

Future of Teeth Predicted From Study of Past

Paleopathology

By Emily C. Davis

Skull of an unhappy Indian of San Nicolas Island, who had pyorrhea and abscesses and rheumatic joints.

What are our teeth coming to? The opinion is often gloomily expressed that evolution is insidiously at work on our grinding and chewing tools and that the faces of the future will be very different from the faces of today.

We know that a part of the body that is no longer used has a tendency to disappear: Witness the well-known case of the ancient little horses that ran on tiptoe until in the course of milleniums their four or five toed feet had only three toes and finally each foot had only a single stiff toe or, as we call it, a hoof.

With such warnings from the past in mind it has been predicted that eventually men will have poor, ineffective teeth and finally none at all. Diseased teeth are now a commonplace among civilized men; and the modern diet contains so large a proportion of soft, sweet, and cooked foods that the teeth get no strenuous setting-up exercises and have to combat unfavorable chemical conditions. When a tooth gets a low efficiency rating from the dentist, out it comes, in goes a synthetic tooth, and we apparently get along just as if nothing had happened.

So, it is sometimes argued that the next age of man will be the toothless age. The vision of that future human type shows a creature with a specialized, horny gum good enough for dealing with the pills and pastes and liquids which the food chemists of that day will provide as a balanced diet. We may well shudder to imagine the mumbled speech and the

unbeautiful faces of that toothless race.

But a more reassuring picture of the future is seen by one well known scientist who has taken a long look into the past. By tracing the panorama of toothaches in the prehistory of the world for millions of years, he gauges the direction in which the world's creatures are traveling, so far as dental evolution is concerned. He has scrutinized the fossil teeth in early beasts from fishes and dinosaurs to sabre-tooth tigers and horses, and in early men from Egyptians to Indians. This scientist is Dr. Roy L. Moodie, professor of dental research at the University of Southern California and an authority on paleopathology, or, in words of two syllables, the study of disease as shown in fossil bones.

Dr. Moodie takes a cheerful view of man's future in spite of the fact that thousands of people are wearing artificial teeth where the natural tools ought to be; in spite of the serious prevalence of defective teeth among school children; and in spite of the fact that pyorrhea, which causes the teeth to loosen in their sockets, appears to be more prevalent than ever before.

Pyorrhea, which is today the most widespread of all diseases, was the world's oldest disease, Dr. Moodie has found. It is a disease in which chemical action causes erosion of the edges of the tooth sockets. Bacteria invade the sockets and the teeth loosen and fall out.

Now, fossil skulls examined by Dr.

Moodie show that this process took place in the mouths of ancient fishes in the ages before there were any birds or mammals on earth. The dinosaurs and the water-dwelling lizards, the mosasaurs, suffered from the same disease in the Age of Reptiles, millions of years ago. Mammals of many kinds, when they appeared on earth, inherited this wasting process. Bones of old camels and the mighty elephant-like mastodons show it. The sabre-tooth tigers had it, and the cave bears. All types of ancient and fossil races of man exhibit traces of the same trouble.

The prehistoric inhabitants of Hawaii as represented by their skulls and bones preserved in the Bishop Museum at Honolulu are known to have suffered from diseases of the teeth and particularly from pyorrhea.

But, on the whole, Dr. Moodie finds that no human race in the past suffered from tooth troubles as did the Indians who inhabited Peru in the centuries before white men came to America. These were the tribes which finally were bound together into the great Incan Empire, when a comparatively small group of Incas, or nobles, set out in a determined campaign of conquest. These Peruvian Indians were more direfully afflicted with dental troubles than the ancient Egyptians whose diseases have been studied with special care.

Like the Egyptians, the Peruvians bound their dead in many wrappings, and when the bundles were put away in dry caves in the highlands or in the desert sand of the Peruvian coast, the climate preserved the bones in good condition. Many of these packages have been opened and examined by scientists seeking to know the types of anatomy of the prehistoric Indians and the diseases and

wounds which left traces in their skeletons. Other mummy packs have been examined by the keen eye of the X-ray which looks through the many layers of cloth and photographs the skeleton within.

Dr. Moodie has examined many of the bones of these Indians.

"A large percentage of the inhabitants lost all of their teeth by middle age from pyorrhea and abscesses," he says. "Hundreds of palates were found wholly without teeth, but bearing the marks of active disease."

The Indians of Peru did not suffer as much from decayed teeth as modern America does, but abscesses starting in the socket of a tooth often penetrated into the head, producing infection in the sinuses which broke through into the eye cavity and into the middle ear. This would have resulted in a high percentage of deafness.

