# SCIENCE NEWS

*Science Service, Washington, D. C.*

## NEW CHECK ON THE EARTH'S AGE

NEW measurements on a very old mineral have given the possibility of a new accurate determination of the time since the molten earth cooled sufficiently to form a solid crust. This new glimpse into the past of the earth comes as a result of the work of Dr. A. von Grosse and Dr. J. D. Kurbatow, working at the Institute of Technology in Berlin.

That the earth is at least eighteen hundred million years old is one of the conclusions recently reached as a result of studies in physics and geology by the Committee of the National Research Council. A revision of previous calculations may be necessary, however, since the recent work. Physicists have grown accustomed to changing their estimates on this problem from time to time. During the last century, before the discovery of the radioactive atoms like radium, Lord Kelvin was quite sure that the sun even could not be older than fifty million years; and of course the earth had to be younger than the sun.

The new research in Berlin indicates that the ratio of actinium to radium is four per cent. in the "Wilberforce uranite" examined. This fact gives a new check-up on the reliability of the most accurate clocks used by physicists in solving this problem. Those clocks are provided by the unchanging disintegration of heavy radioactive atoms into lighter atoms.

As this process has been going on for millions of years at the same rate as now, it is possible by measuring the amount of lighter atoms formed to know how long the break-up has been going on. These lighter atoms are very similar in nature to lead, and can not be distinguished from it by ordinary chemical means. Separate clocks are given us by three different chains of elements which start from uranium, thorium and the yet-unknown parent of proto-actinium. The end of the uranium chain is radium "G," of the actinium chain is actinium "D." By measuring the amounts of lead, uranium and thorium and the relative amounts of radium G and actinium D two independent checks on the age of the earth can be obtained from the radium clock.

The new figure given for the actinium-radium ratio is different from that accepted by the National Research Council Committee: three per cent. At present the greatest possible age for our planet is believed to be 3,000 million years.

## BALL LIGHTNING

BALL lightning, one of the rarest, strangest and least understood of natural electrical phenomena, has recently been the subject of an unprecedented amount of discussion in scientific circles. In the hope of getting new light on this mysterious phenomenon, Dr. W. J. Humphreys, meteorological physicist of the U. S. Weather Bureau, wants reports from everybody who has observed it. He has given a list of questions on the subject to *Science Service,* with the request that observers of ball lightning send their answers to him, at the U. S. Weather Bureau, Washington, D. C.

Ball lightning is quite unlike the ordinary, almost instantaneous electrical discharge that constitutes ordinary lightning. It is a slow, long-continuing discharge, that floats through the air or runs along the ground in the shape of a ball, or sometimes the shape of a pear. The color varies from red through blue to dazzling white.

These glowing balls often enter houses, coming down the chimney or entering through a window or door or even a crack. They float or glide around, sometimes with a fluttering or crackling noise, but seldom do any harm. There are no cases on record of persons injured by them; though Dr. Humphreys reports an amusing story that came to him of a too-curious pig that nosed one with his snout and was stunned when the ball literally "blew up in his face."

Dr. Humphreys' list of questions follows:

Who saw it? Names and addresses of all witnesses should be given.
Where and when was it seen? Location, date and time of day should be as exact as possible.
Did it come at the beginning, middle or end of the storm?
Did it occur indoors or out?
If indoors, how did it get in and how did it leave?
Was there one ball, or were there more than one?
How long did it last?
What were its size, shape and color?
Was its outline sharp or fuzzy?
Did it make any noise?
Did it leave an odor?
Did it move or stand still?
If moving, did it go with the wind or against it?
Was its movement vertical, horizontal or at an angle?
How fast did it move?
Was its movement smooth or in jerks?
What were its effects?

Dr. Humphreys is especially hopeful that some one may succeed in getting a photograph of a ball lightning discharge. No really well authenticated photograph of this kind has ever been taken.

## NARCOLEPSY

A SUCCESSFUL method of treating a strange disease has been reported to the American Medical Association by Dr. John B. Doyle and Dr. Luman E. Daniels, of the Mayo Clinic. Some people who suffer from this disease fall down when they laugh or get excited. Physicians call this symptom cataplexy. Suddenly, when anything arouses the patient's emotions, his muscles become weak, and he can not stand.

Another symptom seen in this disease is an irresistible desire to sleep. The afflicted person may be conducting business, he may be driving an automobile, it makes no difference what. He must sleep, and he does, whatever the consequences to himself and others may be. The name for the disease, including both the weakness and

the sleepiness, is narcolepsy. It was recognized as a distinct condition in 1880 by Gélineau, a French physician.

