SCIENCE NEWS

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THE CARNEGIE INSTITUTION EXHIBITION

NEW developments in scientific fields were shown to the Board of Trustees of the Carnegie Institution of Washington at its meeting on December 13 in review of the year's work of some 400 staff members and research associates in laboratories and observatories scattered at strategic points throughout the world. A three-day exhibition was also open to the public at the Washington headquarters.

Mathematical estimates of the racing capacities of thoroughbred colts yet unborn have been worked out by Dr. Harry H. Laughlin, of the Eugenics Record Office at Cold Spring Harbor, N. Y. Dr. Laughlin's formulae take into account past performances of all notable racehorses in any given animal's pedigree, and although they can not be used for setting the odds in any particular race, they will give the owner an idea of what he can expect of his foal in the long run. Dr. Laughlin has worked out an ideal "synthetic" horse, which has not yet been realized in the flesh, although it might be possible to approach him, given proper breeding opportunities.

Samples of sea-bottom rocks can be obtained by a kind of short cannon that is lowered on a cable, to fire a hollow projectile against the floor with a charge of powder. The hollow shell punches out a piece of the bottom just as a watermelon "plugger" takes a sample of the melon. The sample of rock can then be hauled to the surface for study and preservation. In the development of this apparatus, the Geophysical Laboratory of the Carnegie Institution and the Geological Society of America worked in cooperation, with assistance also from the Du Pont Powder Company and the U. S. Lighthouse Service.

From the laboratories of embryology in Baltimore came a stage in the development of the monkey that has never been seen before. It is the living organism at the point where it is simply a hollow ball of cells filled with fluid, resulting from the original fertilized egg. At the stage shown, it is just ready to become attached to the maternal tissues, to begin its slow development leading to birth.

Folsom Man, whom archeologists recognize as the earliest known American, but whom they have perforce left vaguely "in the air" as to date, is at last restored to a time in American prehistory. Edgar B. Howard, who has made studies at Clovis, New Mexico, exhibited evidence that Folsom Man was present in America about 10,000 B. C. This is the age assigned on geological evidence to a lake bed at Clovis where some of Folsom Man's distinctive grooved stone spear-points were lost. Mr. Howard also reports that America's oldest hunters, these Folsom Men, used unique stone weapons. Their grooved darts, thin and leaf-shaped, are not matched by any Stone Age weapons found elsewhere in the world.

Electrical tides in the earth—great surges of electric current intimately tied up with the Northern Lights and magnetic disturbances—were demonstrated in a working exhibit by the department of Terrestrial Magnetism. The earth currents affect compass needles and telegraph communication; the latter, in fact, was the means of discovering the currents in 1844.

Experimental studies in the Geophysical Laboratory on the actions of solutions under pressures as high as 180,000 pounds to the square inch, are disclosing new facts on such different things as the air man breathes, the human blood, beverages of all kinds, oil, gasoline, glass and the lavas flowing from volcanoes. All these are solutions having common broad problems.

OBSOLETE NAVY MAGNET FOR RESEARCH AT COLUMBIA UNIVERSITY

THE giant, and now-obsolete electromagnet of the Navy's radio station at Annapolis is to be shipped to Columbia University where scientists will turn it into one of the most powerful tools in the world for smashing atoms and learning new facts about atomic nuclei.

Built for wartime use, the 130,000-pound electrical giant now lies dismantled in a field. On December 14 a fleet of trucks was expected to take the sections to Columbia's physics department where a special submerged concrete bed—jokingly called the wading pool from its appearance—already awaits its coming.

So large are the various sections of the equipment that a special sloping trench has been dug down which the apparatus can be skidded into its basement laboratory. When assembled it will stand ten feet high.

Across the large pole pieces—forty inches in diameter—it will be possible to create intense magnetic fields tens of thousands of times stronger than those of the earth which keep compasses pointing to the north. In technical terms the magnet will have a magnetic field strength of from 10,000 to 12,000 gauss.

For science the renaissance of the Navy's electromagnet will bring into use another apparatus for possible experiments on atomic transmutation, artificial radioactivity and studies on the happenings within the cores, or nuclei, of atoms when they are bombarded with other atomic particles accelerated to high energy in the device.

Pioneer equipment in the field is the apparatus of Professor E. O. Lawrence, of the University of California, which still holds the record for size, weighing 85 tons and having pole pieces with an effective diameter of 45 inches.

The California apparatus has as its essential part another wartime electromagnet built for, but never shipped to, one of the now-defunct Chinese governments. At the time of the war such huge electromagnets were planned and built for Poulsen quenched arc wireless telegraph transmitters, the latest development at that time.

The advent of vacuum radio tubes has now rendered this type of equipment generally obsolete for radio communication, though the arc transmitter built for Columbia's new magnet was so good that it was in full use at

the Annapolis 500,000 watt high-power station until 1934. Its use was mainly for general broadcast messages to Navy ships and stations throughout the world and some point to point communication. A new vacuum tube transmitter of the same 500,000 watt power is now being installed to take its place.

