SCIENCE NEWS

Science Service, Washington, D. C.

THE METHOD OF SCIENCE

THE future of mankind depends on man's learning to use the method the scientific man uses in solving his problems. This was the message of physics to medical x-ray science as conveyed by Professor Robert A. Millikan, of the California Institute of Technology, at the Cleveland meeting of the American Roentgen Ray Society.

Professor Millikan stated that man must learn the scientific mode of approach before he will solve the worst of his social or governmental ills. The method of science is always to utilize the knowledge of the past as a platform from which to make advances into the future. In every single case the scientist starts with the accumulated knowledge of the past and pushes a little further along, and then from this slightly advanced platform builds still a little further, and so on and on, always pushing ahead from the last platform of all past knowledge.

Professor Millikan sketched briefly the way in which this scientific method of approach was used in exploring the field of electromagnetic radiation from x-rays and ultra-violet rays to cosmic rays. The knowledge gained in this field is of tremendous importance and usefulness, but the method by which it was gained is even more important. Dr. Millikan pointed out that this scientific method of approach is "vastly more important for the future of the race than any particular bread-and-butter application in the whole field of radiation, no matter how important that field as shown by the fact that enormous industries—the whole communications industry and sound pictures, for example—have come out of it." He surveyed the field of radiation and described the ranges of particular interest to medical men. Among these is the whole range of x-ray and gamma ray frequency, the main use of which is "combatting mankind's most terrible scourge, cancer." This runs from a frequency in electron volts of about 12,000 up to 1,200,000 electron volts, which is the highest frequency which has been generated by an x-ray tube and used continuously for cancer treatment. These high potential x-rays are particularly appropriate for deep-seated cancers, the low potential tubes being successfully used to treat superficial cancers.

"It is not too much to say," Professor Millikan continued, "that the best of medical authorities agree that radiation is the most potent agent we now have for combatting the scourge of cancer, not even excepting surgery."

Passing from medical matters he continued his description of radiation as follows: "With the range of about 2,000,000 electron volts we end the highest frequency of radiation being regularly applied for therapeutic or other useful purposes, but Dr. Lauritsen, at the California Institute of Technology has recently discovered the existence of nuclear disintegration gamma rays which carry a frequency of artificially produced radiations up to 17,500,000 electron volts and this figure begins to overlap the enormous energies which we find in cosmic radiation, which, however, is completely unknown from any terrestrial sources. We have now studied these cosmic rays throughout the whole range of energies from twenty million electron volts to fifteen billion electron volts, and know a good deal about the way in which these stupendously powerful cosmic rays come into the earth and how they are absorbed by matter.

Professor Millikan briefly summarized the latest advance in knowledge of these rays obtained by sending into the stratosphere balloons carrying instruments with very exact recording mechanisms. These balloons reached up to 98.3 per cent. of the top of the atmosphere, at an altitude corresponding to 92,000 feet. An important fact learned from the balloon observations, made this past summer, is that at the latitude worked with, at San Antonio, Texas, the cosmic rays reach a maximum intensity at an altitude of about 68,000 feet and then decrease in intensity as higher altitudes up to 92,000 feet are reached. The complete interpretation of these observations can not be made until similar flights and readings have been made nearer the equator, Professor Millikan said, adding that he and his colleagues are now trying to obtain such flights.

MAN'S ANTIQUITY IN AMERICA

PREHISTORIC elephants, hunted to death by cunning primitive darts, have been unearthed in New Mexico, proving at last to scientific satisfaction that America was inhabited as long ago as 8000 B. C.

The discovery, which places America's famous Folsom Men more definitely than ever before in a niche of time, was made by a joint archeological expedition directed by the Academy of Natural Sciences of Philadelphia, the Carnegie Institution of Washington and the University Museum of Philadelphia. The site of the discovery is the region of Blackwater Draw, between Portales and Clovis.

Dr. Edgar B. Howard, of the academy, leader of the expedition, reported finding at the site bones of ponderous mammoths with stone spear points made by man associated beyond doubt with them. One of the ancient hunter's weapons lay under a vertebra, another under a shoulder blade, and another between the forelimbs of a beast. The prehistoric elephants thus slain were obviously trapped in a bog, where they floundered until the eager big game hunters could dispatch them with their pointed spears.

Bone points, the first of their kind ever discovered in connection with prehistoric elephants or with America's ancient Folsom Men, were unearthed at the scene. One of these bone points rested on the base of a mammoth's tusk.

The antiquity of the event, about 10,000 years ago, is estimated on geological and climatological evidence. The remains of the hunt, with the lost and discarded weapons,

were buried through the centuries by hard silt and several feet of sand, and remained undisturbed.

Scientific witnesses attending the excavation of the bones and weapons included Dr. Ernst Antevs, geologist of the Carnegie Institution; Dr. Harold Colton, of the Museum of Northern Arizona, and Dr. Frederica de Laguna, archeologist of the University Museum.

