SCIENCE NEWS

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ORCHIDS FROM TOPS OF PANAMA TREES

ORCHID collecting among the tree tops of a Panama tropical jungle, by botanists standing in the bow of a native dugout canoe, was the experience of a scientific expedition from Washington University and the Missouri Botanical Garden, under the leadership of Dr. Carroll W. Dodge. Not only did the botanists paddle their craft up among the tree tops, but the road they followed was the ancient Spanish camino real, or King's highway, over which once trotted caravans of horses and donkeys bearing the treasures of Peru.

The apparently upside-down adventure was made possible by the flooding of a large area of primal jungle with water backed up by the new 170-foot dam at Alalhuela, forming Madden Lake, to control floods and supply power and lockage water to the canal. Areas formerly reached only by arduous trips on paths cut through the dense jungle were easily explored in canoes. Since the expedition reached the lake before it was filled to its final level, regions now completely under water were studied as well as lower levels in the forests whose tree tops are still exposed. The party had the opportunity, also, to study the plants of the upper portion of the forest before the trees died. So far as Dr. Dodge knows, this is the first time that such a chance has ever before been offered to botanists.

More than 5,000 plants, representing about 1,800 species, besides a large number of living lichens, orchids and tree-dwelling relatives of the pineapple, were added to the herbarium of the Missouri Botanical Garden in St. Louis and the collections of the garden's tropical station at Balboa.

Of the two other members of the expedition from St. Louis, Dr. Julian A. Steyermark, a graduate student in the Henry Shaw School of Botany, of Washington University, returned with Dr. Dodge, while Paul Allen remained in Panama to make another trip with A. A. Hunter, manager of the tropical station. The expeditions are being financed partly by the Washington University Science Research Fund, established by the Rockefeller Foundation, and partly by the Missouri Botanical Garden.

THE NEGATIVE PROTON

ALTHOUGH perhaps vainly, science is hunting for another fundamental particle—the negative proton—out of which atoms, and hence all matter, may be constructed. To explain and simplify present concepts of how the cores of atoms are composed which need protons, electrons and neutrons to fill the picture, it is hoped that it will be possible to find the negatively charged counterpart of the positively charged protons.

This, in substance, is the conclusion of Professor George Gamow, now visiting professor of theoretical physics at the George Washington University from Russia. Dr. Gamow, who first predicted the layers of energy now found within the atom nucleus, also predicted such negative protons still to be found. He reports that the search for the negative proton is difficult because man and the planet on which he lives may be in the wrong part of the universe. We live in a world where protons and electrons exist. Yet if the universe as a whole is electrically neutral there must be other regions and worlds where the opposite is true; regions where negative protons and the newly discovered positrons make up atoms. One can think of the splitting of some giant star into two parts. One component might be like the sun and its planet earth. The other half might have charges of the opposite sign. The first part would be a region like that found on earth where protons and electrons predominate. The latter might be the negative proton world.

TREE RINGS

USING a calendar of tree rings, complete from the seventh century A.D. down to the present, archeologists here hope to date diseases that plagued prehistoric Americans of the Southwest. Burial grounds of Southwestern Indians are yielding rich discoveries for an understanding of diseases in America before white men came, says Dr. John H. Provinse, assistant professor of archeology at the University of Arizona, who is studying diseases that marked the bones.

"Reasonably conclusive" diagnosis of seven diseases that troubled American Indians in Arizona has been made. An eighth disease, syphilis, is doubtful, inasmuch as other diseases might have left the perforated palates, thickened long bones and other conditions that suggest this malady.

Dr. Provinse reports that the question of the origin of syphilis in the Old World or the New may be settled by further study of pathological bones in the Southwest and by careful checking with the tree-ring dating charts developed by Dr. A. E. Douglass, astronomer of the University of Arizona. The charts, which set in sequence annual growth rings of trees representing dates for many centuries, have enabled archeologists to discover the ages of over ninety pueblos and cliff dwellings. If fragments of wood, associated with burials of diseased Indians, can be dated by matching growth rings to dated rings of the tree-ring calendar, then dates in America's ancient medical history can be established. Syphilis, in particular, is not yet proved to have existed in America before the coming of Europeans.

Among the ancient American diseases diagnosed by Dr. Provinse in the bones he has studied are Potts disease or tuberculosis of the spine; rickets; osteomalacia, a nutrition disorder of adult women resembling rickets; arthritis, and Paget's disease, which distorted the bones, with such deformities as a bowing of the lower leg.

CHITIN

RAYON, synthetic lacquers and a thousand other things made from wood and cotton cellulose are now chemical

commonplaces. We no longer stop to wonder at them, for they are not miracles any more. Chitin, which is found practically throughout the invertebrate animal world, forms such things as the wings and body-shells of insects and the thick crusty armor of crabs and lobsters. It contains carbon and hydrogen in about the same proportions as they are found in cellulose, but it has less oxygen than cellulose has, and it also contains nitrogen which cellulose lacks, and is to that extent chemically more nearly related to the proteins than to the carbohydrates.

