SCIENCE NEWS

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SOME ADVANCES IN THE SCIENCES DURING 1934

Medicine

A SERUM, believed to be the first, that counteracts the effect of the often fatal bite of the black widow spider was perfected by Dr. Fred D'Amour, University of Denver professor.

New knowledge of how pancreatic enzymes of ferments become active was obtained with the extraction of a new and potent protein-digesting enzyme, chymotrypsin, and a new protein, chymo-trypsinogen, by Drs. M. Kunitz and J. H. Northrop, Rockefeller Institute laboratories at Princeton, N. J.

The outbreak of amebic dysentery, starting in Chicago during the fall of 1933, was found by the Chicago City Health Department to be caused by sewage contamination of the water supply of two Chicago hotels.

The cysts which transmit amebic dysentery can be filtered out of water by the usual filtration methods used to purify water supplies, Dr. Bertha Kaplan Spector, U. S. Public Health Service, and John R. Bayliss and Oscar Guillins, chemists of the Chicago Department of Public Works, found in experiments at the Chicago Experimental Filtration Plant.

Complete degeneration of myelin sheath segments of the nerves resulting from strong alcoholic intoxication is permanent, but the slight irritative changes from mild daily intoxication are quickly repaired, Dr. C. C. Speidel, University of Virginia Medical School, learned from observation of frog tadpoles.

A new precise method for destroying successive layers of nerve cells from the brain cortex, thus greatly facilitating the study of localization of functions, was announced by Dr. J. G. Dusser de Barenne, Yale School of Medicine.

Alcoholic neuritis, serious nervous disease resulting in paralysis and often death, is due to lack of food and not to the poisonous effect of the alcohol on the peripheral nerves of the body, Dr. Maurice B. Strauss, Thorndike Memorial Laboratory, Boston, reported.

Scurvy-preventing vitamin C is manufactured in the body of infants up to the age of five months, Paul Rohmar, N. Bezsonoff and Ursula Sanders, of the medical faculty of the University of Strasbourg, reported.

Spectrum analysis of vitamin E, which makes possible the identification of this food factor by physical measurement as well as by feeding experiments with animals, was accomplished for the first time by Drs. A. J. P. Martin, T. Moore, Marion Schmidt and F. P. Bowden, Dunn Nutritional Laboratory, University of Cambridge, England.

A new rickets-preventive was found in cholesterilene sulfonic acid, chemical relative of vitamin D, Professor Lester Yoder, Iowa State College and Iowa Agricultural Experiment Station, announced.

A dietary factor which can prevent hemorrhage in chicks and may be a new, hitherto unknown vitamin was found in seeds and cereals by H. Dam of the Biochemical Institute, University, Copenhagen.

Tetany, severe nervous and muscular disease featured by painful muscular cramps and not to be confused with tetanus or lockjaw, can be cured or greatly relieved by treatment with "A.T. 10," a chemical fraction of irradiated ergosterol or vitamin D, Dr. I. Snapper, professor of medicine and general pathology, University of Amsterdam, reported.

A thermocouple that gives the temperature of air deep in the lungs by measuring the temperature of each breath was devised by Dr. Francis G. Benedict, director of the Boston nutrition laboratory of the Carnegie Institution.

Verification of the fact that the blindness-causing form of the tropical disease, onchocerciasis, is widespread in the Belgian Congo and that about one third of the wild-flies, regarded as chief carriers of the malady, are infected with the disease, was made by a Harvard University expedition under the direction of Dr. Richard P. Strong.

Azochloramide, new germicide and disinfectant that kills bacteria without injuring living tissues and does not break down in the presence of organic matter, was announced by Dr. Franz C. Schmelkes and associates of Wallace and Tiernan Research Laboratories, Belleville, N. J.

Psychology and Psychiatry

Learning of the simple type known as "conditioned reflex" may take place when the brain cortex is completely missing, but a form of conditioning involving adaptation was found to depend upon functioning of the cortex in dog experiments by Dr. Elmer Culler, of the University of Illinois.

The association area of the frontal lobes of the brain is essential to memory of the immediate past, or ability to keep in mind several aspects of a problem while seeking the solution, it was learned from experiments with apes and monkeys performed by Drs. C. F. Jacobsen and J. B. Wolfe, Laboratories of Comparative Psychobiology, Yale University.

High frequency radio currents were used by Dr. Clarence W. Brown, of the University of California, to block out certain nervous centers of the brain for study of their functions without pain or injury to the animal involved and without affecting the higher cortical centers of its brain.

