EVOLUTION

Man of the Future

Greater Height, Hairless Body and Larger Brain But Smaller and Poorer Teeth Seen 500,000 Years Hence

By DR. FRANK THONE

EVER since Darwin popularized the doctrine of evolution, and as a consequence thereof extended man's history into the past a hundred times as far as people were used to thinking it had gone, a favorite pastime of prophets of the romantic school has been to project man's history-to-be into imagined future centuries. Some very fascinating and fantastic pictures have thus been drawn of what humanity will be like, but they have been almost wholly the work of imagination; scientists have for the most part shied off, denying that they were prophets or the sons of prophets.

But now arises in the assembly of romancers and sheer guessers a young man soundly versed in anthropology, the Science of Man, and offers a modest forecast of what mankind may be like 500,000 years from now. He is Dr. H. L. Shapiro, associate curator of physical anthropology at the American Museum of Natural History. He is a young man, but his ability and promise are well attested by his older colleagues. And the suggestions he puts forth, somewhat provisionally, are not just guesses; they are based on careful study of the fossil remains of early races of man and of his nearest cousins among the lower animals, together with observations of what seem to be present trends of physical development among modern men. In other words, Dr. Shapiro's prophecy is the application of a common method of sciences—the projection of the more or less solid line of the known past as a dotted line into the unknown future.

To forecast what man may be like at the end of half a million years may seem a very bold thing to do, but Dr. Shapiro, with some humor, declares it to be exactly the opposite. There are two ways, he says, for a prophet to escape the consequences of prophesying wrongly: either he may be as vague as the famous Delphic oracle was, so that anything that happens may be taken as the fulfilment of his dictum, or he may set the date so far in the future that he will be dead and gone beyond the reach of criticism by the time the outcome of his prophecy is known. So five hundred thousand years offers immunity.

There is another good reason, however, for taking so long a focus into the future. Any prophecy at a much shorter range, say ten or fifty thousand years, Dr. Shapiro says, might not be particularly interesting, for evolution moves so slowly that nothing much is likely to happen to man's physical being in such short periods as those. Present-day man is very little changed from the men of the later days of the Old Stone Age, if indeed he is changed at all. But half a million years gives man time enough to change his make-up and emerge with at least a slightly different face and figure.

Precaution

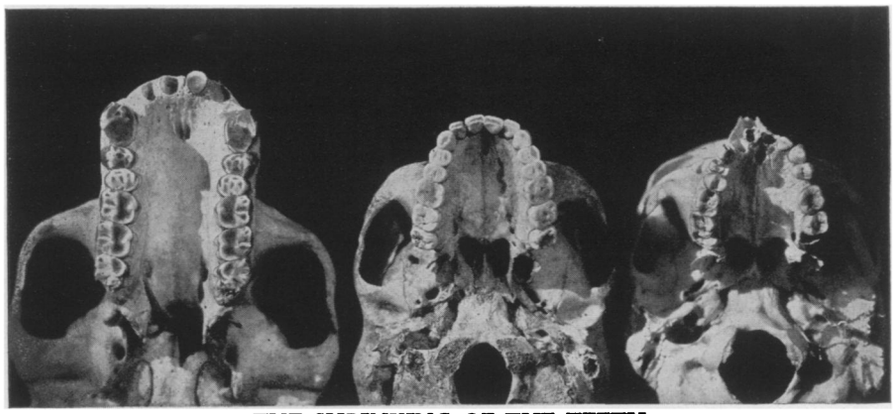
Before launching into his prophetic career, Dr. Shapiro also takes another precaution, as a proper scientist should. He covers up contingencies with a solid, protecting "if." Man is to a considerable extent the creature of his environment. If major changes should take place in the earth's astronomic behavior, or if its climate, geology or other factors that influence man should become radically different in this five hundred thousand years, then naturally all bets are off. But if conditions remain substantially as they are today—and Dr. Shapiro thinks this is as likely as any other possibility—then a forecast can be ventured.

