

## SCIENCE NEWS

Science Service, Washington, D. C.

## ANIMAL LIFE IN HOT SPRINGS

THOUGH always in hot water, many forms of animal life that inhabit the geysers and thermal springs of Yellowstone National Park and similar regions the world over appear to thrive and enjoy life, according to an article by Professor Charles T. Brues, of the Bussey Institution, which will appear in the forthcoming number of the *Quarterly Review of Biology*.

Professor Brues has conducted investigations in Yellowstone Park, and assembled data from studies in other parts of the world, all of which indicate that practically all of the principal fresh-water forms of life, and many that inhabit brackish or briny waters as well, are represented in the populations of these steaming baths. None of the animals favors the hottest waters, which reach temperatures between 190 and 200 degrees Fahrenheit, though plants of lowly classification can live in these places. The animals live in the cooler parts of the springs, though even in these the water is continually as hot as the hottest summer day at noon. Thus, he found water-beetles in water of 90 to 100 degrees, the larvae of a species of horsefly at 91 degrees, a water-bug at 96 degrees, snails at the same temperature, and bloodworms at 120 to 124 degrees. He found a small animal related to the crayfish in slightly cooler but still tepid water, and identified it as the same species that lives in the Arctic in ice-cold ponds.

Temperature, Professor Brues states, is not the only problem these animals have to solve. When the water is warm it holds but little oxygen in solution, and they have to breathe somehow. Some of them, like the mosquito "wrigglers," do so by coming to the surface for air, while others seem to have adapted themselves to the small supplies of this necessary element afforded by the water. Moreover, the water frequently contains an excess of carbon dioxide in solution, and sometimes poisonous chemicals, such as sulphuretted hydrogen gas and arsenic, and they have to be able to withstand these. Finally, the water always has either limestone or silica in solution, and the former is especially ready to precipitate if the temperature drops a little, threatening constantly to enclose in a mummy-case of chalky material any small animal luckless enough to be caught away from water hot enough to keep the stony material properly dissolved.

## RESULTS OF INBREEDING ON NORFOLK ISLAND

PROVIDING the original stock is sound, inbreeding among human beings results in no deterioration, physical or mental. Nor does mixture of widely differing races produce an inferior type. Such are the conclusions of Dr. Harry L. Shapiro, ethnologist of the American Museum of Natural History, from recent study of the inhabitants of Norfolk Island, a small island north of New Zealand. They are Tahitian-English half-castes whose history dates back to the mutiny of the crew of the ship *Bounty* in

1789. At present there are more than 600 of these islanders and they are the descendants of twelve Tahitian women and nine Englishmen, part of the mutinous crew.

In 1789 the crew of the *Bounty*, a vessel sailing in the southern Pacific, mutinied, casting the captain adrift in a small boat and making for Tahiti. Here nine of the crew, fearing capture, sailed to Pitcairn, a small uninhabited island east of Tahiti. They took with them twelve Tahitian women and nine Tahitian men. On Pitcairn the women were divided among the Englishmen as wives. The Tahitian men were allowed no women. This led to jealousy and the Tahitian men were killed, leaving no descendants. The Tahitian women and the Englishmen all of them sound stock established a line of half-castes. They were completely isolated and they multiplied rapidly.

By 1856 the population was too great for the small space of Pitcairn. More than 150 moved to Norfolk Island which was at that time uninhabited. To-day there is a population of 600 on Norfolk Island and 175 on Pitcairn, all the descendants of the original Tahitians and English. It is of the Norfolk Islanders that Dr. Shapiro has made a study.

Dr. Shapiro has found these islanders to be of sound physique, taller than the average English and Tahitians, and of good mentality. There is only one feeble-minded person, he said, on Norfolk Island. Their education has of necessity been rudimentary for generations, but they are now provided with teachers by the Australian Government under the jurisdiction of which they come. And the teachers are getting excellent results.

Thus, according to Dr. Shapiro, the Norfolk Islanders prove that, when the stock is sound to begin with, intensive in-breeding makes for no decrease in stamina. Likewise, race mixture, in his opinion, brings no deterioration.

The idea that the half-caste is inferior, he maintained, comes largely from the fact that pure races have always looked down on the half-caste. In Norfolk Island, he said, the half-caste has a chance to show his worth, for there is no discrimination against him, as the entire population is half-caste. And Norfolk Island, he pointed out, is one of the only places in the world in which no stigma is attached to half-castes.

## THE COMING ECLIPSE OF THE MOON

AMATEUR astronomers will have the opportunity of aiding their professional brethren in observing the eclipse of the moon on the early morning of June 15. The eclipse will be visible throughout the country, clear weather permitting, and Dr. Willard J. Fisher, of the Harvard College Observatory, has made a special appeal for amateur observations. Persons living in the southwestern part of the United States will probably have the best chances.

"Clouds are possible at even the biggest observatories," he said, "and the results of a few amateurs may be valuable on that account, if for no other reason."

