



(Field Museum photo)

The rhinoceros hornbill not only has too much beak but an extra helping dumped on top of that.

WHAT would you do if a hard wart developed on the bridge of your nose, and finally grew up into a formidable horn?

Or if your upper eyeteeth started to get longer and longer, curling outward and forward until they were a couple of feet long?

Supposing one of these nightmare-things should happen to you, and there were no surgeon or dentist to remedy the situation, what would you do?

You'd learn to get on with the new adornment, of course. Especially if all your neighbors were becoming similarly decorated and nobody poked fun at you for looking that way. Some of us get used to having mighty queer-looking faces, or legs, or feet, as it is.

Fortunately, we of the human race have not had to do much of that sort of thing. We do have some troubles with organs and parts of ourselves that seem to have degenerated in the course of evolution, like our wisdom-teeth and our appendixes; but nothing seems to have gone on a rampage of embarrassing overgrowth.

But if we look about us at the world of animals we can see case after case where changes of that kind seem to have taken place in advance of any need for them, or if originally needed and used some part has gone on developing to a downright freakish extent. There are hundreds, even

Strange Animal Growths That Just Got Going And Couldn't Stop

Zoology

By Frank Thone

thousands, of species in all classes of the animal kingdom that have teeth, or horns, or wings, or feathers, or scales, or hair, that can't be called anything but simply overgrown.

And yet the animals so affected get along all right, and even find uses for these strangely overdeveloped organs. The elephant, to choose one of the most extreme cases at the outset, has had terrible trouble with his eyeteeth through all the ages. They are often longer than his legs. Yet he gets along all right. He has got past the barrier these over-grown eyeteeth put between himself and his food by growing his nose into an extra arm and hand. And the teeth themselves he has learned how to use as helpful tools in grubbing up things and as formidable weapons when he gets into a fight with another elephant.

Yet there can hardly be a question but that at the outset the elephant didn't really *want* his tusks. They were, in a sense, wished on him. The aboriginal elephant stock, the strange small animals from which elephants have descended, were not wearers of big tusks. They were animals that looked something like pigs, and they probably rooted for a part of their living, as pigs do today.

In that sort of occupation, somewhat overdeveloped eyeteeth would be very useful, as the moderate tusks of pigs still are. The trouble with the elephant's ancestor was that once the tusks got going they apparently didn't know when to quit, and they eventually developed into the tremendous tusks carried by some of the mastodons and mammoths, that were as long as the animals were high.

Perhaps the most extreme of all cases of the over-growth of teeth forcing a change in mode of living is that of the extinct saber-tooth tiger.

Their upper eyeteeth grew out into great curved daggers, so long that the animal apparently could not get solid

food past them into his mouth. One would think that under such circumstances there was nothing for the poor, over-armed tiger to do but starve to death. But there's more than one way of getting a meal: if one can't eat one can at least drink. And that seems to be what the saber-tooth tiger did—he lived on blood. With his great dagger-teeth he killed his prey, and then enjoyed a gory meal, leaving for carrion beasts and scavenger birds the flesh which he could not bite because two of his teeth were too long.

But teeth are by no means the only part of the body that can run wild. Horns are even more given to unwieldy lengths and bizarre growths. A walk through the African mammal section of any zoo or museum leaves one with the impression that the whole antelope tribe has inherited, like an ancestral curse, an overload of horn. And whole sections of the deer and sheep families, too, have been dowered with more horns than they really need for adequate defense.

This notion that a lot of things that are conspicuously developed in the animal kingdom are really of no particular use to their possessors, but have got that way simply because they got started and couldn't stop may seem at first somewhat heretical. Certainly it doesn't agree particularly well with either the earlier naive notions about evolution, or with the older notion, beloved by the schoolmen, that everything has its use.

