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SPECTRUM FOR TESTING PARTIAL COLOR-BLINDNESS

THE rainbow hues obtained when pure white light is passed through a prism are the best colors to be used in testing cases of partial color-blindness, Sir John Herbert Parsons, of the University of London, declared at the dedication of the Wilmer Ophthalmological Institute at the Johns Hopkins University. Sir John, one of the world's authorities on color vision, represented the ophthalmologists, or eye specialists, of England at the dedication exercises.

Color-blindness may range all the way from total inability to distinguish colors, when the subject sees everything as gray and black, to mild forms in which the subjects have difficulty in distinguishing one or two shades. Confusion of red and green is a particularly common form, and a highly dangerous one when it occurs in employees of navigation or railway lines. Colored lights and flags are so universally used for signals that public safety depends on accurate testing of railroad and navigation employees. In cases that are not very pronounced, it is extremely difficult to make accurate tests, and it is for these cases especially that Sir John recommended the use of spectral colors.

The Board of Trade of London has a special lantern for testing public employees in which the colors are all shown with the same degree of luminosity or brightness. This lantern is not allowed to be sold on the market, however. The lantern was devised because sailors and railroad men objected to matching colored wools, which they considered altogether too feminine. The wools are commonly used for other types of patients. Both lantern and wool tests are not infallible, Sir John commented, but a trained examiner will be able to tell whether color-blindness exists, even if he can not tell the degree by these means.

Color-blindness is often called Daltonism from John Dalton, the great English scientist, who discovered it. Dalton himself was a Quaker and shared his sect's abhorrence of bright colors. After receiving the degree of doctor of laws, he went about the streets wearing a crimson robe of that doctorate, quite happy and quite unconscious of the agitation he was causing among his Quaker friends. He himself was color-blind and did not know the color of the robe he wore. It was 50 years after Dalton's discovery of the condition before any serious efforts were made to eliminate color-blindness from the personnel of ship and train crews.

WOOD ALCOHOL BLINDNESS

THE story of the blindness that comes from wood alcohol has not yet been completely told. A further study of this problem might well be made by the newly dedicated Wilmer Ophthalmological Institute as suggested by Dr. George E. de Schweinitz, of the University of Pennsylvania, in his address at the dedication exercises.

Physicians now generally believe that it is not the wood alcohol, but some impurity in it, possibly fusel oil which is nearly always found in commercial wood alcohol, that causes the blindness. The bad liquor prevalent in recent years often contains wood alcohol and has been the cause of much wood alcohol poisoning and blindness. However, wood alcohol may also be inhaled or it may be absorbed through the skin. This is an important hazard in certain industrial operations.

The dedication of the new Wilmer Institute, devoted to the study and treatment of eye disease, Dr. de Schweinitz considered an outstanding contribution to American ophthalmology. Other landmarks mentioned were the invention of bifocal glasses by Benjamin Franklin in 1764 and the establishment of the first eye infirmary in this country at New London, Connecticut, in 1870.

One of the first operations for cataract performed in this country was done by Edward Reynolds, of Boston. On his return from Europe where he had been studying the eye and its diseases, he found his father suffering from cataract. According to his own account, he "went to his surgery, offered a prayer to the Deity, took a glass of sherry and went ahead to do his best."

Routine examination and care of the eyes of all patients entering the hospital first was established in this country at the hospital of the University of Pennsylvania Medical School by Dr. Charles Norris of that institution. This was a particularly important step in the development of ophthalmology according to Dr. de Schweinitz. Further development of this medical specialty would come through further cooperation between eye specialist, regular physician and pathologist, the latter being the specialist who studies in the laboratory the changes brought about in the body's tissues by disease. Conditions at the new Wilmer Institute are particularly fortunate both for the individual patient and for the development of the science of ophthalmology.

THE USE OF BACTERIOPHAGE

EQUIPPED with a brand new weapon against disease, scientists have failed to get the hoped-for results with it because they have not known exactly how to use it. Bacteriophage, the potent germ killer, discovered by the French-Canadian, Dr. F. d'Herelle, now a Yale professor, gave promise of being the world's greatest disease-conqueror. It has fallen short of fulfilling this promise because the men who had to use it have not understood it well enough to get uniformly good results.

The age of the material, the method of administration and the amount of the dosage are points that must be settled in order to get the most successful results with this new weapon, one of its advocates, Dr. N. W. Larkum, of the Michigan Department of Health, told a group of fellow scientific men, at a meeting held in Indianapolis on October 18. The group to which he spoke was composed of men who have devoted themselves to the study

of disease germs and means of combatting them. This group is an informal organization, without any name, which meets several times a year in order to exchange views and notes of progress on the members' work.

