Catholic University of America located in Washington.

The jar fragment was found at the ruins of the Canaanite royal city of Gezer. The bit of clay is evidence that alphabet writing existed in the world as early as the nineteenth century B. C. It seems that the Canaanites, who held the Promised Land before the Children of Israel appeared to claim it, were a people who not only knew a system of writing, but had an alphabetic system.

This scrap of writing is now regarded as one of the most important archaeo-

logical discoveries made in Palestine in many years. And, strange to say, when it was discovered some months ago it was set aside with objects a thousand years younger than itself, and thought to be no older than they.

Prof. Butin saw that the letters were like the alphabetic inscriptions that have been coming to light from the Wilderness of Sinai, which lies south of Palestine.

The Sinai alphabet writings show traces of having been evolved directly from Egyptian picture writing, and thus they are looked upon as a real missing link in alphabet evolution. The question about them has been—how old are they? The fragment of pottery from