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DECREASE IN PELLAGRA

DEATHS from pellagra, "hard times" disease, have unexpectedly decreased during the present depression. Vegetable gardens and yeast seem to have effectually routed the former specter of economic depressions.

These two factors, together with education in pellagra-preventive measures, seem to have reduced the pellagra death rate by about one third in the face of the country's worst depression, according to a discussion of the subject by Dr. William DeKleine, of the American Red Cross, at a meeting of the Florida Public Health Association.

Dr. Joseph Goldberger, of the U. S. Public Health Service, showed before his death that pellagra is caused by lack of a certain factor in the diet. This factor is now called vitamin G. It is found in fresh vegetables, lean meat and abundantly in dried yeast.

When the great flood of 1927 devastated large portions of the Mississippi Valley, the American Red Cross undertook to apply Dr. Goldberger's findings. Dried yeast was distributed on a large scale. The residents of the area were encouraged to start home vegetable gardens, and more than 120,000 packages of seeds were distributed in 1927 and 1928. This action reintroduced gardening in many sections of the flood area where the farmers had previously depended on a cash crop, buying their own food at the stores and commissaries. Under this system, when the cash crop failed, they were unable to buy adequate food and, having raised none themselves, fell victims to the hard-times disease, pellagra.

The introduction of gardening in the flood areas was continued in other Southern states until 1932. In addition, housewives were shown how to can and preserve the garden foods for winter use. Dr. DeKleine believes that it is this gardening and canning, in addition to the distribution of yeast and other health foods by the Red Cross and other relief agencies, which have caused the drop in pellagra deaths despite the depression.

THE CAUSE OF DENTAL DECAY

LACK of phosphorus and vitamin D in the diet is the chief cause of dental decay, Dr. R. Gordon Agnew, of West China Union University, reported to the Board of Governors of the university meeting on December 6. Dr. Agnew's report summarized his four years of research in which he analyzed three thousand diets.

Depriving animals of these two food elements produced tooth decay in almost one hundred per cent. of the cases. Experience with the diet of four hundred and fifty children of a Toronto institution bore out the results of Dr. Agnew's studies on animals.

Dr. Agnew stated that his extensive experiments on laboratory animals and humans indicate that phosphorus and vitamin D are the important nutrient elements in the prevention of dental caries. With the laboratory animal phosphorus assumes a major rôle, but in humans, vitamin D becomes of great importance.

Dr. Agnew's findings check with observations made in the laboratories of Dr. E. V. McCollum, of the Johns Hopkins University. Dr. McCollum and his associates found that definite proportions of vitamin D, phosphorus and calcium were needed in the diet in order to prevent tooth decay. They explained this on the theory that the phosphorus was needed in the saliva to enable this secretion to act as a buffer solution keeping enamel-destroying acid from accumulating. Without the proper amounts of calcium and vitamin D, however, they believed the phosphorus would not get into the blood and then the saliva.

Commenting on Dr. Agnew's work, Dr. McCollum called it one of the more important chapters in the history of nutritional research.

"The inference drawn from the research," he stated, "shows that if we get an adequate supply of vitamin D, plenty of milk, vegetables and other foods rich in phosphorus, we can nearly all prevent dental caries. In that event attendant diseases attributed to caries will be materially lessened.

"It so happens that the average American diet is built around the protective foods rich in phosphorus and calcium. With a little care we can obtain the elements necessary to nutritional well-being, with the exception of vitamin D which is found chiefly in fish oils. Its natural source is found in the skin when activated by the ultra-violet rays of the sun. Unfortunately, the sun in this latitude is seldom strong enough, so the natural source must be supplemented."

SUN-SPOT CYCLES

SUN-SPOTS do not always grow more numerous at eleven-year intervals. There have also occurred periods in which the sun has very few spots at all and during these "dearth" periods the low numbers that do show themselves probably reach their maxima at intervals of ten years instead of the usual eleven.

This was one of the points developed in a lecture at the Carnegie Institution by Dr. A. E. Douglass, astronomer at the University of Arizona. Dr. Douglass has done notable research on climatic cycles as revealed by the varying widths of growth-rings in trees, and by using these data in the examination of wooden beams he has been able to determine when Indian pueblos in the Southwest were built.

The most notable period of sun-spot dearth since the beginning of modern astronomy, the speaker said, occurred in the seventeenth and eighteenth centuries. During this time, the tree-ring records indicate, the eleven-year sun-spot cycle was shortened to ten.

Indications of the occurrence of sun-spot cycles have been found in tree-ring and other climatic records of prehistoric date at intervals for millions of years. These records have been studied in buried tree-stumps found in Southwestern canyons, in Ice Age trees excavated in Germany, in fossil redwoods in Yellowstone National

Park that were green when three-toed horses roamed the earth, in the succession of thin clay layers of varves formed at the close of the Ice Age, and in certain Texas mineral deposits of Permian Age, before the dinosaurs came.