In most cases of narcolepsy no cause for the condition has been found. Consequently, in the fifty years since the disease was identified and named, many treatments have been tried, none of which has had much success, except perhaps the glandular treatment of Dr. J. Ratner and of Dr. Beyermann, two German physicians.

Recently, however, Drs. Doyle and Daniels have employed ephedrine, a vegetable drug, introduced into this country less than ten years ago by a Chinese physician, Dr. K. K. Chen. Six patients whom Drs. Doyle and Daniels have treated, and two who were treated after their method by Dr. H. A. Collins, have been relieved of symptoms, most of them completely.

The discoverers of this treatment do not claim that they have a cure for this disease, for the patients must continue to take the medicine, and some possibly would have to take more of it than would be good for them, for the drug is powerful. However, several hopeless patients thus far have been restored to usefulness and happiness, and, since this treatment is not difficult for a competent physician to administer, there is nothing to prevent its wide use.

## THE SURINAM TOAD

THE Surinam toad, a rare and most curious species that carries its eggs and young in pockets on its back, will be the main objective of Dr. William M. Mann, director of the U. S. National Zoological Park, when he leaves on July 22 for an expedition into British Guiana. There are a lot of other animals in South America he would like to have, Dr. Mann told *Science Service*, but his heart is especially set on getting a collection of these interesting toads for the new reptile house in the Washington zoo, the newest and finest show-place for cold-blooded animals in America.

The Surinam toad shares its peculiar form of maternal solicitude with the kangaroo, a mammal, rated much higher on the evolutionary scale. It differs from the kangaroo, however, in carrying its offspring on its back instead of in an abdominal pouch.

When the female produces her eggs, she develops deep pockets all over her back, each of just the right size to hold an egg. With the assistance of her mate, she manages to get her eggs into the pockets, where a natural sealing substance closes them in.

There they remain until they hatch, and indeed until the toadlings that emerge from them are ready to hop out and make their own way in the world. For the tadpoles of the Surinam toad, though they have gills and tails like toad tadpoles everywhere, never get a chance to swim until they are full grown. They pass through all the changes of their infancy in the mother's back-pockets, sticking their heads out through the covers, until at last their legs are grown. Then, relieving their mother of the burden of parenthood in a most literal manner, they hop along their independent jungle way.

Dr. Mann stated that though these toads are comparatively rare he has good hopes of getting at least one, and with luck may bring back half a dozen or more. He expects also to bring back many cages full of other strange animals not yet represented in the National Zoological Park collection.

## BELIEF OF INDIANS IN EVOLUTION

LONG before Darwin, native Americans of the Southwest were teaching their children evolutionary ideas as a matter of course. This chapter of the ancient history of evolution in America is pointed out by Arthur Woodward, curator of history at the Los Angeles Museum.

For centuries the Zuni Indians have believed in evolution. The evidence is their creation myths, and also ancient fetishes of stone carved in the form of animals. Dr. Woodward states that "Frank Cushing, that immortal ethnologist and primal recorder of Zuni folklore, set down the Zuni tale of 'The Drying of the World' and the evolution of the Zuni from small, reptile-like forms to men who walked upright and lived as men.

"According to the Zuni, in early days men, or at least the ancestors of men, lived in the bottommost of four caves beneath the earth. Then, the Two Culture Heroes, sons of the great Sun Father, took pity on the people and by means of cane ladders permitted them to crawl from the lowest level to the next cave. Here it was a bit lighter and the people began to assume upright forms. They multiplied and became restless, seeking higher levels. In this second cave they learned more of speech and began assuming a tribal identity.

"By means of a third ladder they ascended to the third cave which was brighter, and here they began to long for the outer world. In each climbing some were left behind. In the fourth cave, those who could crawl up the cane ladder became full-fledged Zuni, having been taught the arts by the Twin Culture Heroes.

"However, the earth was then very moist, and strange creatures and man-eating animals roamed the wet surface.

"To protect men from the fierce monsters, the Culture Heroes shot magic arrows of lightning. Some of the huge beasts died where they stood and their bones turned to stone and were buried in the earth.

"The Zuni are not surprised when fossil remains are found now-a-days. They know those gigantic animals roamed the earth when it was new. They know men evolved slowly from lower forms."

The Two Culture Heroes allowed the spirits of the giant beasts to linger in the fossil remains. These powerful forces, the ancient Zuni hunters converted to their use in hunting and war. They did it by making little stone fetishes representing the animals. By feeding and propitiating the little stone figures, they could call upon the spirits for aid. The first evolutionists of America were practical as well as theoretical.

## DETECTION OF FAULTS IN RAILS

TELLING what the inside of a sound-looking locomotive rail is like without waiting for a train wreck to disclose

the fact is an achievement of science that is daily saving lives. In a report to the American Institute of Electrical Engineers, H. C. Drake, engineer of Sperry Products of New York, explains how this is accomplished with the detector car, the new safety patrolman of the railroad.