Bacteriophage kills germs in a test-tube and actually dissolves them. The hope of its discoverer and sponsors is that it will do the same thing to germs in the human body. In some cases it has killed the germs that were attacking the body, in others it has failed to do so. Dr. Larkum believes that the failures occur when the phage is used incorrectly, through ignorance of the best conditions for it to do its work.

Possibly the phage is potent only at a certain stage of its development. Up to now, the age of the material has not been given any consideration. The method of administration has been chosen with a view to getting the stuff into contact with the bacteria. Dr. Larkum suggested that it may be better to bring the material into contact with the susceptible tissues of the body, in order to make them immune to attacks of the disease germs and thus check the spread of the germs through the body. The matter of how large a dose to give also needs to be determined scientifically. "At present the selection of the dosage is entirely arbitrary, based upon some success attending a given dose. It is entirely logical to conclude that as many failures have been due to excessive dosage as have been due to an insufficient amount. Until further light has been shed upon these various factors in bacteriophage therapy, one is scarcely justified in condemning the method."

EMOTIONS AND DISEASE

NOBODY really overworks as far as mind and body go, but we live at such a high emotional tension that we become tired and jaded and require violent stimulation to keep us going. Also, this high emotional tension is the cause of a number of diseases, Dr. Charles P. Emerson, of the Indiana University School of Medicine, said at a recent meeting of the New York Academy of Medicine.

"Under certain conditions a strong emotion can inflict a physical injury just as truly as can a knife," Dr. Emerson said. "The injurious effect of a long maintained depressing emotion has never been appreciated. We endure well the effects of strong emotions, if only their duration is brief or their qualities varied. That the depressing, contractile, paralyzing emotions called fear, apprehension, worry, etc., weigh heavily in the balance against a patient during the course of an infection has long been suspected, but since these phenomena can not be weighed, measured nor rendered objective, we can not at this point consider them seriously. The effect of these emotions on the glucose tolerance of a previously well-standardized case of diabetes mellitus can, on the other hand, be measured in terms of grams of sugar in the urine, in milligrams of glucose in the blood-stream, and of units of insulin necessary to restore the sugar-free condition."

Dr. Emerson urged physicians to consider more the emotional and psychological aspects of disease than has been done in the past. This new phase is just as much a part of regular medicine as are the physical and biochemical aspects with which physicians have long since become familiar.

MANGANESE BY VACUUM DISTILLATION

DISTILLATION gets most of its publicity as a result of its more or less disreputable employments, but it achieves most of its real usefulness in the world in technical laboratories that few people ever hear about, at tasks which only chemists can think up for it. Its newest job is to get manganese, one of steel's most important alloys, out of its ores in an almost absolutely pure condition. An improved apparatus for doing this was described at a meeting of the Metallurgical Advisory Board, in Pittsburgh, by Dr. James B. Friauf.

Distillation of any kind depends on boiling the material to be purified, and then condensing the steam or vapor. This is simple enough with water, which boils at 100 degrees Centigrade, and with alcohol, which boils at an even lower temperature. But the boiling-point of manganese at atmospheric pressure is about 1,900 degrees, and even in an almost complete vacuum it is still in the neighborhood of 1,000.

To accomplish this difficult distillation, Dr. Friauf encloses a magnesia crucible full of manganese ore in a chamber of fused silica. Around the crucible is a coil of water-cooled wire, through which a high-tension, high-frequency alternating current is passed. This induces what are known as "eddy currents" within the coil, and this induced electricity heats the manganese in the ore above the boiling-point, causing it to pass off a vapor. The gaseous manganese rises from the crucible through a magnesium chimney, and condenses into a solid again on its cooler walls. From there it is recovered as a solid metal, so hard that it can scratch glass.

THE DISCOVERY OF RUINED MAYA CITIES

IN discovering four ruined Maya cities dotted on the great unexplored area of the Yucatan peninsula of Mexico, the airplane flights of Colonel and Mrs. Charles Lindbergh and Carnegie Institution archeologists have given a better conception of the line of growth of the ancient Maya civilization.

The newly discovered cities lie in a line stretching northeastward from the Old Empire region of the Maya, located largely in what is now the state of Guatemala, where the civilization emerged about the time of Christ. The newly found ruins connect this older area with the New Empire region, on the north end of Yucatan peninsula. Chichen Itza is the outstanding example of this New Empire culture.

Flying over unmapped dense tropical jungles, the Lindbergh party sighted three ruined cities definitely determined to be "new." A fourth city, one of the largest found, may be a new discovery, but it may prove to be one seen by Dr. Thomas Gann some years ago in the vicinity of Lake Bacalar.

Many months and perhaps years will be required to investigate and explore the cities located from the air. Many weeks of hard travel by land will be necessary to place land parties at the ruins. But when the broken temples are rescued from the enveloping vegetation, there

will be available a better idea of the spread of the Maya, who more than fifteen centuries ago rose from primitive simplicity to a complex state with highly developed religion, government and monumental architecture. How and when the center of Maya culture shifted from the Old Empire region to the New Empire has been one of the unanswered questions. The connecting cities now found will probably supply the answer.