The strictest and simplest Darwinism would demand that we find an explanation for all these over-length tusks and out-size horns in their "survival value." The simplest Darwinian doctrine envisaged a world where changes took place little by little. If a change was advantageous, it was picked out and encouraged by natural selection; if disadvantageous, it was discouraged and

eliminated by the same sifting process. So an eleven-foot tusk or a six-foot horn must be something very advantageous to the owner. The trouble was, that such advantages were not always evident, even after careful examination. Thereupon the early Darwinians (many of whom were very much more Darwinian than Darwin himself) by a sheer act of faith declared that these things had their survival value to the animals concerned, but that we haven't found out yet wherein that value consists. But most scientists were willing to admit that these cases rather constituted riddles that the particular key of natural selection acting on small fluctuating variations didn't fit very well.

One of the evolutionary theories that is older than Darwin, that of Lamarck, doesn't fit the case any better. Lamarck's idea, based mostly on speculation, was that the animals got the changes that came upon them by working for them. The often-cited giraffe's neck, that grew long because generations of giraffes stretched to reach tree branches, is really a fair illustration of Lamarck's doctrine. This mode of evolution has never received such clear-cut support, in spite of multitudes of experiments, as to convince its doubters. Nevertheless, it still keeps its fascination and has its followers.

But what an elephant would do to achieve tusks too long for his own convenience, or how hard a rhinoceros must work in order to develop a three-foot horn when a one-foot one would be as effective a weapon, the theory fails to tell.

And the pre-evolutionary idea, that all these things were specially created for the animals' own use, is even harder to maintain if one really tries to find how the animals use all the surplus beyond a reasonable means of attaining their ends. If a four-foot tusk is enough for an elephant to work and fight with, why lavish twice as much ivory on him? To meet this point, philosophy falls back on the possible usefulness of the overgrowth to somebody else—whether directly and materially, or indirectly through inspiring wonder and reverence. That is something about which zoologists should not quarrel, for those concepts go outside the field of zoology.

Elephants through all ages have had to contend with overgrown eyeteeth. This extinct species had tusks longer than his legs.

But they leave the question still unsolved, of how the animals got that way. Philosophy supplies possibly acceptable answers to Why? but not How? And it is with How that zoology is more concerned.

The partial answer to the riddle of over-development of horns or tusks or feathers or what not, that these represent normal and useful developments that have gone past the point where they should have stopped, has been called "orthogenesis" by some scientists. That's a Greek word, or rather two Greek words, and gives the thing a more learned look. But when it is englished, it means something like "single-track development." For "ortho" means straight or direct, and "genesis" means getting born or coming into existence.

This orthogenesis is no more a complete explanation of how everything happened in evolution than the Darwinian doctrine of natural selection, or any other contribution so far offered. But it does help to keep the overgrown ends and appendages from sticking too far out of the frame. It most pointedly doesn't tell how any of them started, but it helps perhaps toward an understanding of how some of them failed to stop.

The world is chock full of a number of things that look more reasonable if we think of them as examples of this business of getting started and not knowing how to stop. Besides the teeth and horns we have already looked at, there are feathers. Birds are most likely descended from reptiles, and feathers were probably at one time something extra fancy in the way of scales. But having achieved the ends of warmth and flight and beautification, they often

keep right on growing to a most embarrassing degree. Long tail-feathers are common, from the relatively modest array of the ring-neck pheasant to the amazing developments of such fowl as the peacock and the lyre-bird. To be sure, the extra array of feathers in these birds is supposed to be of importance in the business of getting a mate. But a peacock with a battered tail still manages to find a spouse, and he probably would succeed if he had no tail-feathers at all. It is probably just another case of making use of something you've somehow inherited.

Beaks are another thing of which birds often get an awkward overdose. There is the rhinoceros hornbill, that remarkable bird that seals his wife up in a hollow tree while she sits on the nest, and then devotedly feeds her while she is safely immured in her maternal prison-castle. The hornbill has a beak nearly as long as his body, so big that it gets in his way when he wants to eat. And the enormous excrescence of a crest that grows on the base of his upper mandible is hard to see as anything but just another case of too much of a good thing.

Even the beak of the flamingo, that looks like a highly efficient tool for picking small shellfish and similar tidbits out of the bottom silt, isn't an unqualified success. For its peculiar shape makes eating the morsel rather more of a job than it would be if the bird had a straight, orthodox beak like a gull. One is left with the feeling that the flamingo found himself in the world with a very decidedly Roman nose on his countenance, and has been making the best of it.

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