SCIENCE NEWS

Science Service, Washington, D. C.

INAUGURATION DAY

WHATEVER the uncertainties of Washington weather may bring Mr. Roosevelt's inauguration as president, he can look forward with reasonable assurance to January 20, 1937, for a day of settled weather. On that day, when, according to the Twentieth Amendment, future presidential inaugurations will take place, he can probably begin his second term (if the fortunes of politics so ordain) under kindlier skies than Washington usually provides around the stormy beginning of March.

An examination of Weather Bureau records for the past ten inauguration years, from Cleveland's second, in 1893, to Hoover's in 1929, shows that only one of the January twentieths in that time had any measurable snow or rain. That was the first of the series, January 20, 1893, which was a chilly, rainy day with a little snow. Contrasting with this, the March fourths during the same series provided rain or snow seven times out of ten chances. Cleveland's second inaugural took place in a snowstorm, and Taft rode to the White House through a veritable blizzard that dumped nearly ten inches of snow on the streets of the capital. The most recent inauguration day, Mr. Hoover's in 1929, brought a cold, disagreeable rain that began just before the oath of office was administered and lasted all the rest of the day.

January 20 inaugurations not only promise fairer, more settled weather, if past performance can be construed as promise, but they will probably not bring severe cold. The Weather Bureau's records for January 20 in all inauguration years from 1892 to 1929 show mean temperatures above the freezing mark on all but three of the days. Those were January 20, 1893, with 20 degrees; January 20, 1897, with 30 degrees, and January 20, 1901, with 25 degrees. The highest mean temperature of the series was January 20, 1913 (Wilson's first inaugural), with 49 degrees. Since the principal ceremonies of the inauguration usually take place during the warmest part of the day, the mean temperature can be expected to be bettered considerably in most years.

Weather probabilities for March 4, the last inauguration day under the old dispensation, are totally unpredictable as yet, according to Weather Bureau officials. During the past few weeks changes have been taking place so rapidly that not even the most tentative guess can be made of possible tendencies. It is possible to say only that the first week of March is an unsettled period, when anything may happen.

SECRETARY OF AGRICULTURE WALLACE

HENRY A. WALLACE, who is to be Secretary of Agriculture in Mr. Roosevelt's cabinet, brings to his office the combination of practical farming and equally practical science that has become a tradition of the Department of Agriculture. Born to the editorship of the great farm paper, *Wallace's Farmer*, which his grandfather had founded and his father continued, Henry Wallace was given the best training that the Iowa State College at Ames afforded. He came out with his baccalaureate in science in 1910, both a "dirt farmer" and a "dirt scientist."

Among other things, he calls himself an agronomist, which means a scientist of field crops. His outstanding agronomical work, however, has been in plant breeding, specifically in corn breeding. Before his time, Dr. George H. Shull, now at Princeton University, had applied the principles of Mendel to the production of "pure lines" in corn, isolating desirable characters in specially developed strains of plants, even though in doing so he made them unpromising runts in all other respects. Then he recombined his "pure lines" at will to build up a mosaic of characters of exactly the kind he wanted.

Dr. Shull had become interested in other plants and let his corn work drop. Henry Wallace took it up and carried it out on a much larger scale, producing numerous new strains of corn on his farms around Des Moines. The best of these high-yielding offspring of crossed "pure lines" have revolutionized corn production in the Midwest. Paul DeKruif, in his book, "Hunger Fighters," has brilliantly summarized the work of Shull and Wallace.

But corn breeding, and botany applied to the problems of the cornfield, are by no means all of Henry Wallace's scientific accomplishments. He has given much thought to the economic problems of the farmer as well, building up a considerable reputation as an agricultural economist. And since both plant breeding and economics require the expert handling of numerical data, he has become a statistician, as much at home behind a calculating machine as he is behind his editor's desk or among his experimental corn-rows.

The titles of his three published books reflect his threefold scientific interest: "Agricultural Prices," published in 1920; "Corn and Corn Growing," in 1923, and "Correlation and Machine Calculation," in 1924.

THE NEUTRON

THE neutron is not a mere close combination of electron and proton acting like a fundamental particle of a nature, but it actually is an elementary particle itself.

This is the conclusion of Dr. Franz N. D. Kurie, twenty-six-year-old research fellow in the Sloane Physics Laboratory, Yale, after experiments on atomic collisions in which neutrons take part.

When Dr. J. Chadwick, of Cambridge, England, last year discovered the neutron, it was held that it is an electrically neutral combination of the more familiar electron and proton.

By measuring the angles at which protons are ejected from nitrogen atoms, Dr. Kurie found that the neutron does not conform to the configuration described by physicists. Two views of neutrons have been held: that it is either like a dumbbell, with a positive and negative

charge separated by a small distance with their effects cancelled; or is like an onion, with a sphere of one kind of electricity surrounded by a layer of the other kind so that again the charge is cancelled.