Besides the eleven-year "normal" sun-spot cycle, interrupted by occasional ten-year "dearth" cycles, sun-spot maxima also show at least two other groupings, Dr. Douglass said. One of these is a period of a little over eight years, the other about fourteen years. These minor cycles often make the record hard to decipher, and it is only by mathematically "peeling them off" by means of what is called the cyclogram method, that the underlying main cycles become clearly distinguishable.

In his study of climatic cycles as recorded in tree-rings, Professor Douglass has examined and measured over a quarter of a million rings.

THE WEIGHT OF AN INSECT'S SKELETON

How much does an insect's skeleton weigh? This question has been accurately answered for the first time by Patrick Alfred Buxton, of the London School of Hygiene and Tropical Medicine.

Like many other investigators who make it their business to find out all they can about the lives of insects, he wanted to know as much as possible about their vital functions. He has been experimenting by exposing them to different conditions of dry and moist atmospheres, determining what sort of exposure does them the most harm. Yet many times, after he had noticed that insects lost both water- and dry-material weight after exposure, he found himself faced with the problem:

"How much of what remains of this insect is living matter on which it could perhaps call for energy, and how much of it is 'dead' skeleton?" He determined to find out.

Insects do not have large, bony skeletons like higher animals. Much of their "skeletons" are made up of chitin, the horn-like substance that forms their shells and stings and sheaths. Mr. Buxton could not simply dissect an insect, take out all its bones, and weigh them.

Selecting a bunch of fat meal-worms, he dried them out and removed all the fat with ether. The rest he put first into pepsin and then into pancreatin, which are two digestive juices. He had to powder the little dried bodies and break up the legs, and then coat them with a liquid that would make them sink in the juices. And so he let them digest—literally, just as they would be digested in the stomach of an animal—for three or four days. What was left, he weighed.

When he came to use blood-sucking insects, however, he found that his digestive juices would not dissolve haematin, the dried blood-substance. He had to work out another method. Back he went to his meal-worms and using the results obtained by digesting for comparison, he found that dissolving powdered dried insects in potassium hydroxide solution at the boiling point for 24 hours would give the same results. And potassium hydroxide will dissolve haematin along with the rest of it.

About one twelfth of the body of a meal-worm is skeleton, Mr. Buxton discovered, but that is not the important thing. Others now have, thanks to his work, a method by which they can find the skeletal proportion of any insect.

THE ANCESTRY OF MAN

MAN can not trace his physical ancestry to any existing or fossil genus of the great apes. He is too big to be their descendant. Man and such apes as gorilla and chimpanzee are alike giants among their zoological kindred, and giants do not beget giants of radically different kind.

This line of scientific argument, directly contrary to Darwin's original theory as to the descent of man, is advanced by Gerrit S. Miller, curator of mammals of the Smithsonian Institution, in a report to the American Society of Mammalogists through its official journal. Mr. Miller's discussion was evoked by an article by a distinguished British anthropologist, G. Elliot Smith, who traces modern man from the great apes of the tertiary geological period with such intermediate steps as the Java Man, *Pithecanthropus,* and the so-called Dawn Man of Piltdown, England, *Eoanthropus.*

Mr. Miller does not reject the idea of a derivation of man's physical ancestry from somewhere in the simian line. But, he points out, all analogies we have in other more complete lines of animal descent point to the derivation of larger creatures from smaller ones, not from other large animals.

"The fact that man and all the great apes, excluding the gibbon," he says, "are in the advanced evolutionary stage known as gigantism can hardly be doubted by anyone who will take the trouble to survey the living members of the order primates as a whole. For he will then see that this group of mammals is made up of hundreds of kinds whose size ranges from that of squirrels to that of bird dogs, a dozen or two that are somewhat larger, and four whose great bulk makes them wholly exceptional—gorilla, orang, chimpanzee and man. Obviously it is the majority and not one of the exceptions that must set the standard for size.

"The records of paleontology show that giants have arisen in many groups of mammals. More significantly, they show that these overgrown creatures commonly exist during short intervals, geologically speaking, and then become extinct without giving rise to new lines of development. Their racial life seems to have advanced beyond its period of plasticity. It is true that a gigantic stock dating from one age is often represented in a later age by a modified successor of its own general kind—as one elephant by another. But in no single recorded instance have we the fossils to demonstrate that an earlier mammalian giant has been modified into a later giant of an obviously different type—as a mastodon into a modern elephant or a great sabre-tooth into a modern great cat. So complete is the absence of evidence that a mere suggestion of such transitions would not be seriously put forward. Nevertheless the evolutionary anomaly implied by either of the two examples just mentioned is probably no greater than the one implied by the belief that a

great ape, its evolutionary trend stabilized in gigantism, could change, under stress of altering environment, into such an essentially different kind of giant as man.