"The earth, we have no reason to doubt, will continue in its orbit at a speed not perceptibly different," says Dr. Shapiro. "Nature, perhaps rather more under control than now, will function in the accustomed way, with occasional eruptions to warn man of his human and finite powers. Inevitably in this long period of time civilizations will have declined and new ones will have arisen to take the lead for a time. Perhaps on several occasions civilization will come perilously near to barbarity, but it will ever spring anew and to dizzier heights. There is nothing in human history inconsistent with this view.

"Nor, on the other hand, do I share the opinion of some that men will have become so enmeshed in machines that he will have lost the function of his appendages through disuse. No, the use of our arms and legs, even though it be only for sport, will be vigorous. In this I agree with Aldous Huxley in whose brave new world man employs machines to his enhanced satisfaction but nevertheless enjoys the exercises of his body."

That eugenics will greatly influence the physical development of the race Dr. Shapiro doubts. It is conceivable, even inevitable, he says, that its principles will be applied, but "it will not deflect the stream of evolution very far from its course."

The first thing you might notice, if you saw your great-grandson-16,666-times-removed approaching from a dis-



THE SHRINKING OF THE TEETH

Left, gorilla; middle, Australian aborigine; right, modern "advanced" man, with his greatly reduced jaw arch and feebler dental array.

tance, would be his great height and corresponding bulk. Even in recent measured times, people of the same stock, of the same line of descent, have been growing taller and heavier. Dr. Shapiro cites the close physical measurements that have been made on three generations of Harvard men. The present generation in this group is about 3.55 centimeters (1⅜ inches) taller than their own fathers, younger sons are somewhat taller than their elder brothers, and the fathers are taller than the grandfathers.

No Place for Food Pills

The increase in height will entail an increase in girth, as well, probably. Such has been the tendency in all lines of animal descent. That is what happened in the long descent of the horse from the little Eohippus, and as for the great saurians of the geologic Middle Ages—well, Dr. Shapiro breaks into verse about them:

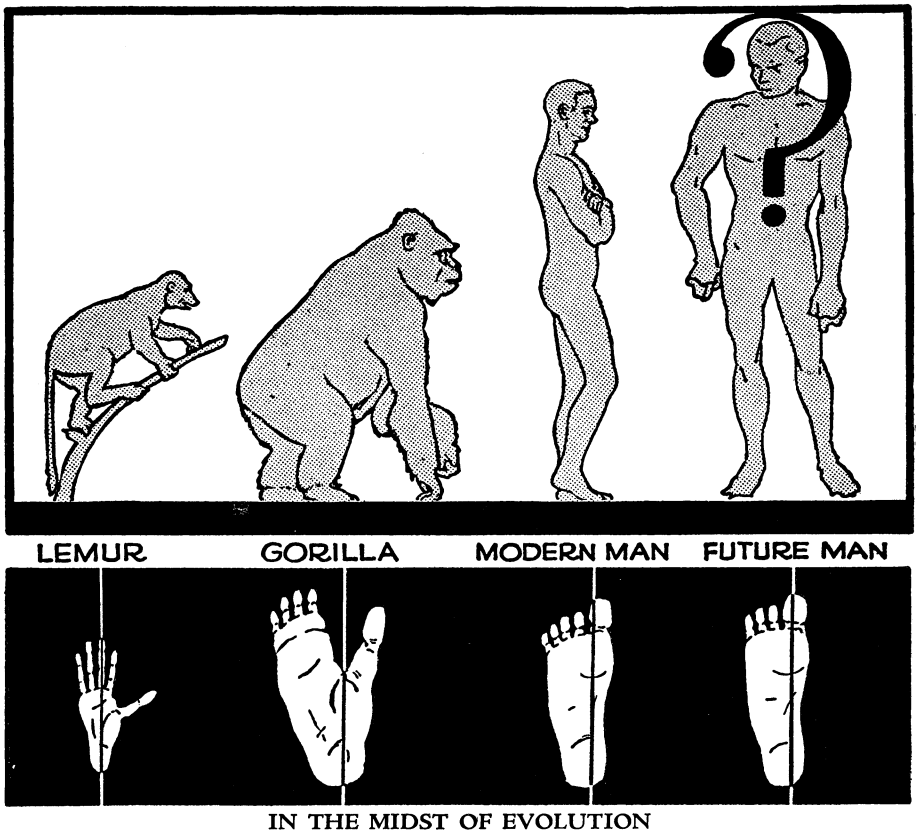
"One of these ponderous creatures might well have looked back to its phylogenetic youth and sung with sadness:

