SCIENCE NEWS

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PAPERS PRESENTED AT THE DES MOINES MEETING

DEFECTIVE individuals should not be allowed to reproduce and multiply the burden of their kind upon society, said Professor G. H. Parker, head of the zoology department of Harvard University, in the annual lecture before the Society of Sigma Xi and the American Association for the Advancement of Science. The great influence of heredity upon the characteristics of a person, brought out more strikingly than ever by recent scientific observations, should cause people to protect themselves at once from a great menace, Professor Parker said. "In experimenting on race betterment it seems quite clear that the place to begin is with the most defective members of society," he stated. "Those who are state wards and must be cared for by state funds, and those whose defects are hereditary, should in some way or other be restrained from reproduction. Such a step may be carried out by segregation, which has been advocated by many public custodians . . . , but a much more radical means of controlling defective individuals is sterilization. When sterilization is considered," he continued, "it is always easy for one to point out who should be sterilized. We all know the personalities about us who are objectionable, and we can quickly point out the stocks that should not reproduce. But sterilization is an operation that should not be allowed to proceed excepting in proper hands. It is an operation that should be permitted only through a court medically advised." California, with a eugenic sterilization law for about 20 years and more than 6,000 cases of legal sterilization, was pointed out as the most forward state of those that have adopted sterilization. The influence of organic inheritance has been greatly depreciated in the past, Professor Parker said, the belief being that people are influenced to a greater extent by environment. He recited a number of observations of identical twins, the only persons from whom information of this kind can be obtained, because they come into the world with exactly the same inborn characteristics.

RACE horses and men follow the same physiological laws in track events, and horses follow these laws more closely than men, is the conclusion reached by Professor A. E. Kennelly, of the Harvard Engineering School, as told in an address before the American Association for the Advancement of Science. Professor Kennelly has studied all world records for horses trotting, pacing and running and for men swimming, walking, rowing, running and skating, and he finds that there are certain definite relations between the time, distance and speed of all events for both man and beast. One application of what has been learned shows that if a man runs, or a horse trots or uses any of the other gaits over two distances, the first twice as long as the second, 118 per cent. more time will be needed to cover the second distance than was required for the first. Another of the laws shows how long an athlete may be expected to last before becoming exhausted if he increases or decreases his average speed If his speed is raised one per cent., his running time is reduced nine per cent. Professor Kennelly said he also found that if the speed of a record event is increased per cent., the record distance corresponding to the new speed is four and three tenths smaller than the first distance. These and many other interesting facts learned apply to all the different gaits given above and to a slight extent to bicycling and automobiling. They are valuable both to the scientist and to the athlete and sportsman and point out, especially for the athlete and sportsman, the most vulnerable records, those that should be most easily broken. The data for this study were secured by Professor Kennelly from the "World Almanac." Although he is an electrical engineer, he has made the determination of laws of fatigue of men and horses a hobby for a number of years, having published papers on the subject in 1906 and 1926.

JUST as one may sleep warmly out of doors under a quilt, or shiver under a sheet, so the upper atmosphere, what scientists call the stratosphere, is kept warm over Arctic latitudes by a thicker layer of ozone. This was the explanation for a curious fact that has puzzled scientists, in a paper read at Des Moines before the American Meteorological Society by Dr. W. J. Humphreys, of the U. S. Weather Bureau. The stratosphere is the layer of the atmosphere above the highest clouds, and, unlike the lower layers, does not become colder with height. Temperature observations have been made of this layer by means of small balloons, equipped with recording thermometers. They reveal the curious fact, said Dr. Humphreys, "that the stratosphere is coldest over equatorial regions and becomes gradually warmer with increase of latitude, the extreme difference being around 35 degrees Fahrenheit—coldest over the warmest earth and warmest over the coldest earth." Though a full explanation has not yet been made, Dr. Humphreys thinks that it is due to the ozone. Observations have shown that there is less ozone over equatorial than over Arctic regions, a fact that is itself yet unexplained. But the ozone absorbs radiation from the earth, and reradiates part of it back again. Therefore, where there is more ozone, more heat is sent back, and so the upper atmosphere there is warmest.