The direction in which either of these models of the neutron would eject protons has been calculated, and it has been found that the dumbbell type should eject them all perpendicularly to its own path, while the onion type would eject some straight ahead, with about ten times as many being thrown off perpendicularly.

Dr. Kurie's experiments with neutrons did not confirm either of these theories and he believes that the neutron is not built according to either of the accepted models. He concludes that the neutron is an elementary particle possessing an individuality and discrete qualities as do the electron and proton.

Dr. Kurie performed his experiments with a Wilson cloud chamber, a device which makes visible the track of a swift-moving proton somewhat as an aviator can see the wake of a boat which is itself too small to be seen.

Of the three thousand neutrons which pour throughout the chamber each second, but which can not be seen since they do not disturb the molecules of the gas within, one neutron occasionally hits a proton, the nucleus of a nitrogen atom. This proton, carrying an electrical charge, disturbs the molecules in the chamber and leaves a track which Dr. Kurie photographed with a special camera which he perfected while obtaining his doctorate at Yale University under the direction of Professor Alois F. Kovarik. The angle at which the proton has been ejected can thus be measured since the direction in which the neutrons are moving is known.

RAT-CATCHING CATS

SELECTIVE breeding of rat-catching cats is the best way to keep down rats in the opinion of Dr. Adrian Loir, medical officer of the port of Le Havre, France.

Dr. Loir's interest in the subjects of rats and cats arises from the fact that rats may spread bubonic plague. France, like other countries, keeps hourly guard on her ports lest plague-stricken rats, with infected fleas ready to pass on this scourge to human beings, gain entrance.

Dr. Loir recently reported the success of his cat breeding to the French Academy of Medicine, the most important forum of medical science in France. He discoursed before this gathering of learned men on such an apparently frivolous topic as his cat, Poupette, and another rejoicing in the name of Lico.

Lico is a champion and is first holder for 1930 of the cup of the Rat-catching Cat Club of Normandy. The Rat-catching Cat Club was founded by Dr. Loir, with its chief object the breeding of cats with a constant and intense craving for catching rats. Not all cats chase rats. Some establish a tacit neutrality pact with rats, with whom they may be seen in some streets at night, the one ignoring the other studiously. Such is not the case with Dr. Loir's cats, however.

In one dock area in Le Havre, in 1930, where as many as 145 rats were caught in only 8 days, there are now no more rats. Five rat-catching cats, one of whom is Lico's son, patrol this area which the rats of Le Havre have learned to dread more than the plague itself.

One day Herriot, formerly Prime Minister, paid a visit to Le Havre, where he was so impressed by Dr. Loir's initiative that he begged a cat of him for the benefit of the town of which he was mayor, Lyon. It seemed that the abattoirs of Lyon were overrun by rats. It was the story of Dick Whittington all over again.

As Dr. Loir told the story, the Mayor of Le Havre was not deaf to this appeal. Le Havre was to come to the rescue of Lyon. A special credit was opened to allow the director of the abattoirs to receive Le Havre's envoy with the necessary distinction. Her name was Poupette, and the litter of kittens to which she gave birth shortly after her arrival was a practical gesture indicative of her appreciation of the hospitality she had enjoyed. On November 24, 1932, the director of the abattoirs wrote: "I wish to tell you that the abattoir of Lyon is completely rid of rodents of every size."

BACTERIA-FERMENTED BEER

BEER made by the fermentive action of a special bacterial culture instead of the customary yeast, and drunk, bacteria and all, is an excellent remedy for disorders of the digestive organs as well as a palatable drink. So states Professor Paul Lindner, of the Berlin Agricultural College, who made the discovery in the course of an endeavor to determine the identity of "soma," the sacred drink of the ancient Persians and Indians. Professor Lindner's preliminary report is given in the German scientific weekly, *Forschungen und Fortschritte.*

"Soma" had long been supposed to be merely ordinary beer, with the addition of some kind of plant, not now identifiable with any certainty. But the health-giving properties of the brew are so lauded in the ancient literature that Professor Lindner suspected that the well-being induced by it was more than the ordinary pleasant delusion of a successful Bierabend.

He had for many years been familiar with the Mexican drink "aguamiel," made from the juice of the century plant, and sometimes called "milk of the green cow" because it was drunk by the Mexicans while it was still white with its active fermentation. He had discovered that the fermentive organism in this drink is not a wild yeast but a bacterium, which he called *Termobacterium mobile,* or for convenience simply Tm. The same organism has been found in other fermented drinks produced in the tropics, and where it is present it predominates to the exclusion of yeast.

Professor Lindner suspected that it was the bacteria rather than the beverages they produced that brought about the excellent digestive and assimilative health of the drinkers. To test this theory, he centrifuged out about a tablespoonful of the organisms from some fermented liquid and swallowed them "straight." They did have a most beneficial effect.

