SCIENCE NEWS

Science Service, Washington, D. C.

THE SIGHT OF BIRDS

DENYING the plausibility of the long-accepted notion that bright feathers of male birds serve to attract their mates, Dr. Austin H. Clark, of the U. S. National Museum, has announced that the structure of birds' eyes and direct observation of their relation to their environment indicate that both the bright colors of the male and the modest hues of the female hide the wearers from their sharp-eyed enemies.

The idea that our most conspicuous birds are hidden by their brilliant coats appears paradoxical, but Dr. Clark points out that the conspicuousness depends on who does the looking. The secret lies in the construction of the bird's eye. It differs chiefly from our own and other mammals' eyes, he says, in being built about a lens of shorter focus. The image projected by the lens of a bird's eye therefore lies all in one plane or nearly so, resulting in the equal definition of all the objects in the field of vision. This is necessary for an insectivorous bird catching its prey upon the wing or for a predaceous bird. Distance means little to them, detection of their victims everything.

To a predaceous or an insectivorous bird, therefore, a landscape consists of a clear-cut patchwork of myriads of fragments of all sorts of colors and of sizes. Each stick and stone and leaf stands out sharply, no matter how distant. Against such a background, Dr. Clark explains, those objects must be least conspicuous which are most boldly colored in sharpest contrasts, dark and light, regardless of what the colors are.

In the relatively long-focus mammalian eye, sharp vision is possible in only one plane, which is continually shifting back and forth. Beyond this plane the landscape becomes blurred, and tends to be reduced to the average color of all its various elements, so that the creature least conspicuous to a mammal is the one most nearly like the average color.

The dull coated female bird which stays near the nest is therefore protected by her color from attack by mammals, Dr. Clark maintains, while the brightly colored male living in the tree tops and perching on the ends of branches is protected by the gaudier hues from attack from other birds with their wonderfully perfect eyes.

PHYSICAL CONDITION AND EXERCISE

THE commonly accepted idea that good physical condition is a safeguard against infection from disease germs has received somewhat of a blow from the results of experiments carried out by the late Dr. Reynold A. Spaeth in the laboratory of the Johns Hopkins School of Hygiene and Public Health. Dr. Spaeth found that female white rats which were "in training" as a result of exercise resisted one type of pneumonia infection less well than control rats kept in restricted quarters, where exercise was impossible. It is as yet too early, Dr. Spaeth felt, to advance any theory in explanation of this unexpected situation. The experiments, however, dispose of a suggestion that had been brought forward to account for the results of some earlier work on the same public health problem—the relation between physical condition and resistance to infection.

In a series of earlier experiments from the same laboratory it was found that, in both guinea pigs and white rats, animals that had been fatigued to the point of exhaustion by forced running in motor-driven drums resisted infection more successfully than rested, unfatigued animals. It was suggested that the exercise, even though carried to what from the animal's point of view was certainly excessive lengths, was responsible for the higher resistance. The experiments on white rats, where the animals ran spontaneously many miles and were in the pink of condition and yet failed to resist the infection as well as the controls, made that theory untenable.

It is of interest to note that among white rats the female is the more strenuous sex. The males were so slothful that they were finally eliminated entirely from the experimental cages. They persisted in behaving merely like an extra set of controls. The most active female ran nearly one thousand miles while the least active male ran, during the same time, less than one thousand feet. Female white rats run farther and are more active in the presence of the males, but even after the latter had been eliminated from the experimental cages, the females' performance still entitled them to be called "athletes" in contrast to the inactive controls—and the lazy males. And these athletes were less able to cope with infection than the sedentary males.

Experimenting next with guinea pigs Dr. Spaeth sought for an answer to the query: Why are athletes so fragile? Going over the results of these experiments, he was forced to the curious conclusion that these animals owed their resistance to infection, neither to exercise nor to fatigue, but to the fact that they were in a temporarily starved condition. The exhausted guinea pigs, which withstood infection better than the well-fed controls, lost as much weight during the hours in the motor-driven drums as though they had been partially starved for several days. Guinea pigs, like all herbivorous animals, eat or at least nibble almost all day and all night. Unless herbivorous animals can get concentrated food-stuffs in the form of grain, they have to keep feeding most of the time in order to get enough to eat. Unlike white rats, guinea pigs recover from fatigue by feeding, not by sleeping. Just as soon as they are able to drag themselves to the food-troughs, they feed ravenously, rapidly regaining their normal weight. An analysis of the results of the earlier experiments showed that whenever an experimentally infected guinea pig gained weight on the day after infection, that animal lived. The converse was not invariably true—that is, many animals lost weight and still recovered; but among those who succumbed to the infection there was not one that had gained weight the day after infection.

ANNIVERSARY OF THE CONQUEST OF YELLOW FEVER

TWENTY-FIVE years ago two "buck privates" and a few medical officers of the U. S. Army under Major Walter Reed at a camp in Cuba offered their lives and were experimented upon in order that yellow fever might be conquered.