SOME PAPERS ON PUBLIC HEALTH AND MEDICINE AT THE HARVARD TERCENTENARY CONFERENCE

MILK, water and salt are hot weather health aids, it appears from studies reported by Dr. Cecil K. Drinker, dean of the Harvard School of Public Health, at the symposium on environment and its effect on man, held as part of the Harvard Tercentenary celebration. A man doing hard work in high temperatures must have plenty of food and water and he should take half an ounce of salt daily to replace the amount that will be lost from the body in perspiration. He can see no reason for limiting unduly the amount of protein food such as meat, eggs and cheese. For the white man, life in the tropics depends on a severe discipline which is hard to maintain. Dr. Drinker advises for white residents in the tropics a moderate amount of simple food, plenty of water, an adequate amount of salt, daily exercise, no alcohol or excesses of any kind, and plenty of sleep.

Lack of vitamins was blamed for two of the commonest forms of dental trouble by Dr. Percy R. Howe. Tooth decay and pyorrhea, he said, have never been successfully produced by bacteria under laboratory experimental conditions, whereas they readily occur in animals deprived of vitamins A, C and D, and certain essential minerals. Lack of vitamin A, he added, has been shown to be especially damaging to the outer enamel of the teeth.

Beri-beri is not the only nerve disease due to vitamin deficiency, Dr. Maurice B. Strauss stated. Conditions like those of this Oriental ailment have been found in nutritional upsets following alcoholism and pregnancy. In the first type of cases, the alcohol was shown not to be directly destructive to the nerves, since the condition could be corrected with the right kind of diet. Pernicious anemia and pellagra bring about a serious degeneration of the spinal cord, which may result in complete paralysis. Liver extract has been found effectual in combating this condition.

Protamine insulin, a new form of diabetes treatment, was praised by Dr. E. P. Joslin. It permits the number of doses to be reduced to one in twenty-four hours, it maintains a more nearly even level in the insulin concentration of the blood and it has made the treatment of diabetes so much less disagreeable that many persons who formerly refused insulin are now willing to use the treatment in its new form. This is especially true of children. Finally, as a promise of still further improvements in treatment, the discovery of protamine insulin has spurred investigators into renewed activity.

Trichinosis, a painful and sometimes fatal disease contracted through the eating of infected pork, is fully ten times as common as has hitherto been supposed. Not two per cent., but twenty per cent., of population samples studied had suffered from the malady at sometime in the past. This rather startling state of affairs in the nation's public health was discussed by Drs. Donald L. Augustine and W. W. Spink, of the Harvard Medical School, at a symposium on infectious diseases, part of the celebration at Harvard University. The figures are based on recent dependable studies of autopsy material in Boston, Minneapolis and Rochester, N. Y. Recent studies in his own laboratory have convinced Dr. Augustine that the commonly used diagnostic methods, of looking for the parasitic larvae in blood, spinal fluid and body wastes, are futile, and that microscopic examination of bits of the patient's muscle is of doubtful value. Far better, he stated, is a serological test which he has devised, using the parasites themselves to prepare an antigen. This method is specific for this one disease, except the skin tests when used in patients hypersensitive to other proteins.

ITEMS

THE safety record of the commercial airlines of America for 1936 is already worse than it was for the whole of 1935, it is revealed in figures released by the Bureau of Air Commerce. For the first six months of 1936, 25 paying passengers were killed in regular airline travel. Last year only 15 passengers were killed during the twelve months. The increase in deaths will make a large swing in the much-discussed passenger-miles per passenger fatality figures. In 1935 the airlines traveled 24,037,290 passenger miles per passenger fatality. For the first six months of 1936 this figure has dropped to 7,574,134 passenger miles per passenger fatality.

A DROP of 4.7 per cent. in automobile fatalities for the first eight months of 1936 over the same period in 1935 is reported by Metropolitan Life Insurance Company statisticians in reviewing the record for industrial policy holders. This decline has occurred in the face of increases in motor vehicle traffic and in the consumption of gasoline, the statisticians comment. The National Safety Council found a 2 per cent. drop in automobile fatalities up to the end of July, 1936, as compared with the same period of 1935. The council does not take too hopeful a view of the situation, however, for July was the third successive month to register an increase in auto deaths over the corresponding month of last year.

A TWO-ACRE Indian pyramid near Metropolis, southern Illinois, is to be sliced and tunneled by archeologists from the University of Chicago. Excavations will reveal whether the great flat-topped pyramid, 40 feet high, contains evidences of prehistoric Indian life in the region, or whether it was raised merely as a high earthen foundation for ceremonial buildings. Dr. Thorne Dueul, of the university, is directing the expedition which consists of fourteen students. The Kincaid mounds, where the great mound is located, are believed to have been an important center of Indian trade in the upper Mississippi Valley, and previous excavations have shown that the earth ten feet deep is sown with debris of human occupation. The lost cemetery of the ancient settlement is also to be sought.