The successful planting of small coils beneath the skin on the heads of dogs, with direct connection to the brain, made possible, by means of induced currents, the study of special functions of brain areas without pain or injury to the animals, is reported by Dr. Roger B. Loucks, Phipps Psychiatric Clinic, Johns Hopkins University.

Dr. Donald G. Marquis, of Yale University, found that complete loss of the occipital lobes of the brain does not prevent dogs from learning to respond to a signal of

light, although without this "visual" area the animals are unable to see objects or forms.

Salt is not a taste, but is discerned by a skin mechanism, is the conclusion of Dr. Samuel Renshaw, of the Ohio State University, who found that salt, unlike tastes, is more noticeable at body temperatures than hot and can be "tasted" on lips and gums where no taste organs are present.

Temperature is perceived not through a special skin mechanism, but through the dilation and contraction of the blood vessels, according to Dr. John P. Nafe, of Washington University, St. Louis.

An unusual case of visual defect in which the victim could not distinguish objects but saw them blurred together into one and which was cured by training in an analytical attitude was reported by Dr. D. M. Purdy, University of Kansas.

The theory that a different process makes possible the hearing of high and of low frequencies was corroborated by experiments showing that fatigue of the ear produced by a high tone affects hearing of high tones more than hearing of low tones, is reported by Dr. Clifford Pearce, Brown University.

Changing the volume of a sound changes its apparent pitch, and the apparent volume is likewise dependent upon pitch, was found independently by Dr. S. S. Stevens, of Harvard University, and Dr. Harvey Fletcher, of the Bell Telephone Laboratories.

A clue to fundamental differences in physiological brain conditions underlying mental deficiency was found by Dr. George Kreezer, Vineland Training School, in the way in which the muscles of idiots respond to mild electric currents, their reaction resembling that of an animal with injury to higher brain centers, or that of an undeveloped fetus.

The intelligence quotients of exceptionally bright children decrease as they grow older and girls lose more than do boys, has been found by Professor Edward A. Lincoln, of the Harvard Graduate School of Education.

Samuel D. Robbins, director, Boston Stammerers' Institute, believes that intelligent children who are delayed in learning to talk are often sufferers from a short auditory memory span and should be taught only words containing very few sounds.

Diabetic children taking insulin treatment are normal in intelligence was found by Dr. Howard West, Amytis Richey, and Mary B. Eyre, Claremont Colleges.

No matter how well a skill, such as piano playing is learned, the more making of one movement is not sufficient to call forth the next and neither does consciousness of what you are doing lapse after learning, was found experimentally by Dr. Walter S. Hunter, Clark University.

A comprehensive photographic atlas of infant development was completed by Dr. Arnold Gesell, assisted by Drs. Helen Thompson, Catherine S. Amatruda, Jessie J. Carlson, Alice V. Keliher and Frances L. Ilg, all of the Clinic of Child Development, Yale University.

Athletic and mental training beginning at the age of twenty days for one of twins and at 22 months for the other, demonstrates that critical periods exist when certain types of skill or knowledge can best be learned, is the conclusion of Dr. Myrtle B. McGraw, Babies Hospital, New York.

Engineering

The giant Cunard-White Star liner, the 543, 1,018 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 November 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, of 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 Milwaukeee 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 the present Holland tunnel through which more than 75,000,000 vehicles have passed.

Queensway, the 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 putting Denver, Colorado, on a main transcontinental line.

All-time construction record for pouring concrete was established at Boulder Dam when 10,462 yards of "liquid stone" was placed in one day.

Six new bridges of major importance were under construction in the United States, including Golden Gate and Oakland bridges both at San Francisco; a bridge across the Mississippi River at New Orleans, and Astoria bridge on the Columbia River, and the bridge across Narragansett Bay and Tri-Borough Bridge, Manhattan.

The world's largest camera, 31 feet long and weighing 14 tons, was placed in operation by the U. S. Coast and Geodetic Survey for copying nautical and aeronautical charts.

The shoal water fathometer, an improved "echometer," which will measure ocean depths less than 120 feet with an accuracy within one inch, was developed by the U. S. Coast and Geodetic Survey.

By use of short-wave radio telephone the United States and Japan were linked in direct voice communication between any telephone in either country.

Radio waves of half inch length, the shortest produced by radio tubes up to that time, were used by Drs. C. E. Cleeton and N. H. Williams, of the University of Michigan, to measure the ammonia molecule.

Marchese Guglielmo Marconi, "father of wireless," invented a new type of radio beacon, using microradio waves only a few centimeters in length, for the navigation of fog-bound harbors.