The imminent shipment to New York of the 65-ton electromagnet from the Navy's radio station at Annapolis was confirmed by Dr. George B. Pegram, professor of physics at Columbia University, who said: "The large atomic particle accelerator which we plan to build from the Navy equipment operates on the scientific principles used in the cyclotron apparatus as designed and employed by Professor E. O. Lawrence at the University of California.

"Essentially, charged particles, either protons, the nuclei of hydrogen atoms, or deuterons, nuclei of the isotopic heavy form of hydrogen known as deuterium, are introduced into the cyclotron apparatus.

"Once inside the accelerating chamber, which looks like a large covered frying pan, they are bent by the strong magnetic field existing across the pole pieces of the large electromagnet. Under the action of the magnetic field they travel round and round in a circular, or strictly, a spiral path.

"Twice each trip around the circuit the charged particles are speeded up by several thousand volts potential provided and properly timed by auxiliary electrical equipment. These individual increases of velocity—often called electrical 'kicks'—ultimately raise the total energy of the whirling particles to very large values.

"In a few seconds and a few hundred trips around the circuit of Professor Lawrence's apparatus, for example, the velocity and kinetic energy of the charged particles can be increased to several millions of electron volts."

HIGH PRESSURES USED BY CHEMICAL INDUSTRY

How man has succeeded in producing synthetic nitrogen compounds and synthetic alcohols at low cost and in sufficient quantity to supply the world's needs was described at a meeting of the Franklin Institute, Philadelphia, by F. A. Wardenburg, general manager of the Ammonia Department, du Pont Company, Wilmington, Del.

High-pressure synthesis is the technique by which these results have been accomplished. Mr. Wardenburg said that pressures as high as 15,000 pounds a square inch are employed, such a pressure being equivalent to a column of water thirty times as high as the Empire State Building. At this pressure the gaseous raw materials used in the process have a density about one-third that of water, whereas ordinarily the same gases are much lighter than air.

Most of the high-pressure synthesis plants here and abroad are designed to "fix" atmospheric nitrogen in the form of ammonia, which in turn can be converted to nitric acid and nitrates, materials essential to peace-time industry and agriculture as well as to national defense. During the peak year of the World War, Mr. Wardenburg pointed out, when practically all of the explosives required by the allies were made in America, no less than fifty ships were required to transport nitrate of soda from Chile to Atlantic ports. In the event of another similar emergency, the country would be entirely independent of Chile.

Of further significance is the fact that through the new high-pressure synthesis technique, cheaper nitrogen fertilizers have been made available throughout the world. Also, by a similar technique, gases can be combined to produce alcohols and other chemicals at a cost far below that achieved previously.

QUARANTINE FOR MENINGITIS

HEALTH authorities in Washington are surprised at reports that thirty thousand inhabitants of Kiowa County, Okla., are under quarantine to prevent the spread of meningitis. Quarantine of this sort is considered impractical, if not absurd. The only measures recommended for checking the spread of the disease are isolation of the patient and disinfection of his bedding, clothes, and any mouth and nose discharge, and avoidance of crowds.

The reported regulation preventing persons from leaving the county without showing a negative test for the disease is held particularly impractical. The only way to determine the presence or absence of the meningitis "germ" is by examination of the fluid from the spinal cord, which is obtained by spinal puncture, a painful and difficult surgical procedure. During the World War attempts were made to check the spread of meningitis by quarantining all healthy carriers of the disease, but this was found to be not only impractical but impossible.

For the week ending December 7, latest on which figures are available, no cases of the disease were reported by the Oklahoma State Health Officer to the U. S. Public Health Service. The federal health service has wired the state health officer for information on the present outbreak, which is said to have started in a CCC camp at Purcell.

Early in the year outbreaks of meningitis in transient camps and shelters caused some alarm in the neighborhood of these camps. Public Health officials declared at that time that the disease was not likely to spread from such camps to the rest of the population. Crowded living conditions, such as may exist in tenements, in barracks and in the steerage of ships, are particularly favorable to the development of epidemics of meningitis.

Meningitis is an inflammation of the membranes covering the brain and spinal cord and in epidemic meningitis this inflammation is caused by a "germ" called the meningococcus. The disease usually starts suddenly with severe headache and fever. A serum has been developed which has been partially successful in treating the disease.

MOVIES OF PLANTS

PLANTS moving with rhythmic grace as though in an esthetic dance, plants getting "drunk" on a whiff of poisonous carbon monoxide, featured a botanical movie show put on at a meeting of the New York Academy of Sciences on December 15, by Dr. William Crocker, of the

Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

In the "Dance of Life" pictures, the plants, being rooted, perforce emulated some of the modernist human dancers, who "move everything but the feet." They swayed and undulated from side to side, slowly raised their leaves in unison, like arms, and slowly lowered them again. Tips of twining plants circled like the heads of snakes. Roots "wormed" through the earth.

