in coloring, is more than twice the age of previously known specimens, the famed dinosaur eggs of the Gobi desert being about 100,000,000 years old and the oldest known to science previous to the present discovery.

It is one of the most primitive eggs ever laid on land. Prior to that time animal eggs had always been deposited in water, a feature retained from the fish ancestry of the amphibians. Unhatched, and preserved with but little distortion, the fossil gives an accurate conception of the egg's original shape and also of the character of the shell, which is slightly cracked in various places. A microscopic study of this shell is now under way to determine the structure of the limy covering.

### May Be Ophiacodon

The egg cannot be definitely associated with any particular animal, but it is believed to be that of a large lizard-like animal known as *Ophiacodon,* a creature with an exceptionally large head and short limbs, measuring about six feet from snout to tip of tail. The partial skeleton of an animal of this kind was found near the egg.

Scientists have been searching in this region since 1878 for fossils but until the Harvard expedition not even a fragment of a fossil egg was discovered. The fossilization of such a delicate object and its preservation for such a long time must have required unusual circumstances.

A huge inland sea is believed to have existed during the Permian period, covering much of the states of Texas, Kansas and Oklahoma, with animals living along its shores. That these animals were present in great numbers is shown by the remains of thousands of fossils found in these "badland" patches of today.

### Laid Near Water

The egg was probably laid close to the water and was quickly covered by the accumulating clays of the shore line, along with the bones of other animals carried in by the water, there to begin fossilization, it is believed.

Additional hundreds of feet of sediments eventually left the egg deep under ground. After lying there for a period of 225,000,000 years the fossils have now come to light through the gradual erosion of the overlying deposits. These ancient sea beaches are quite numerous regions of the Southwest, varying in color from vermilion to dark maroon and occasionally purple. The deposit is mostly joint clay and sandstone with several thin layers of limestone.

What is probably one of the best fossil skulls of its kind ever found in this area, that of an *Eryops,* a salamander-like amphibian about eight feet long, was also brought back by the expedition, which was headed by Llewellyn Price and Theodore White, both of the Museum staff.

The skull is 26 inches long and 14 inches wide, and exceptionally well preserved. The exact relationships of the skull bones to each other can be discerned, since the skull was not crushed by the weight of the overlying clay and sandstone. It will also be possible to determine the size of the brain and thus the nervous organization of the animal, as well as the creature's place in the fauna of its time.

The egg has already been placed on exhibition at Harvard and the fragments of the skull are being assembled for display in the museum.

*Science News Letter, December 15, 1934*

MEDICINE

# Tuberculosis Test Material Isolated in Pure Crystals

## Victory in Sixty Year Battle is Considered Great Advance in Medicine's Warfare Against White Plague

A GREAT advance in medicine's warfare on the great white plague, the obtaining of tuberculosis test material in pure crystals, has just been made by Dr. Florence Seibert of the Henry Phipps Institute, Philadelphia.

For 60 years scientists have been endeavoring to isolate in pure form this substance of the tuberculosis bacillus. It, like tuberculin, allows the making of a simple skin test to tell whether or not a person or animal has tuberculosis. The new purified substance will be of immediate application to human patients.

Scientists have known for 60 years that this substance was there in the TB "germ" and they have been using it in tuberculin tests on man and in vast programs of tuberculosis eradication in cattle to insure a safe milk supply. But it has never before been available in pure form.

The isolation of this new substance, called the purified protein derivative of the tubercle bacillus, may be likened to getting out of the pancreas pure crystalline insulin for treating diabetes. Using the old tuberculin would be like using a preparation of the whole pancreas to treat diabetes. The insulin would be there but so would many other substances. Old tuberculin contained the tuberculosis detective, but it also contained many other things.

To produce this important protein substance, tubercle bacilli were grown on an inorganic medium and by special chemical methods the pure crystalline substance was isolated. Dr. Seibert has reported technical details of the isolation in the *American Review of Tuberculosis* (Dec.) Her work was done under the auspices of the medical research committee of the National Tuberculosis Association, largely supported by Christmas seal sales.

*Science News Letter, December 15, 1934*

PHYSICS—AERONAUTICS

## Stratosphere Balloons Rising to 17 Miles

THE working of small unmanned stratosphere balloons sending back continuous reports by radio from altitudes of over 17 miles was described by Prof. J. M. Benade, distinguished Indian physicist from Forman Christian College at Lahore, India, to the American Physical Society.

Prof. Benade who is the "right-hand-man" of Prof. Arthur H. Compton on the radio-balloon phases of cosmic ray research and inventor of the method reported to the Society with Dr. R. L. Doan of the University of Chicago.

The apparatus transmitting stratosphere temperature, pressure and cosmic ray intensity weighs only ten pounds, said Prof. Benade. Temperature and pressure data are transmitted by radio signals controlled by two magnetic vibrators, each of whose motion is de-

termined by stratosphere conditions at the given altitude.

Cosmic ray intensity is transmitted by a special electrometer measuring the electrification of air molecules in the apparatus. Gradually the air ions formed by cosmic rays charge up the electrometer which is arranged so that for a given constant charge it will energize a photoelectric cell. The photocell current then cuts off the radio transmitted. The frequency with which the incoming signal is interrupted is, therefore, a measure of the cosmic ray intensity at the point in question.

