GEOLOGY

Radioactive Potassium Is New 'Clock' to Check Age of Earth

K 40 Analysis Shows World Is Less Than 3,000,000,000 Years Old; New Estimate Agrees With Uranium Figure

A RADIOACTIVE potassium "clock," latest aid to scientists seeking to know the age of the earth, indicates that the world is less than 3,000,000,000 years old, Dr. A. Keith Brewer of the U. S. Bureau of Chemistry and Soils reports (*Science*, Aug. 27.)

Radioactive potassium, an isotope of the common variety with an atomic weight of 40 instead of 39, he also indicated, is becoming a "lost element," similar to radium, whose amount is also gradually diminishing.

Radioactive potassium, K 40, changes over long periods of time into the common variety of calcium, the metal that forms the basis for lime and limestone. Scientists can compute the age of the earth from their knowledge of how much calcium is to be found today and a knowledge of the rate at which radioactive calcium decomposed.

Results by the potassium "clock" method, Dr. Brewer reported, are in close agreement with estimates of the earth's age gained from another radioactive "clock", that of radium, uranium and lead.

Radioactive potassium, like uranium, was at one time much more common, he pointed out.

Caused Great Changes

Radioactive potassium, which Dr. Brewer reported last spring to be playing a vital part in life processes, particularly in the growth of plants, may have been partially responsible for the tremendous changes in plant and animal life that occurred during the Carboniferous age, some 250,000,000 years ago.

"It is interesting to note," he declared, "that the K 40 content (of the earth) during the Carboniferous era was from four to fifteen times that existing at present; this may have had an important influence on mutations and rampant growths during that era," he pointed out.

The potassium clock has also aided in setting a date approximately one and a half billion years ago when the earth's crust began to solidify, thus making life possible. Calculations based on the potassium clock fix the time as 1,430,000,000 years ago, as compared with 1,500,000,000 years ago for the uranium-radium-lead clock.

Radioactive potassium is today comparatively rare, most of it already having disintegrated into calcium. Potassium's ordinary variety, K 39, is 8,300 times as common as the radioactive isotope, K 40, Dr. Brewer reported.

At the present time, indicated Dr. Brewer, the amount of radioactive energy liberated by potassium, uranium and thorium is of the same order of magnitude. A billion years ago, however, the supply of energy liberated by the radioactive form of potassium, K 40, was far in excess of that from uranium and thorium.

His results, the chemist concluded, "also show that in early geological times, radioactivity was far more prevalent than it is today.

Science News Letter, September 4, 1937

ORNITHOLOGY-RADIO

Shortwave Radio Aids In Recording Sea-Birds' Chorus

CULMINATING an expedition on which the voice of a bird was for the first time recorded on film by means of radio, ornithologists at Cornell pronounced successful the first records ever made of the voice of Atlantic petrels.

Albert R. Brand of the laboratory of ornithology at Cornell, and pioneer in bird-song recording, did the field work in cooperation with the Bowdoin College department of zoology. Taking Harold Axtell of Cortland, N. Y. along as his assistant, Mr. Brand travelled in his sound truck to northern Maine, ferried across to the island of Grand Manan, and arrived within six miles of

TO TAME WILD NOTES

Paul Kellogg and Albert R. Brand, Cornell University ornithologists, with part of the radio-aided recording equipment used to write the notes of wild birds on sound film.

Kent's Island, where Bowdoin College maintains a biological laboratory under the direction of W. O. Gross.

A powerful short-wave radio station, VE1IN, is maintained on the island, in charge of Thomas Gross and a corps of operators. This was made available for the project in sound-recording.

In burrows dug in the loose soil a mile from the laboratory among the rocks on the outer slope of the island nests a colony of Leach's petrels. The petrels are nocturnal in their habits, and a strange concert arises from the mouths of these burrows before the males go in search of food for the young.

