

Sap rises in plants not as liquid columns filling the entire cavities of the conducting vessels but as films clinging to their walls, with water vapor filling the cavities, Prof. George J. Peirce, Stanford University, declared.

Detached root tips continued growth indefinitely in an artificial culture medium at the Rockefeller Institute for Medical Research, New York City, under the care of Dr. P. R. White.

A drought of unprecedented severity caused great losses to American agriculture and stock-raising, and also brought about a notable increase in the number of forest fires.

A new and highly menacing outbreak of the Dutch elm disease occurred in the region around New York harbor.

Chinch bugs and grasshoppers caused great damage to grain crops in the Western drought area.

Fungi in their wooden food appear to be necessary to termites, Dr. Esther C. Hendee, University of California, discovered.

A far-reaching program of game restoration through the purchase of submarginal lands and their management for game production was worked out by a committee appointed by Secretary of Agriculture Wallace.

Rabbit ova, fertilized outside the mother's body with sperm from a male, then implanted into a second female rabbit, developed as normal embryos and were born normally, in two experiments performed at Harvard by Prof. Gregory Pincus and E. V. Enzmann.

Turtles' hearts, frozen in liquid air, resumed beating, in the laboratory of E. A. Wolfe and R. A. Torgeson at the University of Pittsburgh.

Carotene, yellow coloring matter in plants that is the raw material for vitamin A, was discovered to be abundant in bacteria, by M. A. Ingraham and C. A. Baumann of the University of Wisconsin.

Chemistry

Triple weight hydrogen, three times as heavy per atom as the ordinary kind, was discovered at Cambridge's Cavendish Laboratory by Lord Rutherford, and Drs. M. L. Oliphant and P. Harteck; at Carnegie Institution's Department of Terrestrial Magnetism by Dr. M. A. Tuve, L. R. Hafstad and Odd Dahl; at Princeton University by Drs. Gaylord P. Harnwell, Henry D. Smyth, Walker Bleakney and Philip T. Smith.

Existence of helium of atomic mass three instead of four was reported by Dr. P. I. Dee of Cavendish Laboratory of Cambridge University.

Age-long impact of cosmic rays on the earth's surface caused the formation of the rocklike material of the crust out of the nickel-iron core, is the suggestion of Prof. Gilbert N. Lewis of the University of California.

A new chemical indicator called "nitrazine yellow" for telling the difference between acid and base solutions at low concentrations was developed by Dr. Henry Wenker.

Protactinium, after uranium the heaviest of all elements in atomic weight, was successfully isolated independently in the United States by Dr. Aristid Von Grosse, University of Chicago, and in Berlin by Drs. Georg Graue and Hans Kading, Kaiser Wilhelm Institute.

The atomic weight of protactinium was



FREAK FOWL

Nearly, though not quite wingless, and thus unlike the famous Plymouth Rock rooster from Kentucky now the subject of scientific experiments at Princeton (S.N.L., Oct. 13, 1934, page 234) the strange bird shown here adds abnormal body posture to his other peculiarities. Unlike the wingless rooster also in his choice of careers, he has taken to the road-show circuit instead of the quiet of scholarly cloisters. His owner, a former East St. Louis, Ill., man, is exhibiting his pet as a side-show freak.

measured as 231 times that of hydrogen by Dr. Aristid Von Grosse and M. S. Agruss of the University of Chicago.

Prof. Enrico Fermi, Italian physicist, reported the production of new material by bombarding uranium, present heavy-weight champion, with neutrons, but later found that what he had mistaken for element No. 93, was really a new form of actinium of atomic number 91.

Propane, a normal constituent of liquefied natural gas, can extract a considerable portion of the so-called Pennsylvania type of ingredient of lubricating oil, making a superior oil out of supposedly inferior western oils, Dr. Ulric B. Bray of Los Angeles found.

Specially prepared calcium sulfate or gypsum, called soluble anhydrite, was developed as a drying agent by Prof. W. A. Hammond, of Antioch College, and Prof. J. R. Winthrow of Ohio State University, useful in dehydrating alcohol and other chemicals.

Isolation in pure crystalline form of a new, very reactive substance, gamma methyl fructose, from fructose, the sugar of fruits, by Dr. Claude S. Hudson, U. S. National Institute of Health, called in question current chemical views as to the composition of sucrose, the common sugar of commerce.

Citric acid, which makes lemons sour, was extracted commercially from the cheapest kinds of Russian tobacco by Soviet chemists.

A rival for transparent cellulose wrapping material called Pliofilm was made synthetically from rubber which is moisture-proof,

elastic and easily sealed by slight heat and pressure.

A new antiseptic, azochloramid, soluble in water and not easily destroyed by heat, was reported to the American Chemical Society by Dr. Franz C. Schmelkes and Henry C. Marks.

Commercial extraction of bromine from sea water was achieved at the Wilmington, N. C., plant of the Dow Chemical Co., by a method which may have also, as a by-product, the extraction of gold from the water.

Various chemicals which stepped out of the "rarity" class into commercial production by carload lots during 1934 include: 1. Acetamide, valuable chemical solvent; 2. Diphenyl oxide, a fluid with high boiling point and chemical stability useful as a heat transfer agent between boiler furnace and high pressure steam in high temperature boilers, which allows cheaper boiler construction; 3. Boron carbide, industrial abrasive approaching the diamond in hardness, which is made from coke and boron in electric furnaces.

A new method of chemical separation of artificial radioactive isotopes from the parent substance was developed by Drs. Leo Szilard and T. A. Chalmers of St. Bartholomew's Hospital, London, which, for the case of iodine, involves the use of pure iodine vapor to prevent radioactive iodine atoms, formed by the bombardment of ethyle iodide, from returning to the target. The method appears useful for the concentration of man-made radioactive products of atomic numbers higher than 30.

Engineering

The giant Cunard-White Star liner, the 543, 1018 feet long and with expected speed of 33 knots, was launched and christened the "Queen Mary" by Queen Mary herself.

New record for North Atlantic crossing by steamship was made on Nov. 5 to 9 by the North German Lloyd liner Bremen, which went from Cherbourg to Ambrose Light off New York in 4 days, 14 hours and 27 minutes.

A new type of direction finder for ships incorporating a cathode ray oscillograph was devised by L. H. Bainbridge Bell and the British Government Radio Research Station.

Streamlined, high-speed trains planned and started in 1933 were completed and a record was made by the Union Pacific's M-10001 in a trans-continental journey from Los Angeles to New York City in 56 hours and 55 minutes.

While the new streamlined trains were breaking speed records throughout the country the regular steam train of the Chicago, Milwaukee, St. Paul and Pacific Railroad streaked between Chicago and Milwaukee at the average speed of 90.6 miles an hour for the 69 miles, attaining top speeds of 103 miles an hour.

Construction was begun on a new tunnel beneath Hudson River in New York City off West 39th street which will duplicate present Holland tunnel through which more than 75,000,000 vehicles have passed.

Queensway, largest and longest vehicular tunnel in the world, was opened between Liverpool and Birkenhead in England.

New railroad tunnels include: eleven and a third mile long Apennine tunnel of the Italian State Railways, and the Moffat tunnel of the Great Northern Railroad across the Continental Divide, (*Turn to Page 394*)