SEEN on any clear moonless evening after twilight as a faint beam of light in the western sky, the zodiacal light has long been an object of study by astronomers and physicists. At the meeting of the American Physical Society, held in conjunction with the American Association, Dr. E. O. Hulburt, of the U. S. Navy's research laboratory, suggested its connection with magnetic storms that sometimes affect the earth. Recalling observations made 75 years ago by a navy chaplain, the Rev. George Jones, Dr. Hulburt pointed out that most abnormalities

of the zodiacal light, such as fluctuations, unusual brilliance or distribution over the heavens, followed magnetic storms. This, he thinks, indicates some connection, and suggests that the particles which cause the zodiacal light, by scattering light from the sun in some manner, originate in the atmosphere of the earth. The partly broken atoms high in the atmosphere may cause the phenomenon under the combined effect of the pressure of sunlight, the gravitation and magnetism of the earth.

BECAUSE of the number of animal diseases which may be transmitted to man, veterinary medicine is a necessary factor in the care of the public health. Four men who made outstanding contributions to our knowledge of disease, Jenner, Pasteur, Koch and Theobald Smith, are claimed by the veterinary profession because all of them were interested in animal diseases. So Dr. Pierre A. Fish, of New York State Veterinary College, said in an address before the medical science section of the American Association. Tuberculosis, undulant fever and tularemia are prominent diseases which are transmitted from animals to man, others being anthrax, glanders, foot and mouth disease, cow pox, rabies, actinomycosis, infectious jaundice, rat-bite fever and bubonic plague. For the control of these diseases public health officers and veterinarians must work together. Veterinarians contributed largely to the health of the army during the world war by careful inspection of all meat, milk and their products before consumption. The importance of continued study of the parasites of man and the lower animals was emphasized in a paper presented at the same session by Dr. Maurice C. Hall, of the U. S. Bureau of Animal Industry. Parasites may be transferred from one host to another, as from wild to domestic animals and from animals to man, and also in the reverse direction. The parasite in these cases seems able to adapt itself easily to the new host, but the host generally is not so adaptable and as a result shows evidence of hostility to the parasite which we recognize as a disease-picture. Veterinary parasitology is daily becoming of greater importance to the livestock industry, while human parasitology is still of major importance in the tropics.

"Too much faith has been placed in our falling death rate from tuberculosis as evidence that this disease is under our control," Dr. William Charles White, of the U. S. Hygienic Laboratory, told members of the American Association. Complete conquest of this grave disease has not yet been made in spite of splendid advances. Over-confidence at this stage is to be avoided, especially because of the harm it may do by turning the public mind from this great task that still confronts the nation. There are still probably over 160,000 deaths annually from tuberculosis in the United States. Statistical figures of death rates give but one small phase of the picture. The rise of incidence of tuberculosis in young girls, studies of incidence of the disease in school children, such as those made by the Phipps Institute in Philadelphia, the appalling death rate from this cause among Negroes and Indians and the rise in the death rate in some cities in spite of valiant efforts being made all point to a task scarcely yet begun. Dr. White also described the scientific investigations being sponsored by the National Tuberculosis Association, which it is hoped will lead to complete understanding of the tubercle bacillus, its life history and chemical methods, and finally to its complete conquest.

BREEDING corn with as much attention to the pedigree of the individual plant as is now bestowed on the pedigree of the individual animal in horse or hog breeding will result in a great increase in midwestern farm productivity within the next ten years. This in effect was the prophecy made before members of the American Association and the American Society of Agronomy by Henry Wallace, editor of *Wallace's Farmer* and practical scientific corn breeder. He told of the methods of modern corn breeding, by which one can select qualities desired and put them into the new strain as a cook stirs ingredients for a cake together in a bowl, producing what might almost be called a synthetic corn plant. The work is done by inbreeding numerous strains of corn and segregating their offspring, until the tangle of their hybrid origin is unsnarled and the desired qualities remain as pure "unit characters." These inbred strains are used as the pollen-producers, or fathers of the new crop. They are planted among the rows of "mother" stalks, which are deprived of their tassels so that they can not produce any pollen of their own to contaminate the seed corn. The work requires both scientific understanding and the skill that comes with experience, so that it has proved most practicable to produce the new kinds of seed corn commercially on special seed farms and sell the product to the farmers, rather than have the latter produce their own seed, as they have been accustomed to do since pioneer days. But the result justifies the greater cost, in the opinion of Mr. Wallace, for although the work is hardly past the beginning stage and the new strains are as yet by no means ideal, they are already outyielding by about ten per cent. the old types of corn produced by open pollination. Mr. Wallace's paper was one of a series on the science of breeding as applied to corn, given under the leadership of Professor John B. Wentz, of Iowa State College.