*Science News Letter, December 15, 1934*

PSYCHOLOGY

# Human Behavior Too Complex To be Studied Statistically

THE BEHAVIOR of a human child is too complex to express in a mathematical formula or to study by the use of the statistics, Dr. Paul Hanly Furfey, of the Catholic University of America, told members of the Society for Research in Child Development. The use of measurement and statistical analysis, probably the most representative technique now employed by American child psychologists, was condemned by Dr. Furfey as not being practically useful.

"Those who loyally follow the assumptions of the statistical method to its ultimate conclusion, calculating tetrad differences and fitting Pearson curves, are merely performing a sort of sacred rite, interesting and stimulating to themselves, perhaps, but without scientific significance," Dr. Furfey declared.

"The physicist proceeds by measuring his quantities as objectively as possible and then subjecting these measurements to a mathematical analysis which often succeeds in discovering relationships not apparent on a superficial examination of the data," Dr. Furfey explained.

"We psychologists have perhaps, more or less unconsciously, imitated these methods in the past, hoping that a method so brilliantly successful in another science would prove equally successful in our own.

"Too many of us have nourished a secret ambition to be the Einstein of psychology, to discover some formula—preferably a rather unintelligible one—which would summarize neatly a great mass of experimental data."

The physicist is able to deal with quantities that remain constant during his experiment or which change according to simply expressible laws, Dr. Furfey explained. But the position of the psychologist is not so easy. It is doubtful whether there are any behavior traits constant enough to be treated by mathematical analysis, he said. Certain abilities, such as that known as general intelligence, may be constant enough so that it is useful to measure them mathematically. But when we turn from the ability to behave in certain ways to the actual behavior of the child, the difficulties begin to multiply.

The physicist can also isolate two variables such as temperature and expansion rate for mathematical study. Child behavior is too complex to make such a procedure possible.

Observation of the child and his environment, and comparison, following methods in use in the biological sciences, were recommended by Dr. Furfey to replace the technique of measurement and statistical analysis.

*Science News Letter, December 15, 1934*

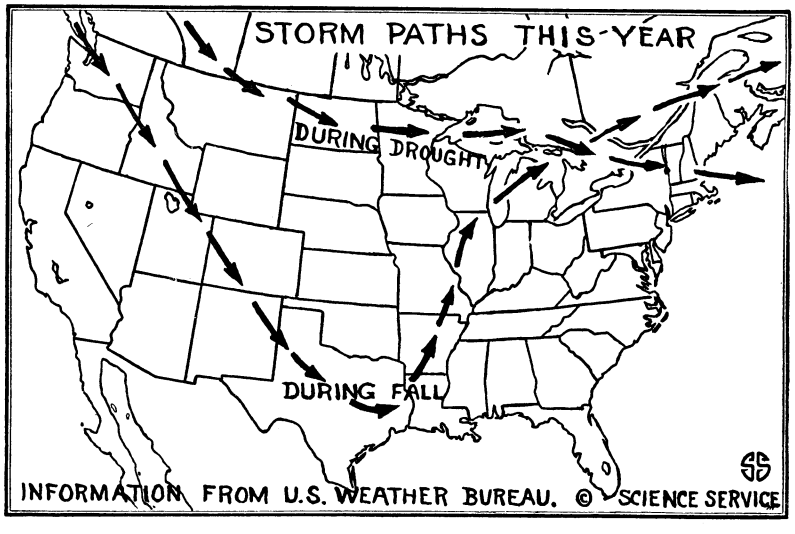
PLANT PATHOLOGY

## Campaign to Save Elms Covers Historic Ground

THE SCENE of George Washington's first field venture against the British is to be the theater of an entirely different kind of warfare during the coming winter and spring. And just as Washington struck there for all America of the future, so the Government campaigners against the dreaded elm disease will be fighting for America's most beautiful trees not only in the East but far into the South and West.

With $527,000 of PWA funds, the Federal forces will move into the area around New York City, to start a campaign of extermination against all trees found to be harboring the disease or the beetles that carry its causal fungus. In the wooded country, men of the CCC will cut down and destroy the sick and dead elms. In the cities, workmen under the direction of experts will take out the doomed trees, sawing them limb by limb as they stand rather than felling them, to avoid damage to telephone and electric wires as well as to buildings. This greatly increases the cost of removal, but the expense cannot be avoided.

An area with a radius of some 45 miles around New York City is known to harbor the diseased trees. Elimination must be made complete in this region,




THE RAINS BECOME BOLDER

***This diagrammatic map shows why the Corn Belt had deadly drought last summer, but has been receiving saving rains this fall. The upper line of arrows shows the approximate path of the rain-bearing summer "lows." In normal years these dip down into the country, perhaps as far south as Kansas, then turn and slide off the map, usually through the St. Lawrence valley. When they just skim the top of the map, as they did last summer, drought comes. The lower arrow-line shows how the autumn storm areas have been driving in far to the south of their usual turning point, and then countermarching squarely up the great central valley.***