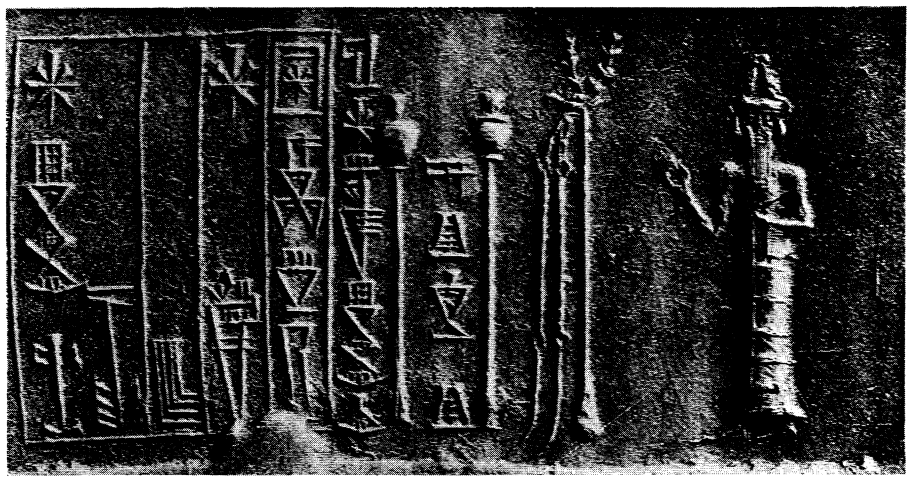
Frog-Like Chorus

Mr. Brand wished to get an accurate record of this frog-like chorus of bird voices. Faced with the impossibility of getting a sound truck to the island, the expeditionists laid a mile of telephone wire from the radio station to the petrel colony. The sensitive microphone with its parabolic reflector used by Mr. Brand in his sound recordings was attached to the end of the telephone line. A new portable field amplifier developed by Prof. True McLean and Paul Kellogg of the laboratory of ornithology, which could be carried easily over the rocks, amplified the petrels' song sufficiently so that it could be sent to the radio station.

As the petrels stood at the entrances of their burrows or wheeled about overhead giving their croaking notes, the microphone picked up the sounds and with the aid of the amplifier sent them to the radio station, whence they sped across the intervening six miles of the Bay of Fundy to the sound truck waiting on the island of Grand Manan. In the sound truck the electrical waves set up by the voices of the birds caused a tiny galvanometer to deflect a ray of light on the edge of a motion picture film which shot past the vibrating light at the rate of 90 feet per minute.

Listening to the developed film as it was played through the reproducer in Fernow Hall at Cornell, Prof. Arthur A. Allen reported that not only the voices of the petrels were recorded successfully, but many other sounds that emanate from Kent's Island at midnight were gathered in and permanently recorded on the film.

The voice of the European nightingale has been broadcast a number of times from gardens near London, England, but this is believed to be the first time that the voice of any bird has been recorded on film by means of radio.



SIGNATURE

Doctor Ur-Lugal-edina of Babylonia signed his name in this odd style, 4300 years ago. He had the whole signature on a personal seal, so it was no trouble.

ARCHAEOLOGY—GENERAL SCIENCE

Babylonians Merit Honor as Original "Fathers of Science"

By DR. WALDO H. DUBBERSTEIN
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ASSUREDLY the ancient Babylonians deserve the title "Fathers of Science."

Through 3,000 years of documented history we can trace their slow steps toward modern science. We today have no reason to feel smugly superior in our advanced knowledge. The really hard steps in progress are the first ones. Those were taken for us thousands of years ago.

Four thousand years ago, Babylonian surgeons set broken bones, made major and minor body incisions, and even attempted eye operations. A pictorial representation shows the physician with his inevitable case and bandages.

Sicknesses were known by specific names, and symptoms were recorded. Magical and religious elements of Babylonian medicine are easily overemphasized, while honest medical prescriptions are overlooked. There is a reasonable purpose in Babylonian magic. Once gods and demons had been accepted, then charms and incantations for their control were also necessary. Had magic been omitted, the patient would certainly have lacked confidence in his physician. It was part of his professional "bedside" technique. But scores of simple medical prescriptions have no magic in them. Some even have real medicinal value.

Mathematics was obviously practical in a complicated business development such as Babylonia experienced almost 5000 years ago. Ancient textbooks offer simple and complex problems, such as:

"A square of 356 yards has been divided into eight triangles; compute their areas," and "Given a rectangle whose width is 10 yards, and whose length is 40 yards, compute its diagonal." Two distinct solutions are offered by the author of the textbook for this last problem, both of which reveal a small margin of error.

In the oldest texts are found addition, subtraction, division, multiplication, and fractional numbers. Square and cube root tables, as well as multiplication tables, were also compiled. Even the theorems commonly ascribed to the Greek Pythagoras and Thales, who lived in the sixth century B. C., seem to have been known, empirically at least, in Babylonia 4,000 years ago.

Astronomy began its climb toward a respectable science as an assistant to that pseudo-science, astrology. Yet by 2000 B. C. Babylonian astronomy had assumed much of its later form as a practical science. Days began with the setting sun,