He then undertook scientifically controlled brewing, using Tm bacteria instead of yeast. He found that the products of such fermentation were pure ethyl alcohol with a very little lactic acid, but no fusel oil, supposed to be the prime cause of the "Katzenjammer" follow-

ing indiscreet indulgence in yeast-fermented beverages. For one thing, the bacteria apparently can not ferment malt sugar, but only glucose, and hence produce a beer of quite low alcoholic content, but high food value.

He induced a commercial brewery in Sweden and one in Vienna to produce bacteria-fermented beer on a moderately large scale, and with the cooperation of Dr. Leo Kaps, of the Wilhelmina Hospital in Vienna, tried it on a large number of patients. When given with the bacterial cloudiness still in it, the beer induced excellent conditions in the digestive tract. The same beer filtered, however, was merely an agreeable drink and had no therapeutic value.

ENERGY FROM COAL, OIL AND GAS

OIL and gas will have increasing use as energy sources in the United States and by 1950 they will account for nearly half of the expanded fuel requirements of the nation.

A forecast of the relationship between coal and petroleum in the future and a survey of future energy requirements was presented to the American Institute of Mining and Metallurgical Engineers meeting in New York by Professor W. Spencer Hutchinson, of the Massachusetts Institute of Technology, and August J. Breitenstein, Ashland, Pennsylvania, engineer.

In 1950 it is estimated that 499,500,000 tons of coal will be used, compared with 517,018,000 tons in 1930. The situation is reversed for petroleum, with 1,419,000,000 barrel consumption predicted for 1950 and 868,484,000 barrels consumed in 1930.

Total energy *per capita* demanded in the United States shows a consistent growth, the engineers were told, and it increased at a faster rate than the population. Chief sources of energy to-day are the mineral fuels, coal and petroleum, which between them account for more than 90 per cent. of the demand, with water-power supplying only 10 per cent.

A marked change has occurred in the relative proportion of energy obtained from coal and oil. Only 30 years ago 91 per cent. of the country's horsepower came from coal, and only 4 per cent. from oil and natural gas, but in 1930, horsepower from coal had dropped to 60 per cent. while the proportion furnished by oil and gas had risen to 31 per cent. By 1950 it is estimated that coal would furnish only 46 per cent. of the country's power, while 45 per cent. would come from oil and gas, and 8 per cent. from waterpower.

Consumption of coal in this country reached its zenith in 1917, with 6.08 tons *per capita*. From this year the decline was rapid. It was only 4.2 tons in 1930.

Other findings of the study by Professor Hutchinson and Mr. Breitenstein are:

Whereas, in 1930, the effective energy supply in the United States, expressed in trillions of British Thermal Units, was 9,031, it will have risen to 14,500 by 1950.

In 1930, the energy supply *per capita*, expressed in millions of British Thermal Units, was 73, while in 1950, it is expected to be 94.

Whereas, bituminous and anthracite coal accounted for 60.3 per cent. of the total energy derived in 1930, it will account for only 46.6 per cent. in 1950.

Petroleum and its natural products, including also natural gas and natural gas gasoline, will show a marked rise. Accounting for only 31.6 per cent. of the total energy derived in 1930, they will account for 45.3 per cent. in 1950.

Waterpower will account for exactly the same percentage of the total energy derived in 1950 as in 1930, namely, 8.1, although the energy applied by hydropower will be greater than in 1930.

ITEMS

THE earthquake that caused excitement and alarm in Peru on February 23 had its epicenter near the western boundary of Bolivia, according to a report of investigators for the U. S. Coast and Geodetic Survey made after examining seismological data telegraphically collected by *Science Service* from a number of American and Canadian observatories. The approximate location was given as 19 degrees south latitude, 68 degrees west longitude. Since the reports indicated a violent earthquake, destruction of property and loss of life may have occurred in case the epicenter happened to coincide with a populated region. Direct reports may not come out immediately, due to the lack of telegraph lines and other means of communication in the interior.

PELTIER'S comet, discovered by an Ohio amateur astronomer, will not become visible to the unaided eye. A parabolic orbit solution made at the University of California by Anderson and Wyse under the direction of Professor A. O. Leuschner shows that the comet approached closest to the earth on February 25 and that it was then only slightly brighter than when discovered. Its brightness will now decrease. The comet's orbit resembles that of certain other comets, but not closely enough to identify it as an old comet paying a return visit. The comet is ninth magnitude in brightness and it has a slight condensation but no stellar nucleus.

A NEW national monument has been set apart on the Grand Canyon of Arizona, about fifty miles down-river from the point in Grand Canyon National Park now most visited by tourists. The new area, which will be known as Grand Canyon National Monument, comprises a total of 392 square miles, and has one magnificent vantage-point from which one can look down on the Colorado, winding its way at the bottom like a silvery ribbon. From most points on the rim in the present Grand Canyon National Park the river is quite invisible. Another feature of the new National Monument is a volcanic cone, thrown up in some long-past time and now wholly extinct. It bears the imposing name of "Vulcan's Throne." National Monuments, as distinguished from National Parks, are areas which are either less accessible to the public or for one reason or another are not suitable for immediate development and administration on the regular National Park scale.