"It might, perhaps, be urged that we should, in the absence of knowledge to the contrary, be prepared to admit that some such unusual thing may have happened on the human line of descent, as Darwin once guessed it had. But the proper reply to this argument would be to insist that the occurrence of no unusual event in zoological history can be demonstrated on the basis of an alluring surmise and a few bones about whose exact nature it has been impossible for students to agree."

WILD ANIMALS IN NATIONAL PARKS

THE wild animals of our national parks, which serve as game reservoirs to replenish the surrounding country, have every prospect of wintering in excellent condition, according to Dr. Harold C. Bryant, assistant director of the National Park Service in charge of research and educational activities.

Forage conditions in the parks in the Rocky Mountain region are much improved this year, as a result of last year's heavy snows, and in Yosemite and Sequoia National Parks, in California, grassy areas not previously seen resulted from the storms of a year ago.

Despite the severe weather of the 1931–32 winter, the park animals came through exceptionally well. Now, as a result of good grazing conditions throughout the summer, they are fat and in fine condition to stand the rigors of another season and to resist the inroads of disease.

A serious problem that has confronted the National Park Service for several years, according to Dr. Bryant, and one that has not yet been satisfactorily solved, is the great concentration of game animals at winter feeding grounds with resultant danger of over-grazing. The summer grazing grounds in the parks are sufficient to support much larger herds, with the exception of the Yellowstone buffalo herd, which is reduced each year to about 1,000 head. Winter feeding, however, still presents a problem, and many of the wild animals go outside the park boundaries in winter.

This situation has been especially acute in the Yellowstone, with the so-called hunters lying in wait in blinds outside park boundaries to snipe the animals, particularly the elk, as they drift across the line onto the flats beyond.

A decided step forward has been made this year in protecting Yellowstone Park animals by the issuance of an order by the Game Commission of Montana declaring a "closed season" of three days out of every week during the regular open season. This gives some of the animals a chance to cross the intervening flats and get beyond to the valleys where they may be stalked by true sportsmen.

Last year the Park Service was quite concerned over the reduction of the mountain or Dall sheep in Mount McKinley National Park, Alaska, as a result of the extremely severe winter. This year it is hoped that winter conditions there will be more favorable, so that the interesting sheep herds may have a chance to stage a good come-back.

ITEMS

INFRA-RED light added to the normal allowance of visible light caused tomato plants grown in the laboratory of plant physiology at the Smithsonian Institution to grow more or less like plants living in the shade. They grew long stems, with long internodes or joints, and their leaves were larger than those of "control" plants getting the same visible light but no infra-red. The relative water requirement of the "infra-red" plants was lower. The experiments were performed by Dr. Earl S. Johnston.

A HALF-MILE of gravel road near Baton Rouge, Louisiana, has been resurfaced with cotton cloth in tests which may yield a quick and economical method of modernizing America's millions of miles of dirt "farm-to-market" roads and make a new market for surplus cotton. Arnold M. Davis was the engineer in charge of construction. South Carolina, Texas and Georgia are also experimenting with cotton-surfaced roads and Louisiana and Oklahoma plan to install additional "test mileage." It is reported that a strip of "cotton road" laid in South Carolina six years ago and exposed to usual traffic conditions has required no repair attention and is still in excellent condition. Bound down with an asphaltic substance and given a top dressing of oiled gravel to meet the grind of the wheels, cotton increases the life of a road by making it thoroughly waterproof.

FOR a white male child born in the United States in 1930 the chances of dying of tuberculosis are 42.5 in 1,000. But for white boys born in 1925 the chances were 50.9 per 1,000 of dying of this disease, while those born in 1920 had 64.6 chances per 1,000 of eventual death from tuberculosis. "This means that, out of every thousand white males born at the present time, twenty-two escape the death of tuberculosis to which they would have been fated under conditions prevailing ten years ago," according to statisticians of the Metropolitan Life Insurance Co., who computed the chances. White girl babies born in 1920 had 57.7 chances per 1,000 of dying of tuberculosis, while those born in 1930 had 35.6 chances per 1,000. Negro boys born in 1930 had 96.7 chances per 1,000 of dying of tuberculosis. Negro girls born in that year had 91.3 chances per 1,000 of death from this disease.

GIVE children toxoid to build up their resistance to diphtheria before vaccinating them against smallpox, is the advice suggested by studies of Dr. Charles Armstrong, of the U. S. Public Health Service. This should make the reaction to the smallpox vaccination comparatively mild and should avoid such complications as post-vaccination encephalitis. Furthermore, diphtheria is now a greater hazard to children in the United States than smallpox, so it would seem logical to protect against it first. In recent years the diphtheria death-rate has been 70 times as high as the smallpox death-rate in this country. Dr. Armstrong's studies of post-vaccination encephalitis, a serious complication which has appeared in recent years, led him to advise that all first vaccinations should be done in infancy, in order to avoid the encephalitis.