It was all done by the opposite of the process used in making slow-motion movies. In taking slow-motion pictures, the camera is run at greatly increased speed while taking, and the finished films projected at ordinary speed, thereby greatly slowing down the apparent rate of motion. In the films shown by Dr. Crocker, the "time-lapse" process was used. In this, the camera is set up in front of the plant and the motor-operated shutter is set for exposures at intervals of several minutes, hours or even days. In this way the plant's motions, imperceptible to the eye, are "condensed," and become evident when the film is projected at normal speed. The hundred days of a corn plant's life can be packed into five minutes of projection.

The graceful, sinuous "dance" of a growing plant is due to the fact that not all its cells expand at the same rate. Consequently, one side of the stem or leaf, or other organ is always growing a little faster than the other, and pushes the tip in the opposite direction. Then the other side grows faster for a while, and the plant sways the other way.

Plants were shown getting "soused" on two different gases, ethylene and carbon monoxide. The first gas, which has been much used for producing ripe color on fruits, stimulating seeds and cuttings to grow, etc., affects plants in very low concentrations. When used as a mixture of one part in a half-million of air, its first effect was stimulating. The growing tissues on the upper sides of tomato and sunflower leaf-stems grew faster, causing the leaves to turn downward. The youngest leaves were most sensitive, but soon the mature leaves "noticed" it also. Restored to clean air, the plants recovered and the leaves returned to position, though the older ones could not quite get back to normal.

Mimosas, or sensitive plants which can fold down their leaves when touched or otherwise stimulated, got so drunk on carbon monozide that they would not react, even to heat. They were like intoxicated persons who can be burned without noticing it. Yet their recovery by the morning after was complete, with no noticeable hangover.

ITEMS

THE trumpeter swan, among the rarest of American wildlife species, was down to about ten pairs, because of illegal shooting and lack of protection, when the Interior Department called attention to its perilous state, Secretary Ickes states in his annual report. Thereupon the Biological Survey set aside their one known nesting area as a migratory wildfowl refuge. It is estimated that a total of more than eighty birds will come through the present winter.

TOBACCO plants as tall as trees are among the strange vegetation of the lower Andean country now being investigated by an expedition from the University of California, under Professor T. H. Goodspeed. One of the tremendous tobacco growths measured by Professor Goodspeed was sixty feet high. The expedition is engaged primarily in a search for wild relatives of the common cultivated tobaccos, to be used in hybridization experiments. Seeds of many other kinds of plants, however, are being collected.

NEANDERTHALERS lived in Italy as well as elsewhere in Europe during the early days of the Old Stone Age. This is confirmed by the discovery of a second Neanderthal skull at Saccopastore, in the Tiber Valley. A Neanderthal skull was found in Italy several years ago, but since it was the only one known it might have been a "stray." The discovery of this second skull, in the same geological formation and accompanied by the bones of animals used for food, is regarded as strong evidence that Italy once had its population of Neanderthalers. Dr. Blanc, of the Geological Institute of Pisa, and the Abbé Henri Bréuil, of the Paleontological Institute of Paris, reported the find.

THE annual report of the Secretary of the Interior states that Boulder Dam, completed during 1935, has already prevented one menacing flood in the Imperial Valley of California. Shortly after the gates of the dam were closed a flood level flow of 105,000 cubic feet per second of water raged in the Colorado above the dam. Had this water passed on, the Imperial Valley would have been menaced. Instead, the waters began filling up the 115-mile-long lake and reservoir above the dam which has already been set aside as a bird refuge and stocked with game fish. Boulder Dam will make impossible a repetition of the 1934 disastrous drought in the Imperial Valley which cost the region over $10,000,000, adds the report.

CENTRALIZATION is the order of the day in the activities of the Academy of Sciences of the USSR. The academy's principal activities, formerly divided between the one-time capital at Leningrad and the present capital at Moscow, have been concentrated at Moscow; and in addition, in several instances bureaus once separate have been consolidated. Outstanding is the establishment of an Institute for Physical Studies, under the directorship of Dr. P. L. Kapitza, for whom the research apparatus he used at the University of Cambridge has been purchased. Other research bodies established by the reorganization of the academy include Institutes of General and Inorganic Chemistry, of Animal and Human Physiology, and of Evolutionary Morphology and Paleozoology, a Laboratory of Mechanics and several museums.

GREAT transport planes, carrying tons of passenger and freight loads, have reason to be afraid of pocket gophers, small animals less than the size of rats or squirrels. The gophers love the open grass stretches of landing fields, and burrow shallow runways close to the surface, making landings rough and bumpy, and sometimes tripping up a plane into a "nose-over." The U. S. Biological Survey, which has had long experience in ridding ranches and farms of small rodent pests, has lately been cooperating with the Bureau of Air Commerce in ridding landing-fields of the troublesome pocket gophers.