"Among the truly great scientists who have blessed the race by putting into man's hand the means of protection from the most deadly diseases belongs Walter Reed," said Dr. Victor C. Vaughan, chairman of the Division of Medical Sciences of the National Research Council, in commenting on the anniversary. "His name is placed along with those of Jenner and Pasteur by the work he did in determining the cause of yellow fever."

Dr. Vaughan is now the sole surviving member of the "typhoid commission" on which Major Reed served at the close of the Spanish-American War, and which was established to fight the epidemics that raged among American troops.

"Yellow fever is now practically wiped out, except for small areas back of Bahia, in Brazil," said Dr. Vaughan, "and perhaps for spots in Africa where a mild disease somewhat similar to yellow fever still occurs, and which some authorities believe is where the disease first originated. A commission from the International Health Board of the Rockefeller Foundation went to western Africa in July for the purpose of studying this disease and determining whether it is truly yellow fever.

"Another school of medical thought claims that yellow fever existed in America before Columbus arrived, and that Columbus had the disease himself when he landed the second time. From there it is believed to have been spread to other portions of the earth in the old wooden ships which afforded an ideal hiding place for the mosquitoes that harbored the disease-giving organism."

At the close of the Spanish-American War in 1898, Cuba became a ward of the United States, and in the following year the dreaded yellow fever broke out among the American troops stationed there. A commission composed of Major Walter Reed, Dr. James Carroll, Dr. J. W. Lazear and Aristides Agramonte were appointed to look into its cause and transmission.

Like many great discoveries, this one was not made all at once or by one man. Dr. Carlos H. Finley, twenty years before, had advanced the idea that the disease was transmitted by mosquitoes. Major Reed determined to test out this theory, and the only way to do this was to use human beings to try it out on, as animals appeared to be immune. Volunteers were called for and the commission offered themselves too. Every man knew he was likely to die.

Two young soldiers, Privates John R. Kissinger and John J. Moran, offered their services. Dr. Reed talked with them and told them the danger and suffering involved and said that a money compensation would be made them if the experiment was successful. The soldiers declined the reward, and Major Reed touched his cap and said, "Gentlemen, I salute you." He wrote later in his published account of the experiment: "In my opinion this exhibition of moral courage has never been surpassed in the annals of the Army of the United States."

The volunteers permitted themselves to be bitten by mosquitoes that had stung yellow fever patients. Dr. Lazear became ill with fever and died in convulsions. Dr. Carroll almost died, and for three days his life hung in the balance. The experiment was tried on eleven other men and nine of them came down with yellow fever.

There were some who did not think this was definite proof. A lonely hut was constructed, far away from habitations and divided into two parts by wire screens.

The entire building was also covered with screens. Two susceptible men were put into this house, one in each compartment, and were thus subjected to the same conditions. Both lived there a while and remained perfectly healthy, showing there was no infection. Then Major Reed let fifteen infected mosquitoes fly into one of the compartments. The man in the mosquito-infested compartment was bitten fifteen times. In four days this man had yellow fever and the other one separated from him only by a screen remained perfectly well.

The mosquitoes were removed and soldiers were placed in each compartment. They remained well. There were still sceptics who claimed that infection might yet be by contact. Major Reed devised conditions which absolutely disproved this theory and showed that only by direct injection of blood from a yellow fever patient, or by an infected mosquito bite, which he said was the same thing.

Once the cause was known, it was possible to stamp out the disease. The effect of this event on history and world progress has been revolutionary. The Panama Canal became a possibility and shorter trade routes were open to all the ships of the world. Plague ridden ports of Latin America were cleaned up and large areas were made habitable. Some archeologists see in yellow fever the cause of the downfall of prehistoric American civilizations. There are those who see a new era of progress for Latin America now that the plague of yellow fever has been removed.

THE LONDON PREHISTORIC SKULL

A LEFT-HANDED lady at least 20,000 years old is attracting more attention in London than any young debutante. Part of the broken skull of this prehistoric inhabitant was found in the heart of the city in the course of deep excavations for an office building. Professor G. Elliot Smith, who has examined it carefully, has expressed the opinion that the woman belonged to the late stone age, and she is therefore the oldest Londoner and the second oldest British resident so far discovered.

One of the most interesting characteristics of the stone age Londoner is her left-handedness, which is indicated by the greater development of the right side of the brain. Six per cent. of the population to-day is left-handed and anthropologists think it likely that a similar condition extended back into the past indefinitely. Probably the prehistoric woman had the same difficulties in managing stone age tools and household equipment that modern left-handers have with right-hand telephones, door knobs and coat buttons.