XYLOSE, a sugar so rare that it has heretofore been a laboratory curiosity at $100 a pound, can now be turned out cheaply at a few cents a pound, requiring no raw material other than waste cottonseed hull bran, water and sulphuric acid. At the meeting of the chemistry section of the American Association for the Advancement of Science, Warren E. Emley, of the U. S. Bureau of Standards, described the process by which seed waste is changed into sugar. Xylose is different from its nearest neighbors in the sugar world, the hexoses or glucose type of sugars, in that it contains five carbon atoms to the molecule instead of six. Because it has always been so rare and expensive, it has never been possible to perform any extensive experiments with it, and consequently it has no known uses. But the experimental plant at Anniston, Alabama, can turn out a hundred pounds a day, and when larger units are built they will have an annual production of about a million tons of cottonseed hull bran to work on. So that if xylose has any uses it should not take long now to dis-

cover them. Mr. Emley suggested that it might be used directly in food products, or possibly industrially as a raw material for alcohol, acids and other chemicals.

IT takes about half a second for the eyes to change from looking at a near object to a more distant one, Herbert H. Jasper, of the University of Iowa's Psychopathic Hospital, reported. By testing the time it took the eye to change from converging on one of three lights 17, 30 and 70 inches away in an otherwise dark room to one of the others, Mr. Jasper found that the average time on first trials varied from 557.1 thousandths of a second for the two nearest lights to 626.2 thousandths for a change from the nearest to farthest. A second set of measures showed improvement. Investigations of how the world looks to rats were reported by Professor Paul E. Fields, of the Ohio State University. The rat is supposed to have eyes which are not capable of discriminating forms, such as the triangle, Professor Fields explained. But in his experiments twenty-five white rats learned to discriminate between a triangle when the apex was pointing up and when the apex pointed down.

YOUNG oak trees must have plenty of sunlight if they are to develop strong root systems, Professor A. E. Holch, of the University of Nebraska, told the Ecological Society of America at its Des Moines meeting. He studied young burr oaks on an open hilltop, in an open stand of oaks and in a more densely grown stand of linden. Year-old seedlings in the full light of the hilltop developed a root depth of five feet and a total spread of 2.25 feet. Trees of the same age in the 12 per cent. light of the oak forest had a root depth of 1.6 feet and a spread of nine tenths of a foot, while in the shade of the lindens, where there was only a 3 to 4 per cent. light, the roots reached a depth of only eleven inches and had a three-inch spread.

ULTRA-VIOLET light is a stimulant not only to the health of humans but to the vitality of a microscopic fungus as well, said Dr. G. B. Ramsey and Mrs. Alice A. Bailey, of the U. S. Department of Agriculture, speaking before the American Phytopathological Society. It causes the production of more numerous and more vigorous spores in the organisms which give rise to the nailhead rust of tomatoes and Fusarium bulb rot of onions, two destructive diseases that attack vegetables while being shipped to market. As with people, the light will have a disastrous effect if too long an exposure is made.

A WELL-CONSTRUCTED office building has little to fear from earth vibrations caused by heavy traffic, Professor C. C. Williams, of the University of Iowa, told members of the association. Man's senses usually exaggerate the vibrations caused by street traffic, passing trains or rotating machinery. A movement of only one thousandth of an inch ten times a second seems a rather violent shaking to ordinary senses. Even the little street vibrations cause pictures to become askew on the wall and make dishes move because there is a more rapid movement in one direction than in the other.

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