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"MIDNIGHT MARVELS"
By WILLY LEY

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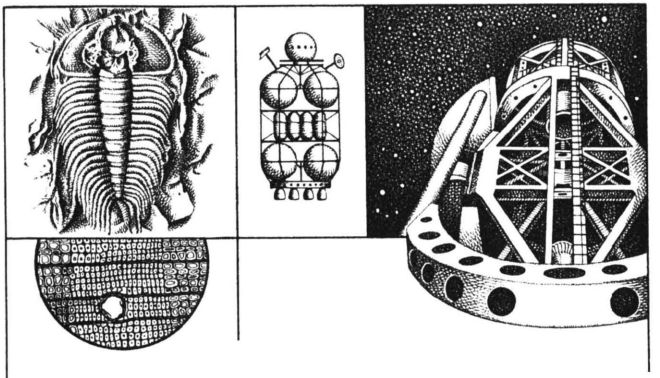

for your information

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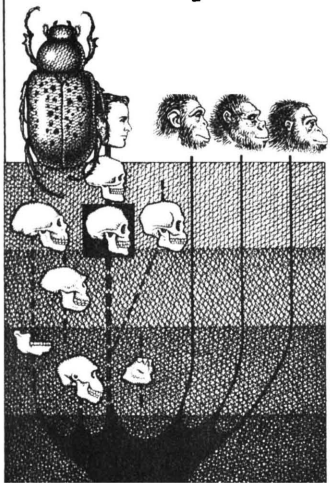

"MIDNIGHT MARVELS"

IN some of the editorial offices of the large-circulation "slick" magazines, you are likely to bump into two editorial policies which sound about as follows: First of all, you must never write about things, but only about people, for "things" are not interesting, while people are.

The example that comes to my mind whenever I hear this is the case of Professor Dr. Wilhelm

Konrad Röntgen and the X-ray tube. The device itself is as fascinating as any device can be, but it was discovered by a thoroughly "routine" professor, undistinguished in every respect up to the time when he made his discovery which, incidentally, was fairly late in his life. The biographers of Professor Röntgen have always had a hard time finding something to say about the man—not something fascinating (that doesn't exist), but something, *anything*, that could be said about him rather than his discovery and its consequences.

The second editorial policy—the art editor is not permitted to voice a dissenting view—is based on the assumption that, although much effort and money have been spent on colorful and painstaking illustrations, the reader of the magazine has *not* looked at the pictures before he started reading.

Disbelieving both these premises, I am going to write about "things"—animals—and any mention of people will be purely accidental and can be skipped. I am also convinced that every reader has by now looked at the "monsters" and is wondering what I have to say about them. Well, aren't you? In your place, I would. All right, then, let's proceed.

THE time was 1545. The place was the city of Frankfurt on the Main, more particularly the office of Herr Cyriacus Jacobus, a printer. There was a manuscript on the table, which was in German and not in Latin, as would have been more likely for the time. However, this deficiency was partly made up by the fact that it was a translation from the Latin.

The original author had been the *Doctor universalis* Albert von Bollstädt, better known as Albertus Magnus. He had been a contemporary of Roger Bacon; in fact, the two managed to respect each other without being in the least friendly. Unlike Roger Bacon, Albertus Magnus never got into any trouble with his ecclesiastical superiors. He also wrote far more than Bacon; the first printed edition of his works filled 21 folio volumes.

One of them had been about animals, written around 1250. Now, in 1545, a Walther Ryff had translated this book into German and Cyriacus Jacobus was willing to print it—but not without illustrations. The public would prefer an illustrated book and, since woodcuts could be printed like type, there had to be woodcuts, which meant finding an artist to draw the pictures.

The trouble began at that point. Albertus had traveled

widely; to find an equally traveled artist was not easy. Besides, a description of something is one thing and a picture of something is a different story. The artist who was picked had only a manuscript to work from, nothing else. If, right now, I called on my wife Olga for a drawing of an African elephant, say, she'd pick a minimum of seven books off the shelves, with photographs of African elephants in all conceivable positions fit to print. She'd study a painting by Wilhelm Kuhnert, who had lived in Africa for the purpose of painting African wild life. Moreover, she has seen African elephants in assorted zoological gardens.