The evidence indicates that the skull is very old. A fine Roman pavement had been discovered in the same locality a few feet below the ground surface. But the skull lay in blue clay under 40 feet of earth, far below relics of Roman occupation. The leg bone of a wooly rhinoceros was found at the same depth. And both above and below the skull level were bones of a mammoth.

The skull's antiquity is further shown by its fossilized condition, and the edges of the fractures indicate that it was broken in ancient times, possibly before it was deposited in the fossil beds of the Pleistocene gravel. There seems little doubt that the skull, like the animal bones, were carried to the site by floods coming from somewhat farther up the Thames.

The intelligence of the prehistoric woman is in dispute. A cast of the brain cavity, made by Professor Smith, shows that she was quite flat headed, and while there is no likelihood that the woman lived so far back as the Neanderthal period, experts who have examined her brain are not agreed as to whether it belongs to the earlier Neanderthal model popular some 50,000 years ago or to the later higher browed type known as *Homo sapiens.*

EOSINOPHILES IN MASTOID INFECTION

BLOOD cells which flash signals of danger or safety, as important as those of railway semaphores, form the basis of a medical discovery made at Spokane, Wash., by Miss Viola Brewer, technician in the laboratory of the Deaconess' Hospital. The young woman's research has given doctors a new method of sizing up mastoid infection and determining the need for an operation.

Miss Brewer has succeeded in taming the eosinophiles, those white corpuscles in the blood which become reddish on contact with the stain employed in making blood counts. Her discovery came about in connection with her laboratory work, in which blood counts were a part of the daily routine. The results of daily tests in mastoid infections centered her attention on the circumstance that subsiding infection is always indicated by a change in the character of the patient's blood test.

Through careful study and comparison, Miss Brewer demonstrated that severe infection causes disappearance of the eosinophile corpuscles in the blood of the patient. With improved conditions these corpuscles reappear in normal abundance. Frequent tests in individual cases showed that there was uniformity in the disappearance and reappearance of the eosinophiles. Close study showed that the changes were in exact harmony with the bedside record of clinical symptoms, including pain, swelling and temperature. In temperatures ranging from 98 to 100 the percentage of eosinophiles was at its maximum. By pursuing the comparisons the technician became convinced that the corpuscles could be made valuable aids to physicians on watch.

When research had established consistent activity of eosinophile action and clinical symptoms, Miss Brewer submitted a detailed report to her laboratory chief. This report has been accepted for scientific publication. Ear specialists in Spokane are employing the method in regular practice. They state that it is a valuable guide to treatment, and that the signals are important in determining the need for use of the knife.

NO "LOST CONTINENT" IN PACIFIC OCEAN

"LEMURIA," "Mu," and all the other hypothetical vast land areas forming "lost" Pacific continents, like the lost Atlantics of ancient European imagination, receive no credence on the part of Dr. Francis Xavier Schaffer, noted geologist of Vienna, now traveling in the Pacific area and the Orient. Dr. Schaffer is backed up in his opinions also by the scientists at the Bernice P. Bishop Museum of Honolulu.

Though no land areas of continental size ever existed in the Pacific, Dr. Schaffer stated, there are regions or movable zones where emergence and submergence are constantly in progress.

"Such a line," he said, "goes all around the Pacific and connects the Antarctic continent with the continents of the southern hemisphere. It is easy, too, to see that the northern continents may more than once have been connected by way of the Bering Strait and by the rising of the relatively shallow sea bottom between Greenland and Europe."

Dr. Herbert E. Gregory, director of the Bishop Museum, disagrees with the theory advanced by Dr. J. Macmillan Brown, chancellor of the University of New Zealand, who claims that the Pacific islands are the remnants of a once great empire that collapsed into the ocean in a series of cataclysms.

"Geological evidence," said Dr. Gregory, "gives no proof that there ever was a large area of land in the central Pacific. No rock has been found which could be considered part of an old continent. The only way that geologists will ever be able to make a real test of these theories will be by an extensive system of borings which must extend through the coral and the comparatively new levels of the islands, and also by a carefully planned sounding of the Pacific Ocean."

"The lost continent theory can not be substantiated by botanical discoveries," said Dr. Forest B. H. Brown, botanist of the Bishop Museum. "In the Hawaiian Islands, for instance, over 80 per cent. of the plants with net-veined leaves occur nowhere else in the world. Had Hawaii been a part of a continent of which the other Pacific islands were also parts, one would expect more plants in common to all."

ITEMS

THE stir caused some two months ago by the alleged discovery by a French Government vessel that the floor of the Bay of Biscay had undergone a sudden upheaval and that, in place of the abyss marked on the marine charts, there was now a comparatively shallow plateau, seems to have been a hoax. A special survey ship of the French Government, the *Gaston-Rivier,* was sent out to check the soundings reported, and Dr. Charcot's scientific ship, the *Pourquoi-Pas,* collaborated in the work. After the most thorough investigation it was found that the bottom of the Bay of Biscay had not changed in any way since the charts in general use were made.