# What Monster Killed the Monster Saurians?

(Copyright, 1903, by T. C. McClure.)

THE whale is as mysterious an animal as the ichthyosaurus. Once it was believed that all the link-forms that led to the whale and creatures like it were in phain sight. All mammals that had adapted themselves to oceanic life were simply thrown into one great group of "sea mammals." Thus the whales went into the same pot with the common, well known seals, and with a third—most peculiar form of animal—the ungainly sea-cows, famous as the creatures that gave rise to the first stories of mermaids. Since seals and sea-cows were so similar to land animals, the seal especially resembling certain beasts of prey, like the sea otter and others, the bridge seemed a plain one.

But it was only a dream of the old "systems" of natural science.

Today the "sea mammals" have been separated into vastly different species. The seals have actually turned out to be true descendants of beasts of prey which have nothing at all to do with whales.

The sea-cows must be considered now as being closely related to the hoofed animals of the land. Their existence is to be explained on the theory that genuine hoofed land animals went into the water after the manner of the living hippopotamus and gradually accustomed themselves to a complete life in the water by a process of adaptation carried to an extreme point.

The whales—dolphins and true whales—remain unexplained. And to this hour no man knows from what group of mammals they can have descended.

Haeckel thinks that this group itself must be separated into two branches and must have descended from two different sources. But where these sources may be he does not know either. The whales appear all at once—as did the ichthyosaurians, with the one great difference that the whales appeared just as the ichthyosaurians disappeared.

The icythyosaurians enlivened the seas throughout the entire Jurassic period. The Jurassic period was followed by the Cretaceous or chalk period. In its remnants we find remnants of ichthyosaurians in all parts of the world where the oceans rolled their floods. Then, with the dawning of the Tertiary period, the "spoor" disappears totally.

Animal bones in enourmous masses remain on earth from that Tertiary period. But the ichthyosaurus is missing totally. His hour must have struck.

Instead of him, there appear, in the first chapter of Tertiary times, great mammals belonging to the whales.

What is it that drove the monster saurian, a model of perfect adaptation, so completely from the scene?

Such a question is as important for true investigation as the puzzling question, "Whence came these wonderful forms?" Why did splendidly fitted animal forms, that had spread themselves all over the globe, and that absolutely ruled for long periods of time, disappear as suddenly as if they had been swallowed?

The most convenient solution would be to say, of course: the time was fulfilled, room had to be made in the world-seas for new creatures, for the time of the mammals had begun; so the ichthyosaurians suddenly became lame and decrepit—as elsewhere over the single animal, so old age crept over a whole animal world, and soon the entire, once so powerful, race was destroyed to the last one.

But, young as our natural sciences are, we have actually seen how species die. And in every such case there were distinct, tangible reasons.

We know how the bird Dodo of Mouritius died. Never again will he, whom old Dutch menagerie owners fed and showed in Holland fairs, ornament one of our zoological gardens. Dodo lived on a lonely island in the Pacific ocean. He had no enemies there. No larger land animal threatened him. That must have been so for thousands of years and more thousands. Then the dodos adapted themselves according to natural law to the care-free life; they became enormously fat and lazy, their wings lost their power and at last became quite incapable of raising the heavy bird from the ground.

This surely was no "senility." This was Hannibal in Capua, the result of a luxurious life, that was safe so long as the beautiful days continued, and that could have continued with them through eternity.

But one day man arrived on the island of Mauritius. He appeared in the form of Dutch sailors, hungry as bears, in the days when man had not begun to travel in swift steamers that carried tinned foods.

Man and dodo entered into competition at once. Man wished to live and the dodo wished to live also. Within a century (1598-1698) the dodos had been eaten up systematically by the Hollanders.

When the century ended the last dodo had gone the way of all flesh, and the species dodo, one of the most remarkable bird forms that ever lived—flightless pigeons as big as turkeys—had ceased to be. A species had expired, but certainly not from age.

Could the same thing have happened to the ichthyosaurus?

We might set the arrival of man on the stage into times so early that it would put his origin into the tertiary period, yet even in the first third of that epoch, wherein the ichthyosaurus is disappearing or has already disappeared, it is impossible to find that man could have existed in a form that would have been dangerous to the huge, oceanic, robber saurians. We, today, with unfited powers and with the instruments of industry, have not been able to exterminate the whale—centuries after the "invention" of the ship.

So we must ask: Did the ichthyosaurus become the victim of a battle for existence with another monstrous animal of the ocean in the time when he had become lazy and defenseless as a result of thousands of years of unchallenged mastery of the sea?

There are some curious facts in which the answer may be hidden.

In the end of the seventies Marsh found, in Jurassic formations of North America, a genuine ichthyosaurus which, strange to say, was entirely toothless. The gums had neither teeth nor grooves in which teeth could have been planted. The resolution of the leg-bones into fins had proceeded to so extreme a stage in this specimen that it was evident that a late, highly-developed species had been found. Since then traces of related forms have been found in England in the latest Jurassic formations and in the chalk period. The American species was christened Baptanodon. What had happened to this ichthyosaurus?