A system of radio facsimile transmission of photographs which uses a stylus and carbon paper to receive and record the wireless-sent picture, in a few minutes instead of an hour, was developed by engineers of the R. C. A.-Victor Company.

A stringless piano, producing tones by electrical vibration and amplification of short steel slivers, was produced commercially.

Electric incandescent lamps, containing two filaments, which may be used either singly or in combination, were made available commercially.

An improved high-speed flashing 1,000-watt light for use in searchlight signalling contains hydrogen and makes it possible to send dot and dash messages twice as rapidly with half the number of errors.

A new stress recorder apparatus for use on engineering models subjected to artificial earthquakes was developed by A. C. Ruge, of the Massachusetts Institute of Technology.

An electrical apparatus that has persistence of vision, is sensitive to ultra-violet and infra-red radiation and allows electrical magnification of an image, was developed by Dr. V. K. Zworykin, R. C. A.-Victor Company engineer.

Georges Claude, French inventor, sailed for the Brazilian coast with a ship adapted for ice-making which gets its power by utilizing the difference in temperature of the surface and bottom water in tropical oceans.

All-metal radio tubes, rugged and durable, were commercially available for the first time in 1934.

"Peanut" tubes, hardly larger than a shoe button, opened new possibilities for the development of pocket radio sets for broadcast listeners.

Short-range, short-wave radio receivers by which laymen can converse over a distance of 12 miles, were made available.

Facsimile transmission of pictures, text and engraving by radio and wires reached commercial realization in newspaper offices.

A coaxial conductor, or concentric circuit, has been developed by the Bell Telephone Laboratories, which will transmit a band of frequencies one or two million cycles wide and can provide either for the multi-channel transmission of about 200 telephone messages or for wire transmission of television.

A method for dissipating fog was demonstrated at South Dartmouth, Mass., by H. G. Houghton, of the research staff of the Massachusetts Institute of Technology.

The $100,000,000 Hetch Hetchy aqueduct supplying San Francisco with water was dedicated.

The world's largest ship elevator taking vessels of 1,000 tons was completed at Neiderfinow in Germany on the canal linking Berlin with the Baltic Sea.

The tremendous increase in gold mining during 1934 led to the introduction of the flotation method in treating gold-bearing ores.

The deepest oil well in the world was drilled in California reaching a depth of 11,000 feet.

Construction was begun on the Fort Peck Dam on the upper Missouri River. Its 100,000,000 cubic yards of earth will make it the largest dam of its type when finished.

Dr. Charles H. Herty and Morris R. Poucher developed a process for making rayon from Southern slash pine based on their previous work in making newsprint from the same source.

Increased adoption of dieselectric engines for power in high-speed light-weight trains occurred within the year 1934.

A special camera was developed which makes it possible to take detail pictures showing the characteristics of lightning and thus show the method of formation of the stroke, the rate of propagation and the number of multiple strokes in a single lightning flash.

A 400,000-volt x-ray tube was developed which is not dependent on a vacuum pumping system for operation. This raises by 100,000 volts the range of industrial radiography where vacuum systems can not be tolerated as a part of the x-ray equipment.

Aeronautics

Despite the accident in the ascension of the Army Air Corps-National Geographic Society's balloon, the *Explorer,* in its stratosphere flight, Captain A. W. Stevens, Major William Kepner and Captain Orvil Anderson brought back valuable information about the upper air including: temperature and barometric data from the ground to the 60,613-foot altitude reached; records of sky brightness at various heights; data on cosmic rays; in addition to contributing materially to the technique of handling large balloons.

Examination of the fabric of the ill-fated balloon, *Explorer,* used in the National Geographic Society-Army Air Corps' stratosphere flights disclosed that the cause of the disaster rip could be attributed to the new way of folding part of the bag inside the envelope with accompanying sticking-together of the rubber-coated material.

Professor and Mrs. Jean Piccard, stratosphere balloonists, reached altitude of 57,579 feet in an ascension which obtained valuable cosmic ray data for Professor W. F. G. Swann, of the Bartol Research Foundation.

Two fully automatic variable pitch propellers, one a constant thrust propeller built by the Eclipse Aviation Corporation, and the other a constant pitch propeller, announced by the Hamilton-Standard Propeller Company, will further increase efficiency and safety in flying.

Commendable performance by many wingless autogyros, such as those of Rohrbach, Strandgen, Platt and Chapedelaine, foretells increased use for this form of air transport.

Autogyros and gyroplanes, machines supported by a supplementary rotor from power derived from the motion of the propeller, will be superior to conventional aircraft as soon as their possibilities for high speed are developed, is predicted by John B. Wheatley, National Advisory Committee for Aeronautics.