A unique feature of the eclipse is that it is just barely total. At 12:34 A. M., eastern standard time, on the morning of June 15, the moon will enter the outer part of the earth's shadow, or the penumbra. The shadow of the earth extends out into space on the side opposite to the sun, and is in two parts. Outside is the penumbra, in which a person floating out in space would see the sun partly covered by the dark disc of the earth. But if this imaginary observer were located within the umbra, or inner shadow, the sun would be entirely obscured by the earth. The only light reaching him would be that bent around the earth, and into the shadow, by the earth's atmosphere. A similar bending of the sun's light by our atmosphere occurs at sunset, and the sun is really seen for a short time after it would have disappeared, if the earth were not covered with an air layer.

At 1:43 A. M., eastern standard time, the moon will enter the umbra, or inner shadow. At 3:13 A. M. the total eclipse begins, when the moon will be completely within the umbra. Nine minutes later, 3:24 A. M. the middle of the eclipse will be reached. The only light that reaches the moon during the eclipse is that which is bent around the earth by our atmosphere. As the air passes red light more readily than blue, the eclipsed moon usually shows a ruddy color, but just how bright the moon appears at such a time is believed to be dependent on weather conditions on the earth. If the weather is cloudy over the part of the earth around which the light is bent, the eclipse would doubtless be darker than if this region were clear. The moon leaves the umbra, and the total phase is over at 3:35 A. M.

According to Dr. Fisher, this eclipse offers an excellent opportunity to test the effect of the atmosphere on the brightness of the eclipsed moon. At mid-eclipse the part of the moon indicated by the arrow on the diagram is just barely within the inner shadow. The light that illuminates this part just grazes the earth over a line crossing Canada from Alaska to Nova Scotia, and so weather conditions in this region will probably have a great effect.

In order to get an accurate idea of the weather conditions at the time of the eclipse in this critical region, Dr. Fisher, with the aid of Professor R. Meldrum Stewart, director of the Dominion Observatory at Ottawa, has arranged to have Royal Canadian Mounted Police, Catholic Missionaries to the Eskimos, and fur trappers, report weather conditions. G. A. Wendt, of the Canadian Westinghouse Company, has also arranged to have appeals for such weather observations sent out by radio.

However, as the sun will just be rising, and the eclipsed moon just setting in this region, it will not be a good place to observe the eclipse itself. In the north-eastern part of the United States, the eclipsed moon will be low in the southern sky. In the southwestern part of the country, it will be higher and in the southeastern sky. Observations made in the United States of the eclipse itself during totality will be compared by Dr. Fisher with weather reports from Canada, in an effort to determine the effect of the earth's atmosphere.

As amateurs, with small telescopes, or even with the unaided eye, may be able to make observations that will be missed at the big observatories on account of cloudy

weather, Dr. Fisher urges all who have the opportunity to observe the eclipse and report their results to him.

"Such persons," he says, "should note the following points, with instruments of any size, from opera glasses up, and with the naked eye:

"Geographical position, time zone, weather and sky conditions; time of each observation; size and powers, even of opera glasses, for each observation; times of contact of the edge of the moon and the edge of the shadow; description of the edge of the shadow; when and how the red color appears and disappears; spots or blotches apparently going across the moon during the eclipse, and so distinct from the ordinary lunar markings; and the visibility of the surface details of the moon, with naked eye, and a variety of instruments, if possible.

"A special observation, easy to make, and of interest, is of the visibility of the moon's features through colored glass. The easiest to get is blue cobalt glass, but good green glass, or ruby glass, like that which the photographer uses in his dark-room lantern, are more valuable, as they pass light more nearly of a single color. Such observations may also be made with the naked eye or a telescope."

Results of such observations should be sent to "Lunar Eclipses, Harvard College Observatory, Cambridge, Mass."

## THE SLEEP OF WHALES

WHERE and when do whales sleep? This question is asked and partly answered by Robert W. Gray, of Exmouth, in a report to the scientific journal, *Nature*. Mr. Gray is the son of an old whaling captain, and has had many opportunities for first-hand observations on voyages in the northern seas.

Whales are warm-blooded creatures, related to the fur-bearing animals that live on land rather than to the fishes of their natural habitat; it is assumed, therefore, that they require sleep in much the same manner as land-living mammals. Once in a while they have been caught asleep at the surface by whalers—usually with fatal results to the whale. A whale suddenly aroused by being harpooned thrashes about for a few moments instead of diving at once, as whales do upon being harpooned while they are awake. For this reason, old-time whalers used to arouse sleeping whales by rapping sharply on their boats before casting their harpoons, because the startled floundering of the monsters might smash or swamp their craft.

But whales found sleeping at the surface are a comparative rarity, and Mr. Gray agrees with other whalers in believing that they require more sleep than they have been observed to take. He is of the opinion that they can sleep under water, and quotes statements to the effect that they may sleep under ice fields.

But sleeping under water, for an air-breathing mammal, has its difficulties. Mr. Gray inclines to the opinion that a sleeping whale, whether at the surface or submerged, does not breathe at all, but closes its blow-hole tightly to exclude water and slumbers while literally holding its breath. He calls attention to the fact that harpooned whales frequently remain submerged for as much as an hour, exerting every muscle in their fight for life, and

reasons that the very much reduced breath-requirement of the sleeping animals would make it possible for them to remain submerged and sleeping for several hours before it became necessary to come up and "blow."