'Fading is the taper waist,
Shapeless grows the shapely limb,
And although severely laced,
Spreading is the figure trim!
Stouter than I used to be,
Still more corpulent grow I.
There will be too much of me
In the coming bye and bye—
There will be too much of me
In the coming bye and bye.' "

This taller, heavier, many-times-removed great-grandson will of course require nutriment for his bigger body. Dr. Shapiro is not one of those who expect future man to have a much-reduced digestive system, sufficient only to absorb highly concentrated food-pills with which they fancy man will content himself. He makes mock of such dismal forecasters:

"Perhaps even such a vestigial digestive tract may be dispensed with altogether if man ever becomes indifferent to food. In that sad day the essential nutriment of life might then be injected directly into the blood stream.

"But I cannot accept this dismal future. The delights of the table are too pleasant to be lightly eliminated in favor of the sterile and joyless consumption of food pills. I can perceive no diminution in man's appetite—if anything he eats more than primitive man—and certainly I have yet to know a healthy man who shows even the faintest inclination to relinquish the sensuous and delicate enjoyment of solid foods. Therefore I leave you your stomach and its appurtenances."



IN THE MIDST OF EVOLUTION

Back of modern man there is the big beast and the little beast; ahead of him there is—what? These sketches suggest the trend. The lower panel shows the development of the foot, with the suggestion that man may shed a toe in the future.

But even though the digestive system remains intact, one adjunct to it is undergoing modifications and will continue to do so, Dr. Shapiro warns. This is our dental equipment. No vertebrate is afflicted with such extensive dental decay as man, he says. Our jaws have shortened amazingly since the happy forgotten tree-dwelling days—indeed, many modern men never get the use of their third molars, or wisdom-teeth. A whole new branch of dental surgery—orthodontia—has been developed to take care of the many ills of over-crowded, badly-arranged, ill-erupted teeth. So when our bulky and well-stomached future man eats, he will have to manage his pleasures of the table with even poorer and smaller teeth than we have now, and perhaps fewer of them.

Improvement in Brain

Even more significant, however, may be the changes taking place in the top of man's head during the half-million years to come. His brain may be expected to increase in size—although Dr. Shapiro hedges his prophecy at this point with the reminder that cerebral evolution may be accomplished by an improvement in the quality of the brain without an accompanying increase in size. But, in spite of certain exceptions to be noted, the human brain has steadily grown larger, from the most ancient to the most modern specimens. Dr. Shapiro gives 900 cubic centimeters for Java Man, 1000 cubic centimeters for the somewhat later Peking man; for the modern European, 1450 cubic centimeters. Projecting the line into the future would give a brain-size of 1725 cubic centimeters 500,000 years from now.

"But this need not call up a picture of a balloon-headed individual," our anthropologist reassures us. "There are men to be met without special comment on the streets today whose skull capacity reaches and even exceeds this figure."

Nevertheless, we may expect the human head to become more dome-like as the brain becomes larger. For the bottom of the skull, as indicated by past developments, can be expected to become shorter. The very shortening of the upper jaw, as the teeth became more poorly developed, has helped in the pulling in of the facial angle to a more and more nearly vertical (*Turn Page*)

slope. Although they are probably not at all on the same line of descent, the gorilla, the Australian native and the European white man illustrate the development of facial steepness very well indeed. The great ape's face is human though he still has a decided "mug"; the European is straight-faced, and we even encounter dishfaced individuals.

Another cranial change that past ages have brought, and future ages may continue, is the smoothing of the skull. Apes develop a crest of bone and tremendous eyebrow ridges. Primitive man had heavy eyebrow ridges also, and these ridges survive, reduced, in many moderns. But on the whole there has been a smoothing off of angles, an evening out of curves.