Nearly as exciting to archeologists as finding new ruins is the fact that no cities were found in the area of the Mexican state of Campeche, which was surveyed on the second day's flight from Merida southward. Coupled with the discovery of the ruined cities farther to the east, the absence of Maya settlement sites in the western part of the Yucatan peninsula is significant in explaining the spread of the Maya civilization.

The four discovered ruins are located in flat country. From the air the raised temple mounds could be seen twenty miles away in some cases. But giant trees and dense vegetation rise about a hundred and fifty feet to shroud the glistening white stones with which time has dealt severely. Only by flying low over the area could the central temples of the cities be seen and studied from the speeding airplane.

The first ruined city, seen on the first day's flight, is located in the southeast corner of the state of Campeche, some fifty miles from the Guatemalan boundary line. Situated in the heart of uninhabited jungles, far from lakes of any kind, it will present a difficult objective to land parties.

Of the three cities discovered in Quintana Roo during the most fruitful fourth day flight, two are located sufficiently near lakes to allow early exploration by parties transported by air to these lakes. The city near Lake Bacalar is probably more extended in area than the others. The last city discovered and the one nearest the coastal ruins of Tulum is the least accessible of the three due to the absence of water near it on which an airplane might land.

Dr. A. V. Kidder, director of the Carnegie Institution's archeological work, who flew on the last three days, was disappointed in not being able to see from the air traces of great stone highways connecting Maya cities.

The flights over Coba on the fourth and fifth days of the joint Carnegie Institution and Pan-American Airways explorations were of historical interest because the city has been seen by white men on only two occasions before this time. In 1926 Dr. Kidder and a companion, J. Eric Thompson, now of the Field Museum, visited the city, and not until last February when Colonel Lindbergh located it during a Pan-American Airways trail-blazing flight was it seen again by a white man.

Dr. Kidder indicated on his return to Washington that air travel will become a routine part of the Carnegie Institution's archeological work in the Maya region as soon as funds can be secured for a light amphibian airplane and equipment. With the use of Pan-American Airways bases at Cozumel Island and Belize, a two-year program of detailed aerial exploration could be carried out for about $50,000. Colonel Lindbergh will act as an adviser to the archeologists on the aeronautical aspects of the work.

ITEMS

A NEW petrified forest, the only one so far discovered with the trees lying as they fell millions of years ago, is reported by the U. S. Bureau of Reclamation. It was found by a road-building expedition on the Lower Yellowstone reclamation project, about three miles southwest of Savage, Montana. The petrified forest covers several acres. Some of the trees are ten feet in diameter and over 100 feet long. They all lie with their tops pointing in the same direction, indicating that they may have been blown down by a storm. The shape of the trunks suggests that they belonged to the same forests that supplied the materials for the nearby beds of coal.

A VOLCANIC island formed last year by a submarine eruption in Sunda Strait, near Verlatern Island, Java, has now disappeared beneath the sea, according to information received at the U. S. Hydrographic Office by the Dutch authorities.

THE sudden birth of a towering waterfall 300 feet high is reported from Iceland by an English traveler writing from Reykjavik. It is due to the breaking down of an ice dam across a lake on top of a glacier-capped mountain known as Lang Jökull, which lies in western Iceland not far from the famous Geysir, first known of all geysers of the world. According to the statements of farmers in the neighborhood, the lake burst its glacial barrier during the course of a single night with a noise like thunder, and so flooded the little river Tungufljot that it carried out a concrete bridge.

EARTHWORMS longer than a man and an inch in diameter are reported in *Nature* as the quarry of a naturalist's hunt in southeastern Australia. Average specimens range from four to six feet in length, and one nine feet long was observed by Charles Barrett, member of the expedition. An extreme length of eleven feet was reported though not seen on this expedition. The worms make loud gurgling noises when they retire into their burrows on the approach of a possible enemy. Their greenish-translucent eggs have tough, horny shells, and are from two to three inches in length.

THE ancient history of Samarkand, famed city destroyed by the Mongol conqueror Genghis Khan in 1220 A. D., is being dug out of the earth by a Russian archeological expedition. Results of the present season's work have been completed and nothing more can be accomplished until next spring. Clay utensils bearing a strong resemblance to Roman vases have been unearthed in the lowest levels of earth reached by the spade. These raise the question of contact between Rome and this eastern center. The finds demonstrate that the city had its origin as far back as the second century. Well-preserved houses from a later period, containing coins, lamps and household utensils, have been excavated. Art panels and reliefs of considerable beauty have been recovered and are now in the Museum of Samarkand.