### OATMEAL AND RICKETS

THE paradoxical situation of a Scot denouncing oatmeal as a deficient article of diet and of an American defending "the halesome parritch" has arisen out of the experiments of Professor Edward Mellanby, at the University of Sheffield, and of Professor Harry Steenbock, at the University of Wisconsin.

It is agreed among all physiologists that any cereal taken alone is deficient in vitamin D, which prevents the disabling bone disease, rickets, in children and young animals. Some time ago Professor Mellanby got results with oatmeal fed to puppies that were so much worse than those that followed a diet of other grain products that he assumed the presence of an unknown substance in oats, with action opposite to that of the vitamins, which he named "toxamine."

Now Professor Steenbock, one of the outstanding authorities on the formation and activities of vitamin D, states that he has very carefully repeated Professor Mellanby's oatmeal experiments. He states that while he finds oats to be somewhat inferior to wheat in the matter of preventing rickets, he can find no evidence that they are as bad as Professor Mellanby paints them, and that he is not convinced of the existence of the hypothetical toxamine.

While an exclusively cereal diet is practically certain to bring on an attack of rickets, Professor Steenbock adds that as ordinarily used, with the addition of other foods of high calcium content they are valuable elements in the diet. Cereals themselves may be given an adequate vitamin D content by exposure to ultra-violet rays.

### ITEMS

EXPOSURE to ultra-violet rays, which has been shown in the case of cows to increase the vitamin D content in dairy products, does not work with fish, according to Charles E. Bills, research chemist of Evansville, Ind. Fish subjected to five-minute exposures of ultra-violet irradiation every other day for six weeks produced oil that displayed no more potency than that made from fish which had not been so treated. During the period in which the Newfoundland codfish fattens, it gorges itself on small fish known as caplin which contain only a small amount of vitamin D. To account for the unusually high potency of cod-liver oil the cod would have to consume, within a period of four weeks, about 26 times its weight of caplin, a most unlikely quantity. The presence of vitamin D in the liver of fish consequently is judged to be the result of chemical reactions in the body of the fish at present not clearly understood.

SEEDS of the Indian lotus a hundred years old have more active life in them than the same kind of seeds of last year's crop, according to a report of Dr. Ichiro Ohga, of the Educational Institute of Darien, Manchuria, to the

*American Journal of Botany*. Dr. Ohga tested these ancient seeds both by sprouting and by chemical examination, and they won on both counts. The research was carried on during Dr. Ohga's sojourn in this country, at the Boyce Thompson Institute, Yonkers.

Is cancer one of the penalties people must pay for the comforts of a complex civilization? Cancer statistics from Mexico, just compiled by Dr. Frederick L. Hoffman, of the Prudential Life Insurance Company, point to the fact that cancer flourishes less among primitive peoples than it does among their more advanced neighbors. In his exhaustive survey of Mexico, Dr. Hoffman has found that the modern plague is far less frequent among the native Indians than among the inhabitants of cities. Mexican states in which the population is preponderantly Indian show a surprisingly low death rate from cancer, he states. Cancer is only from one half to two thirds as common in Mexico as in the United States and Canada. Contrary to general medical expectation, Dr. Hoffman's figures indicate that red peppers and chile are safe cancer hazards, at least to those inured to their effects. It has been conjectured that the irritations set up by the hot diet of the Mexicans would presuppose a high incidence of cancer of the stomach and the digestive tract. Such is not the case, however, according to Dr. Hoffman. Cancer is much commoner among women than men, possible reasons suggested being that it is a latent after-effect of frequent childbirth with lack of proper attendance and care.

ETERNAL ice, to depths of more than a hundred yards, binds the soil of northern Siberia even in summer, according to Professor Schostakowitch, of Irkutsk, who spoke recently before the Berlin Geographical Society. The frozen ground covers an area of 5,000,000 square kilometers, a territory half as large as Europe. In Yakutsk a well has been sunk to a depth of 117 meters without finding the bottom of the frozen stratum. The ice hinders the sinking of surface water, so that vast cold bogs or tundras are formed on what might otherwise be fertile soil. The only spots where thawing ever penetrates this everlasting ice are directly beneath stove-heated houses. Cases are on record where these thawed columns of soil tapped subterranean rivers flowing under the ice layer, resulting in veritable artesian wells that spurted to the ceilings and drove out the occupants. This water soon froze, turning the whole house into a solid block of ice, decorated with gigantic icicles.

"FEEDING the fishes" is not such a simple matter. The dietetic requirements of a trout are decidedly specialized. Experiments carried on by the U. S. Bureau of Fisheries show that beef liver, beef heart and sheep liver will do nicely for spring planting with steelhead, rainbow and brook trout, but when trout are to be reared to a larger size beef liver is what will produce the biggest and best trout. Something new on the menu may result from experiments with three new fish foods—soy bean oil meal, a dried shrimp product and a fresh-water mussel meal. In the future the fresh meat diet may be expanded to include these foods as substitutes for a part of the meat.