But it is as susceptible as cellulose to chemical manipulation, and if industrial chemists were sufficiently interested could doubtless be converted into many of the same things that now are born from cellulose, such as synthetic fabrics, lacquers, plastics, transparent wrappings. Little has been done with chitin even by laboratory chemists; nothing, apparently, with a view to possible commercial applications.

There is no lack of raw material. The lobster, crabmeat and shrimp packing industries turn out mountains of discarded shells every season, which are now just plain waste. These would have to be treated with acid, to extract the lime they contain, before they could be used. Another possible source of chitin, if it ever becomes a paying proposition, are the insect traps set in orchards, nurseries and other places where the value of trees and shrubs justify the expense of maintaining them.

THE EFFECT OF DROUGHT ON PRAIRIE TREES

DROUGHT, that blasted pasture and crop lands in the West last summer, took toll of the prairie groves of trees also. Careful observations made last summer on the trees that form natural outposts bordering on the great grasslands have been made available by Dr. J. E. Weaver, professor of ecology at the University of Nebraska. Few of these trees and shrubs were killed outright, but the varying degrees of injury suffered by the different species are considered worthy of study in connection with plans for the Great Plains shelterbelt, now under preliminary experiment to the west of Lincoln, Nebraska.

Along the valleys, where the soil moisture is normally most abundant and evaporation rates somewhat lower than those obtaining on the uplands, there was nevertheless a great deal of drought injury. Dr. Weaver and his associates noted willows and wild cherries nearly leafless in the heat. The leaves of box-elder were wilted and dried, and those of the silver maple were discolored as though by frost.

Ash and elm, among the most favored trees for shelterbelt purposes, Dr. Weaver records as having wilted crowns; the ash, especially, was half dried and brown. Of the elms, the scorched leaves did not turn brown or bleach white as did those of other species, but took on a bluish-gray color and soon fell to the ground. On the other hand, black walnut was scarcely affected, perhaps on account of its excellent root system; nor were trees of this species found on even drier sites injured. Hackberry appeared in fair shape.

A contrast between two associated species in the same environment is recorded by Dr. Weaver. In the bordering belt of linden and red oak on a steep north slope, one third to one half of the leaves of the shallow-rooted linden were brownish-yellow and functionless; many had fallen to the ground. The more deeply rooted red oak had shown as yet no permanent injury, although the portions of the crown most exposed to the sun were wilted in early morning. In the bur oak forest that covered the slopes of the hills, even greater drought prevailed. From a vantage point on a ridge, one could clearly see that many of their tops had been badly scorched and that the leaves were dried. Most convincing to many people, no doubt, will be the notation that the drought was too mean even for poison ivy. Dr. Weaver states that long-established vines, two inches in diameter, bore wilted leaves even in the shade in early morning, from the crown to the base of the supporting tree.

THE DANGER OF MILD CASES OF SCARLET FEVER

SCARLET fever is spread not only by patients seriously sick with the disease but by convalescents and by carriers, who are apparently well yet harbor the virulent germs in their bodies. Some of the worst epidemics have been caused by infected milk, but in every instance the infection has been traced to the presence of persons suffering from scarlet fever, either on the dairy farm or among persons handling the milk.

The scarlet fever germ is present in discharges from the mouth, nose and throat of the sick. If there is a discharge from the ears or from abscesses, this discharge may also be infectious. Because scarlet fever is so highly contagious and because a mild case in one individual may be responsible for serious or even fatal infection in more susceptible persons, the importance of watching for symptoms and isolating suspect cases is emphasized by the U. S. Public Health Service.

Children contracting scarlet fever feel suddenly tired, restless and peevish. High fever and sore throat are characteristic and usually there is a chill, vomiting or convulsions. These early symptoms are usually followed in a few days by a rash, which appears first on the neck and chest and soon covers most of the body. When there is any suspicion of scarlet fever, a doctor should be called and his advice carefully followed. This is important because of the serious effect which the disease often has on the heart, kidneys and ears.

Great care must be taken to prevent discharges from the patient's mouth, nose, throat and ears coming in contact with other persons. Dishes used by the patient must be kept separate from those used by other members of the family and all clothing worn by him should be disinfected. Children exposed to scarlet fever should be kept away from school and from other children, during the period required for the disease to develop. The Dick test may be used to test the susceptibility to scarlet fever. This test makes use of the toxin produced by germs known as scarlet fever streptococci. A minute quantity of this toxin is injected in the skin and if the child is susceptible a red area, about half the size of a dime or larger, will appear at the site of the injection in about

24 hours. If the exposed child is shown by the test to be susceptible but has not yet shown signs of scarlet fever, a larger dose of the toxin may be given at once. Usually five injections are given to immunize susceptibles against scarlet fever, but injections should be discontinued if symptoms of scarlet fever develop.