Ichthyosaurus, the terrible armed robber, who had chewed armored fishes and stony cuttle-fishes with ease, evidently had "given up" his whole dental apparatus in some places late in his time. That means that he had adapted himself to circumstances in such a manner that he had become as good as helpless against any new, biting creature of the sea.

Involuntarily one is reminded again of the whale and his relatives.

The dolphin still has powerful teeth. But the enormous Greenland whale, the extreme form of all whale-beasts, only has "fringes" that give us whalebone. Those fringes evidently are very convenient for him. With them he sieves the ocean for myriads of little creatures which nourish him. What does, the colossus of the sea, need of teeth!

Plainly this whale proves by example that adaptation can lead to an elimination of the teeth. The birds lost them, too; in the chalk period their bills still were toothed; then came the toothless beak; the free life in the air without competition made teeth unnecessary.

It is apparent that the ichthyosaurians achieved ease in this manner in the end of the Jurassic period, when there were no enemies that demanded battle.

And yet with such renunciation of their fighting powers the ichthyosaurians pronounced their own death sentence like the poor bird dodo. For the foes did arrive; with continuing development times altered, and what had not been, developed itself. So there arose the question of life or death—death being the answer, of course, for the side that had become denuded of defense through its long term of easeful power.

Incomplete as our knowledge is, one thing we know—at about the coming of Tertiary time something decisive happened in the ocean. It was no mad catastrophe that choked uncounted masses of animal forms in steam or carbonic acid gas. It was something that happened with the natural development of things.

New hunters appeared in the ocean—hunters that had not been there in such form or might before.

There was first the family of sharks. It grew unexpectedly at that time. To our imagination the shark still is the most horrible creature of the sea, and with reason. Shark forms greater and more savage than any now living surely meant for that ancient sea the gravest danger that could be imagined for other living creatures. And in the beginning of Tertiary time sharks were developed that exceeded immeasurably anything known now.

As a matter of fact, the grim shark folk were very, very old. Long before the times of the ichthyosaurians they tumbled around in the ocean. Perhaps the higher vertebraies once emerged from their ranks when certain sharklike animals achieved lungs and so gave the first opportunity for the development of the amphibian, from that to the reptile, the bird, the mammal. How that was in detail is still hidden from us. At any rate, the sharks did not all develop into higher animals, but a great family of them retained its characteristics and swam merrily through all earthly epochs into the Tertiary one. And then, when the end of that epoch came, it was as if a particularly hot vitality shot through the tough old race.

Today, when that vitality has long been decaying again, there still remains a colossus of twelve yards in length, the mammoth shark Carcharadon. The teeth of this living shark attain lengths of from two to two and one-quarter inches. But once there lived Carcharadon sharks whose teeth were almost six inches long and five inches thick. What could have withstood such assailants? Certainly no ichthyosaurus that had only remnants of teeth or entirely toothless jaws.

But in addition to the sharks there appeared with the beginning of Tertiary times, perhaps even in the last part of the Cretaceous period, the whale-like swimming mammals themselves. It is worth considering if the whales, appearing so significantly at the time of the disappearance of the ichthyosaurus, did not really destroy it in the very early days of their own existence.

Although we do not know anything about their ancestral tree, it is certain that the whales did not begin with toothless forms like our Greenland whale. Their first representatives appear to have possessed the terrible, almost shark-like, teeth of certain dolphins, that belong to the most dangerous creatures of the sea today.

Our killer whale, or Orca, although generally only six yards long, succeeds with his ferocity and keen teeth in overcoming the Greenland whale, twenty yards long, which has absolutely no enemies beside him except man. Such orcas, as large once as the Greenland whale is now, must have been able to slay both Carcharadon shark and ichthyosaurus. Added to their size and strength was the mammal brain that gave its possessor a further vast advantage over the weak organ of fish and reptile.

That the sea peopled with these giant sharks and monster dolphins was an uncanny home for all unarmored things at that time is proved by certain small, but instructive, circumstances.

Besides the ichthyosaurus a whole horde of swimming reptiles had begun to venture into the open ocean in Triassic and Jurassic periods. Fishing busily with his long neck, there swam the plesiosaurus, a funny animal of which it has been said graphically that it resembled a turtle that suddenly had acquired the neck of a swan.

But already in the chalk period we find the plesiosaurus retiring more and more into the mouths of the great ocean rivers.

They were fleeing from something.

Imagine a thin swan-neck in the jaws of a giant shark. It would snap off like straw. These long-necks, then, first found good reason for flight. It didn't help them, however. They disappeared with the ichthyosaurus.

Then there was the "paw" saurian. These "paw beasts," scientifically named teleosaurians, were crocodiles, swimming cheerfully in the open ocean in those days.

And for these crocodiles, too, the sea had become haunted in the Cretaceous period. They, too, crowded to the river mouths and appeared more and more in fresh waters.

They succeeded in their struggle, so that they remain to this day. The reason is plain. They were not "paw beasts" for nothing. Never had they so far adapted themselves to the life in the ocean that they had changed their regular toed paws for flippers or fins.

So they could escape to the land. They were able to crawl over sand bars and swamps until they reached water again.