We thus have the dental history of an ancient people which suffered excessively so that those with low grade teeth were soon eliminated, Dr. Moodie concludes. But nothing radical has happened to the dental anatomy of South American Indians. Among the modern inhabitants of the same region in the Andes Mountains may be found the descendants of the earlier population, though there has been some intermingling of races. And these people show no sign of startling dental deterioration.

"If the Andeans retain functional teeth after generations of excessive disease, we may look forward to a long continued functioning of our own teeth" is the moral Dr. Moodie reads in their experience.

There may be a different kind of warning, however, in the example of those Indians. The poison from dental infections draining into the systems of individuals was a weakening factor which may have seriously impaired the political welfare of the tribes, Dr. Moodie suggests.

Pointing out a hard palate of an Indian who lost all his teeth before the age of thirty-five and who would have surely lost strength from improperly chewed food, the paleontologist proposes the theory that such conditions as this among the tribes of Peru may have aided the Incas in subduing entire tribes and city-states. Thus tooth defects may have been a determining factor in the establishment of the Incan Empire. The political consequences of pyorrhea have never been traced, but they appear to be a matter for interesting, possibly important, investigation.

Dr. Moodie finds no evidence that the Peruvians practiced dentistry. They attempted serious operations on the skull and other parts of the body, and often with good success. But jaw bones of Peruvian mummies indicate that the idea of extracting a loose tooth or draining an abscess never occurred to them.

Even in Egypt toothaches got little practical attention. An Egyptian surgeon of the pyramid building age, some 4,700 years ago, did operate on a patient suffering from an abscess under a molar tooth. The jaw bone shows that a hole was bored through the bone below the tooth and the abscess was successfully drained. But this progressive adventure in dental surgery did not lead the Egyptian physicians very far into what we would think a most promising field. Examinations of thousands of Egyptian mummies has never revealed certain evidence that the physicians of that land supplied artificial teeth, even to the most influential patients.

A museum in Paris has the jaw of a Phoenician woman who lived about 300 B. C. and who appears to have possessed the world's oldest false teeth. The two right incisors are represented by artificial teeth held in place and bound to each other by fine gold wire. But this is not very ancient surgery as the record of man's diseases goes.

From recent evidence, it seems likely that in our own country operative dentistry had its beginnings about 2000 B. C., among the Indians who lived in New Mexico.

"Experienced dentists after examining a collection of jaws of pre-Pueblo Indians thought to be four thousand years old, have decided that the condition of several of the jaws shows that these Indians practised tooth extraction," Dr. Moodie says. "Growth of new bone in several cases reveals that this process was resorted to as a relief from pain. It is believed that they must have had some instrument made of hard wood, for none of the teeth removed were loose enough to be removed with the fingers alone."

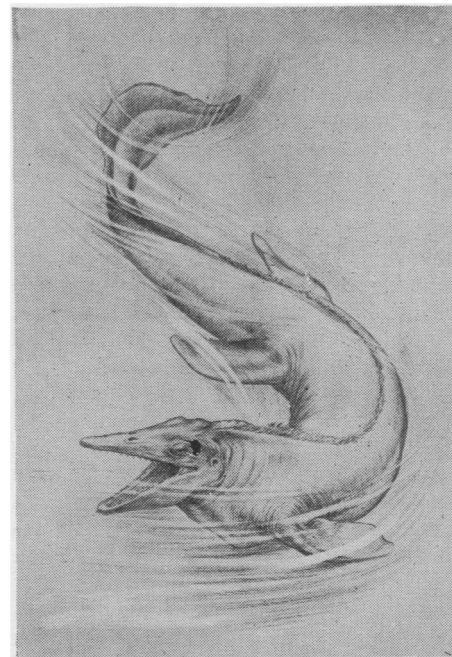
This is an important discovery, Dr. Moodie emphasizes. No primitive race of people have ever heretofore been known to adopt this simple procedure for the relief of pain.

A mosasaur of the earth's great Age of Reptiles, some 150,000,000 years ago. Bones of such creatures add to the evidence that pyorrhea and dental cavities are just about the world's oldest diseases.

We know very little of the incantations and potions which must have been used to exorcise the demons of the toothache, by any of the forerunners of the modern dentist except that the treatment seems to have been of no practical value on a great many occasions.

The skeleton of an Indian who lived on San Nicolas Island, off the coast of southern California, is cited by Dr. Moodie as showing graphically the unhappy state of a victim of unchecked dental diseases. In this skeleton the paleontologist reads a story of an Indian who was an exceptionally strong type. Tartar accumulated on his teeth, pyorrhea set in, and poisons entered his blood stream. This was accompanied by a serious attack of rheumatism. Almost all of the joints of the man's body, even the ribs, were affected so that he could not move without pain. So far as any one can tell today nothing was done to relieve the abscesses, or at least nothing effective.