In this feature, the females have always kept ahead of the males, in apes, in primitive men, in moderns. If the refinement of the skull continues along the lines of the past, we may expect the men of 500,000 years hence to have "feminine" skulls. Meantime the women will have achieved still rounder skulls and smaller faces—their crania will have become infantile.

Science News Letter, April 14, 1934

MEDICINE

Many in Schools for Blind Could Have Sight Restored

MANY children who are now in schools for the blind might have their sight restored through adequate medical or surgical treatment.

This fact was discovered in the course of a survey undertaken by the National Society for the Prevention of Blindness and the Committee on Statistics of the Blind. Measures to bring these children proper medical attention and eventually to restore their eyesight are now being taken.

"Ignorance is usually the underlying reason for loss of sight, whether it be the result of disease or accident," Lewis H. Carris, managing director of the Society, asserted in making public the Society's annual report which described the survey of children in schools for the blind as well as other activities of the Society. This particular survey was made as part of a study of causes of blindness. A series of reports on the situation will soon be published.

Science News Letter, April 14, 1934

MEDICINE

Trichinosis Deaths Traced To Parasite in Heart

ACTUAL micro-organisms and not some mysterious poison thought to have been generated by them are responsible for fatal inflammation of the heart in human cases of trichinosis, the disease produced in humans through the eating of undercooked pork in which the parasite, *Trichina,* is present.

This discovery was made by Drs. Carl V. Weller, Glenn A. Dunlap and John C. Buhger of the University of Michigan.

Most thorough microscopic examination of diseased heart tissue recovered from post mortem cases apparently had failed to show the presence of the encapsulated *Trichina* embryo, he explained, although these could be found in great numbers in muscle tissue throughout the rest of the body. Yet it was this acute inflammation of the heart tissue that caused death some weeks after infection with the organism. Hundreds of fatal cases were studied, but always with the same negative result. Thus it was assumed that the conclusions of earlier investigators were correct.

Then at this juncture a discovery was made. Medical men had been searching for the familiar, rounded, encapsulated form of the embryo. Dr. Buhger was puzzled by the presence in his microscope field of a long, slender granulated body, easily confused with ordinary tissue. He studied it closely and finally recovered a specimen of the *Trichina* embryo un-encysted. Further examination revealed others. But other fatal cases failed to give the same results.

Experiments on animals revealed that the free embryo may be found in the heart muscles seven to fifteen days after infection, but that after this time it disappears and cannot be seen in any form. This is true although the other muscles in the body may be crammed with the parasite. Nevertheless, the acute inflammation of the heart continues, and it is this condition which causes death, Dr. Buhger stated.

Science News Letter, April 14, 1934

PSYCHOLOGY

Stomach Trouble Treatment Aided by Psychologists

PSYCHOLOGICAL methods so aided the recovery of 19 patients suffering from gastric disturbances that within six weeks they were eating anything they wanted without ill effects, it was reported to the New York Branch of the American Psychological Association by Dr. M. N. Chappell, of Columbia University and his associates, Dr. J. J. Stefano of Brooklyn Hospital, Dr. J. S. Rogerson and Dr. F. H. Pike, of Columbia University.

The psychological treatment was supplementary to ordinary medical treatment. A "control" group of 21 patients received only the medical treatment; only 14 of these were greatly improved after a month's time, and these suffered a return of their symptoms when their diet was broadened.

No mystical or mysterious explanation is necessary to account for the success of this treatment, the scientists explain. They did not use psychoanalytic methods. The symptoms of the patients were caused by increased activity and tension of the digestive system which in turn was caused by worry and other emotions. Application of the psychological laws of learning and forgetting enabled the patients to forget the ideas upon which they had been dwelling, and so relieve the physical condition. The procedure will work even where tissue injury is present, provided the injury is not so great as to require surgical treatment, the investigators reported.

The subjects for the experiment were volunteers located through the aid of John O'Neal, then science editor of the *Brooklyn Daily Eagle.*

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