And thus they were permitted to last through all the changes of things till into those wondrous days of man, when in Egypt and India humanity's blind groping for supernatural mysteries made those ancient comrades of ichthyosaurus and teleosaurus "holy."

All these pictures form one chain.

The ichthyosaurus had made himself "comfortable." In many places, at least, he had permitted his weapons to rust and degenerate. Then, suddenly, the ocean teemed with new, fierce adversaries. It was too late for a readaptation to the land; too late even for acquiring fresh water habits.

The very achievement of the ichthyosaurus, the magnificent fin-apparatus that had made it so mighty through ages, became the great obstacle to its continued existence. So came the end in the great drama.

The "lion" of the Jurassic sea vanished like a fat, stupid dodo bird, conquered at last by those same laws of natural development that had made him so great.

If human eyes could have seen it they would have beheld the turning point of two periods. Shark and whale, still with us today, began their lordship of the ocean. The crocodile went into the rivers and passed into the heart of the warm parts of the earth. But ichthyosaurus and plesiosaurus passed as "unfit."

In peaceful little corners of museums they sleep off their wild earth orgies today, the last ichthyosaurians, no longer reckless swimmers in the ocean of primeval worlds, but only quiet dreamers in the great blue ocean of human thought. As by enchantment fixed phantom-like in stone, the old, wonderful sea of Jurassic time lives there once more. The clean, orderly rooms, the shining glass cases, brightly colored paintings of restored primeval scenes, and outside of the windows the nodding green branches of the glad present—that is the last station of a tremendous pilgrimage.

The monsters stare out of their huge eye sockets, with the young ones that failed to see the light of the world millions of years ago. And all bear placards with scientific names that man has given to them, man as master of earth—not only today, but for all the past—master, too, of the ichthyosaurians in whose time he had not even begun to exist, and that yet belong to his "knowledge" today as if he had been there when they began, conquered and died.

That is the mightiest epic, the most wonderful of tales; the epic of the ichthyosaurus.

# Is the Sailor a Brave Man or a Craven?

(Copyright, 1903, by Albert Sonnichsen.)

THE average landsman has the fear of the sea strong in his soul. Therefore, says the landsman, the sailor is a brave man; he is in truth the bravest of men, for he goes down to the deep with a rollicking song on his lips and a devil-may-care gait that signify utter indifference to the known and unknown perils that beset him on all sides.

Five years of experience at sea has proved to me that the landsman has a vastly exaggerated idea of the sailor's bravery. While sea life does attract men who have a natural disregard for personal danger, it may safely be said that the typical sailor is a strange contradiction of reckless bravery and arrant cowardice.

Here is an incident in point. It occurred aboard a vessel in which I made my first trip to sea.

We were sailing before a five-knot breeze through a tropical sea. For several days big sharks, on the lookout for refuse, had been following the ship. One morning a boy, painting over the stern, lost his hold and fell overboard. All hands saw the accident, but it remained for a young Englishman to act. Before the cry had been raised he seized a life belt and leaped overboard with it.

When the ship was hove to both men were a mile astern, and almost an hour passed before they were picked up. Meanwhile the Englishman had reached the boy with the life belt, for the latter could not swim. The Englishman also displayed great coolness in keeping off the sharks, remaining quite still until they were close, when he frightened them off with a few lively kicks, for a shark is really a timid creature. But few men have the presence of mind to think of this when in the water.

Of course the man was made much of for his heroic act; to leap overboard in shark-infested waters is a deed that especially appeals to a seaman's admiration.

About a month afterwards we ran into cold weather, and then, one dark night, we encountered a stiff gale that made it necessary to shorten sail rather suddenly. The lighter canvas was speedily brought under control and furled, but by the time this was done the wind became so strong that all hands were called to furl a big topsail. Even the cook and the steward were obliged to go aloft with the rest of us, while the captain relieved the man at the wheel that he might also help with the sail.

It was a tremendous job, for the heavy sail flapped and thundered over the line of men stretched out on the frail spar, shaking the mast as though cannon were being discharged from the deck. Finally, after an hour's struggle, the sail was tightly furled to the yard, and the men were just preparing to go down when the mate, who had been superintending the job, cried out:

"Hold on, there, fellers, we've been one man short! Has anybody gone overboard?"

Nobody had been seen to fall.

"Then," bawled the mate, "someone's loafing. You fellers stay up here till I go down on deck and find out who it is."

When we came down the mate had found the shirker. It was the young Englishman who had braved the sharks when the rest hesitated.

Had it been any other man he would have been severely punished, but as it was, no one said a word nor even cast a reproachful hint. This the man felt so keenly that when the port was reached he was obliged to be treated in a marine hospital for a nervous disorder.

I met this man ashore some years afterwards. He was on the San Francisco police force, where he had secured employment, for he never ventured to sea again. He voluntarily discussed his case with me. He attributed his cowardice in the storm to heredity. He came of Italian stock primarily, and his theory was that for centuries his ancestors had been used to the comparatively calm waters of the Mediterranean, where most of the sailing is done in craft so small that the sails can be handled from on deck. The danger seamen