

terminated 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

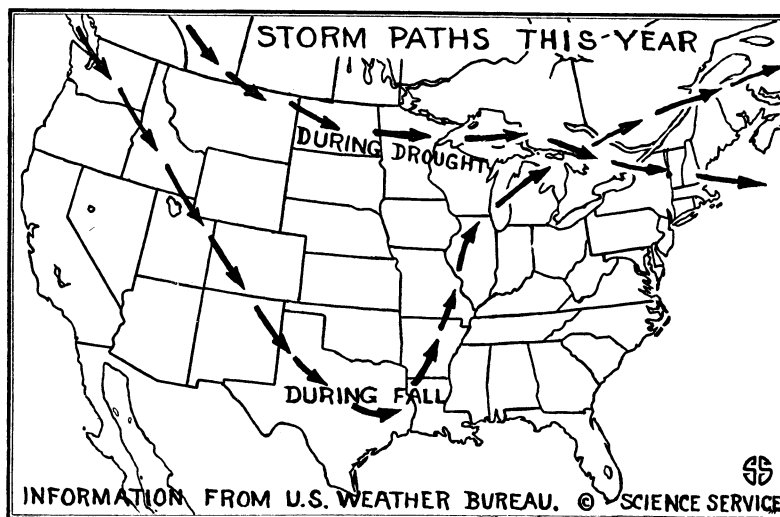
PLANT PATHOLOGY

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 counter-marching squarely up the great central valley.

or the disease will start over again. In addition, a ten-mile "safety zone" outside the known infested area is also marked for cleaning up. In all, 5,000 square miles, containing 3,000,000 trees, must be policed.

Just as Washington frequently had to fight without enough ammunition, so the fighters for America's elms must go into this battle without sufficient funds

to complete the whole campaign. It has been estimated that another million dollars will be needed. Friends of the elms feel sure that the money will be forthcoming in time, if people realize that their own elms, even those as far from the scene of action as the Pacific Northwest, are endangered, unless the enemy is driven out before next June.

Science News Letter, December 15, 1934

PSYCHOLOGY

Writings of Gertrude Stein Those of Woman Without Past

A POSSIBLE explanation, on a scientific basis, for the bewildering if amusing writings of Gertrude Stein has been vouchsafed by the Editor of *The Journal of the American Medical Association* (Dec. 1).

"Her writing seems to be the result of a stream of consciousness of a woman without a past," he says. Further explanation is, in part, as follows:

"Those familiar with such symptoms as automatic writing, palilalia, perseveration and verbigeration are inclined to wonder whether or not the literary abnormalities in which she (Miss Stein) indulges represent correlated distortions of the intellect, or whether the entire performance is in the nature of a hoax, and that Miss Stein produces her literary effusions with her tongue in her cheek.

"Palilalia is a form of speech disorder in which the patient repeats many times a word, a phrase or a sentence which he has just spoken. In addition, the speech tends to be uttered more and more quickly and less distinctly. . . .

Verbal Perseveration

"An analogous condition is palilogia, a term sometimes applied to that form of rhetoric whereby the word or sentence is deliberately repeated for purposes of emphasis. Then there is also verbal perseveration, with the same word or phrase repeated as though the original idea persisted for an undue length of time in the patient's mind to the exclusion of fresh incoming ideas

"Now it is interesting in surveying the writings of Gertrude Stein to find that Miss Stein worked at Radcliffe with Münsterberg and that she wrote a paper, later printed in the *Harvard Psy-*

chological Review for September, 1896, under the title 'Normal Motor Automatism,' by Leon M. Solomons and Gertrude Stein. In their experiments, Mr. Solomons and Miss Stein attempted to investigate the limits of their own normal automatism, undertaking to see how far they could split their own personalities in a deliberate and purely artificial way. They were successful, according to B. F. Skinner (*Atlantic Monthly*, Jan., 1934), to the extent of being able to perform many acts, such as writing or reading aloud, in an automatic manner while carrying on at the same time other activity. Miss Stein reported that spontaneous automatic writing became easy after a little practice. Thus she said:

Running in the Mind

"A phrase would seem to get into the head and keep repeating itself at every opportunity, and hang over from day to day even. The stuff written was grammatical, and the words and phrases fitted together all right, but there was not much connected thought. The unconsciousness was broken into every six or seven words by flashes of consciousness, so that one cannot be sure but what the slight element of connected thought which occasionally appeared was due to these flashes of consciousness. But the ability to write stuff that sounds all right, without consciousness, was fairly well demonstrated by the experiments."

"Obviously, therefore, the writing of Miss Gertrude Stein, such as appears in her plays, books and poems, is quite the same as she developed when experimenting with spontaneous automatic writing.

"Mr. Skinner points out that the ordinary reader cannot infer from this

writing that the author possesses any consistent point of view, because there is seldom, if any, intelligent expression of opinion.

"Her writing seems to be the result of a stream of consciousness of a woman without a past. The stream of consciousness is, of course, particularly well exemplified in some of the writings of James Joyce in *Ulysses*. Mr. Skinner is convinced that this spontaneous automatic writing by Miss Stein is that of a second personality successfully split off from her conscious self, and unfortunately a personality without any background, intellectual opinions or emotions. The mere fact that Miss Stein herself occasionally appears in the midst of the writings of this second personality would seem to be the proof of the opinion."

Science News Letter, December 15, 1934

BIOLOGY

Ultraviolet Rays Make Rare Fish Transparent

ULTRAVIOLET radiation, depended on by basking beach mermaids to give them a fashionably dusky sun-tan, is used for an exactly opposite purpose in preparing specimens of rare fish for laboratory study and museum exhibition. In a study reported to the New York Zoological Society, Miss Gloria Hollister describes its use in a new preservation and clearing technique which takes dark skin colors out and leaves the specimens in a state of X-ray-like transparency, with every delicate detail of bone structure visible.

The process makes it possible to study the internal structure of rare species without resorting to dissection—an important matter when there may be only one or two specimens in existence. Even fine external details, which may not be clearly distinguishable in the natural state, are brought out by a combination of the ultraviolet "clearing" process with the use of the right kind of tissue stain.

The process begins with the fixing of at least the larger specimens in 70 per cent. alcohol, to make the tissues firm. This step is frequently not necessary with smaller fish.

Then the specimen is immersed briefly in distilled water, after which it is transferred to a weak solution of potassium hydroxide. Following this, it is stained in a potash solution of alizarin dye, a red color of vegetable origin.