THE VARIATION OF DISTANCE BETWEEN EUROPE AND AMERICA

TIDES in the solid earth which alter the distance between the North American and European continents by as much as 63 feet have been discovered by Professor Harlan T. Stetson, visiting research associate in astronomy at Harvard University, and Dr. A. L. Loomis, New York broker and scientist, who operates the Loomis Laboratory at Tuxedo Park, New York. These tides in the earth are believed to be caused by the moon through its gravitational pull much in the same manner as it causes ocean tides. They were discovered by the two scientists when discrepancies in astronomically checked clocks in Europe and in North America increased and decreased regularly with changes in the moon's position.

According to Dr. Stetson and Dr. Loomis, discrepancies between European and American clocks, astronomically checked, indicate that the average difference between the two continents may be increased by as much as thirty-two feet when the moon is pulling them apart. When the moon pulls them together they may be closer to each other by the same distance. In conducting their experiments, the two used United States time signals checked at Washington and broadcast from the Naval Station at Annapolis, Md., English time signals checked at Greenwich and broadcast from Rugby, and French time signals checked at Paris and broadcast from Bordeaux. At specified times, each station picks up the signals of the other two.

Discrepancies between time signals from Annapolis and from Rugby were found to rise and fall with the moon's position. A very similar curve designated the differences between Annapolis and Bordeaux signals. Between Rugby and Bordeaux, however, no such relationship was found, indicating that the phenomenon does not take place between England and France. By a stretching of rocks it is well within the realm of possibility for the two continents to move as much as 63 feet apart. Such a movement would be equivalent to stretching a rock a yard long less than .0004 inches, an amount well within the elastic limit even of solid granite.

It was at first thought that changes in the amount of time required for transatlantic radio transmission might be the cause of the discrepancies, or that the moon might lift the Heaviside ionized layer which reflects radio waves and thus gives them a longer distance to travel. Upon checking this, it appeared that no alteration in the Heaviside layer could account for the large size of the time discrepancies. In considering these aspects it was found that the average length of time required for transatlantic transmission is approximately .04 seconds.

ITEMS

A NEW theory of the electron's size, which makes it ten times larger than previously held concepts, was announced by Dr. Max Born, professor of physics at the University of Cambridge, and Professor Erwin Schroedinger, of the University of Oxford. The electron is one of the fundamental particles out of which all matter is composed. Present estimates of the electron's size suggest that some ten trillion of them side by side would be less than a half inch long.

DR. G. ARTHUR COOPER, paleontologist of the Smithsonian Institution, has made a detailed study of ninety specimens of fossil trilobites, primitive relatives of crabs and crayfish, through all stages of their life development from infants a third of an inch long up to adults nearly four inches in length. In the particular species studied, the body form remained the same throughout life, but head and tail changed as the animal grew. Some of the specimens have been deposited in the U. S. National Museum and some in the Peabody Museum of Yale University, but the bulk of them belong to Colgate University, where they were discovered.

DESPITE dust storms in the West and a severe cold wave over most of the country, recent grain-crop conditions are still favorable, the U. S. Weather Bureau reports. Winter wheat in the Ohio valley is in good condition and moisture is largely ample, relieving a long-continued drought condition. The moisture situation is also good in Iowa and Missouri. In the Plains region, where the dust storms occurred, the drought continues unabated, but in eastern Kansas and South Dakota there is at least enough soil moisture for present needs. Most winter grains are in satisfactory condition in the Pacific states. In the nearer Southwest, southern Kansas, Oklahoma and Texas, spring plowing and disking are already well under way, and some plantings of spring oats have already been made.

MORE people were in mental hospitals in New York State for treatment during the years of the depression than for a corresponding period before that economic catastrophe. During both periods the number was constantly increasing, but in the pre-depression era the increase was at the average rate of 1,600 per year. Since 1929, this increase has jumped to 2,500 per year. That all types of mental disease were affected to some extent by the economic crisis, although it may not have been the dominant fact in the increase in any one disease, is the conclusion of Dr. Horatio M. Pollock, statistician of the New York State Department of Mental Hygiene.

PLENTY of rickets-preventing ultra-violet rays pass through Chinese paper windows and these windows are far superior, in this respect, to ordinary window glass, it appears from measurments of various Chinese window materials made in the physics laboratory of Yenching University. Observers have repeatedly called attention to the fact that rickets is less prevalent among Chinese than among Western children. Paper windows might, therefore, be used to replace the more expensive anti-rickets window-glass now on the market.