One type of toothache was not prevalent in earlier times, and that is the type due to dental decay. Dr. Moodie has found that caries, or formation of cavities in teeth, was about the rarest form of physical distress among the early prehistoric animals. Among the mummies and skulls of early human beings some cavities are found, but not in such commonplace frequency as today. When groups of modern children are examined we hear such results as that 95 per cent. of children entering the first grade of a city have one or more decaying (*Turn to page 30*)



Future of Teeth—Continued

teeth and about one-third have abscess formation. While at college age, we hear of 3,000 students being examined at one institution and only ten perfect sets of teeth being found.

Cavity formation due to bacteria entering through the enamel of the teeth occurred less often when people had little or no sugar in their diet, Dr. Moodie points out. Then too, he adds, the gritty food eaten by many tribes wore off the teeth so rapidly that caries seldom gained a foothold. The grit consisted of sand, bits of stone from grinding bowls, pieces of nut shell, seeds, bits of bone. Such extra materials were carelessly mixed in with the food when it was prepared or eaten. The teeth all wore down evenly until pulp infections occurred and then abscesses formed. After that, pain would cause the individual to chew unevenly and the teeth would wear unevenly. This would also cause disturbances of the joint surfaces near the ear and possibly deafness.

Some tribes knew the tortures of toothache much better than others. Among the early inhabitants of New Mexico caries often attained a great development, so that molar teeth were reduced to mere shells, with cavities extending far down into the roots. And a study of 300 Indian skulls from California showed Dr. R. W. Leigh that one Indian in four had carious teeth.

"Among modern white people, the wisdom teeth offer great disturbances and sources of pain from being impacted and decayed," Dr. Moodie says. "It certainly seems probable that our wisdom teeth are on the road to extinction, and if the white people lose their teeth the wisdom teeth will be the first to disappear."

Science is only now probing the facts about nutrition in its connection with tooth building and the facts about the bacteria involved in pyorrhea and dental decay. Such knowledge might be expected to play a major role in warding off the toothless age of the race.

Dr. Moodie points out that some people today are largely immune to diseases of the teeth. In the same household a brother may suffer from one decaying tooth after another while his sister, otherwise no healthier than he, may escape all dental troubles. If the factors that bring about that immunity can be understood and the knowledge generally applied, the dental evolution of the race may turn

out to be a matter of general improvement of the health and strength of the teeth rather than the specialized, horny gums which have been pessimistically predicted.

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Rear tires of an automobile wear one-fifth faster than front tires, according to a recent experiment.

A plant now being erected in Germany will manufacture citric acid by fermentation of molasses.

America's death toll of fighters in the World War in two years was 37,000; 96,000 Americans were killed by accidents in 1928.

Reindeer meat differs little from beef or veal of the same grade, but in general contains less fat and a little more protein.

Indian medicine men were the first to use bark and leaves of the witch hazel plant to alleviate pain, a botanist states.

An underground camera which photographs the progress of drilling for oil wells is an aid to the drillers in keeping the hole to the proper course.

Easter lilies are grown commercially in Florida.

Government experts have developed apparatus to calculate the amount of air passing through different fabrics.

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NATURE RAMBLINGS



Feeding the Snowbirds

There is a large population of birds that either remain with us through the winter or come down from Canada during the snowy season, and these cheerful little tumblers in feathers often find life hard when the weather is cold and the snows are deep. The crumbs from our tables are feasts for them, and a dish of water is a grateful gift for dry little throats that cannot find any that has not been frozen into solid ice.

Scattering crumbs on the snow or the open ground is well enough, and you will be thanked for it; but it is much better to put it into a box on top of a post, where the little feasters will not be subject to the sudden on-fall of a sneaking cat. Such a box may be simply a shallow tray made of the bottom of an ordinary small wooden packing case. But an open tray fills up with snow, so that it is better to have it sheltered from the prevailing winds with a partial wooden canopy. Into this box go the breadcrusts, pieces of carrot and other bounty you may have for the birds. But a special gift, a lump of suet, should be wired or nailed to the post or to the branch of a tree nearby, to give the birds a hearty meal of animal stuff with plenty of calories in it.

When you give them water, do not stick strictly to the Biblical "cup of cold water." In freezing weather cold water will quickly turn to ice. Warm up the water until it is as hot as good hot coffee or tea, and pour it into a warmed pan. Then it will last many times as long before it goes solid.

Science News-Letter, January 11, 1930

In the Island of Jersey cabbages grow taller than a man's head, and the long stalks are dried and polished and sold to tourists for walking sticks.