The detector car, which is a small, self-propelled railway car, moves along the track at six miles per hour when examining rails. It labels the faulty rails whose smooth exterior deceives track-walkers of the hidden danger lurking in them. Operating on the principle that an electric current flowing through a rail must pass around any break in the metal, the detector car records this electrical deviation and marks the bad spot with a streak of paint.

Early in 1927, it was demonstrated in the laboratory that electricity could be used successfully to diagnose the ills, if any, of steel rails. After months of experimentation the first detector car was constructed for the American Railway Engineering Association.

Since its acceptance in 1928 by this group, detector cars have been placed in use on several railroads, and the number of bad rails located is mute evidence of the disasters averted. The human eye is always able to find cracks in rails extending to the surface, but it has remained for the detector car to see through the steel and prevent track failures, previously accounted for as an "act of God."

## ITEMS

WORD of important discoveries has been received by the Bureau of American Ethnology from the largest archeological excavation which the bureau has ever attempted. The expedition, led by Dr. Frank H. H. Roberts, Jr., is working at an undisturbed prehistoric Indian site near Allentown, Arizona, and has unearthed four burials and numerous pieces of pottery, weapons and ornaments. Indians probably inhabited the village from the latter part of the first Pueblo period, which ended about 500 A. D., until some time in the third Pueblo period, which ranged from 900 to 1200 A. D. It is planned to excavate and restore the entire pueblo, placing it in as near original condition as possible. A staff of 35 workers is assisting Dr. Roberts, who considers that from three to five summers' work will be needed to restore completely the ancient site.

MOLTEN platinum gives the world its best standard of light. At the National Bureau of Standards four physicists have produced this new light standard. Using an idea suggested by Dr. G. K. Burgess, now director of the Bureau of Standards, and his associate, the late Dr. C. W. Waidner, the platinum light standard was tested experimentally by Dr. H. T. Wensel, William F. Roeser, L. E. Barbrow and F. R. Caldwell, of the bureau's staff. A flame of standard type burning fuel at a known rate has been used in the past as a standard, but its brilliance varies with changes in atmospheric conditions. Platinum, pure to one part in 30,000, is fused electrically in crucibles of thorium oxide. Comparisons with its light are made when the platinum is melting or freezing. Its temperature then is about 3,200 degrees Fahrenheit. Light produced under these circumstances is remarkably constant. Reproducibility is of first importance for a standard and the values of the platinum standard are repeatable to a tenth of one per cent. The precise value of the new light standard is 58.84 international foot candles per square centimeter.

ELECTROLYSIS, or electric separation of the elements in a chemical solution, is carried on in a new way by a process invented by Professor Alfons Klemenc, of the University of Vienna. In ordinary electrical separations, both positive and negative electrodes are immersed in the solution to be treated, and each takes out the atoms or atom-groups that are attracted to it. In Professor Klemenc's process, the negative electrode is suspended above the surface of the liquid, and separated from it by an air space. When the current is turned on, a stream of electrons is given off by the electrode into the air. The electrical phenomena that accompany this kind of electrolysis are quite different from those of ordinary electrolysis. Electrolytic reduction is carried on more easily, and electrolytic oxidation proceeds much more intensely.

A NEW source of the recently discovered metal, rhenium, which contains up to one per cent. of rhenium has been announced in Berlin by its discoverers, Dr. Walter Noddack and Dr. Ida Noddack. Previously the best ore from which the new metal could be obtained contained only one part of the metal in 660,000 of the ore. Dr. Walter Noddack has been seeking a more plentiful source of the metal for several years. Rhenium, number 75 in the order of the elements, which was discovered a few years ago, is chemically similar to the common element manganese with which it often occurs in minerals. Several thousands of tons of rhenium and rhenium compounds have been distributed among scientists throughout the world. They will study the properties of the new element on a larger scale than hitherto.

BY producing artificially the freezing and thawing conditions destructive in nature to concrete works, the investigators, Professor F. C. Lang and Professor C. A. Hughes, of the University of Minnesota, have evolved a test for gravel pebbles helpful to concrete engineers. The procedure consists essentially in immersing a sample for a few minutes in water at approximately 212 degrees and 35 degrees Fahrenheit and also in a brine solution below freezing. The samples are dried and passed over special sieves to determine the extent to which they break down. The test is then carried on with that part of the sample retained on the sieve. A definite per cent. of the sample passing through the sieve is set as the limit, and any sample showing greater disintegration is regarded as unfit for use in concrete in exposed positions. This test is important in view of the fact that a relationship has been found between the durability of these coarse materials and the concretes in which they are used.