The artist who had to illustrate Ryff's translation of the animal book by Albertus Magnus had just a manuscript. There was mention of a bird the size of a chicken, which was called *Lagephus*. The manuscript stated that Pliny the Elder had called this bird *Lagopus*. This means "hare-footed" and the real reason had been that the legs of this bird look as if hare's fur grew on them. To the artist, the idea of a bird with a hare's feet did not make much sense. But if the learned Pliny had used such a term, there had to be a reason; maybe the bird had other characteristics of a hare.

The result was our Fig. 1.

Fig. 1. This is the bird *Lagephus* . . .

THEN there was a paragraph saying "there is a fish in the seas that has eight feet, hence it is called octopus, which means 'eight feet.' " Yes, it does, but you cannot imagine an octopus unless you have seen one. So the fish with eight feet turned out as shown in Fig. 2.

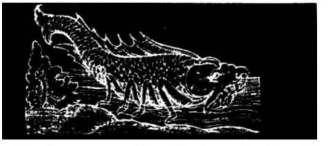

Fig. 2. . . . while this is an "octopus"

One picture (Fig. 3) might have defied guessing for a long

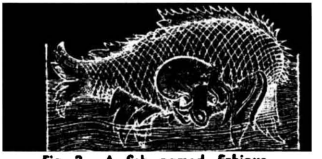

Fig. 3. A fish named *Echinus*

time if the name had not given the misunderstanding away. The text reads: "*Erinus* is a fish in the seas that has its head and mouth turned down below and carries the gateway for the excrements on top above; it walks by means of its spines, which it uses like feet." You won't catch on unless the word *erinus* reminds you of the zoological term *echinodermata* or, more specifically, the class of the *echinoidea*, the sea urchins. The description then makes sense; the picture is a fine example of good will and confusion.

At that same time, there lived a French scientist named Guillaume Rondelet. By profession, he was a physician; by avocation, a zoologist who was especially interested in the fishes of the Mediterranean Sea. In his book, Rondelet presented Fig. 4 and 5, with protestations that he had

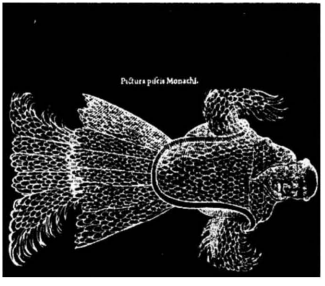

Fig. 4. Truthful picture of a sea monk . . .

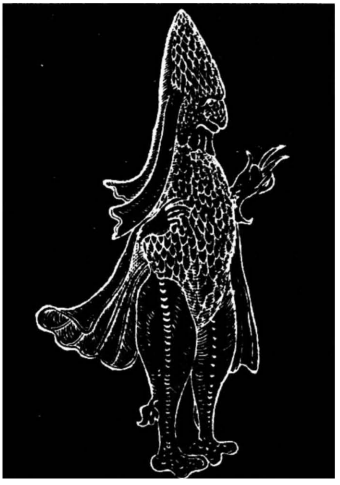

Fig. 5. . . . and his superior, the sea bishop

not seen these two marvels of the sea himself, but was merely showing what had come to him from the places where the events were alleged to have taken place. The "sea monk" was supposed to have been washed ashore on the Norway coast after a violent storm. The "sea bishop" was reported to have appeared at the shore of the Baltic along a then Polish portion of the coast in 1531.

The artist who drew the picture of the "sea monk" should be given some benefit of the doubt; he may have been sincere. When

this picture is reproduced, it is usually printed in such a way that the "sea monk" stands on his feet and the original Latin title is erased, since it would seem to interfere.

But when you look at it in the position used here, you begin to see that this might be a formalized picture of an octopus or of a squid. If one man sketched the squid as it was lying—dead or almost dead—at the seashore and another artist then tried to "clean up" the sketch, this picture might well be the result.

AS for the "sea bishop," I take him to be a Jenny Haniver —a "willful and premeditated" distortion of a ray. During the time mentioned in the story, quite a number of people living at the seashore amused themselves by skillful distortion of rays, which were then dried and sold to the type of customer that even then was born at the rate of one per minute, as "dead basilisks," "dried young dragons" or as whatever else would bring money. The practice of making the things that were later called Jenny Hanivers (nobody knows why) must have been widespread then, for Konrad Gesner of Zürich, in his *Book of Fishes* (1558), pictured one for the sole purpose of exposing "the wandering apothecaries and other peddlers who show such shams to the ignorant."

But it was Konrad Gesner himself and on the very occasion of compiling his *Book of Fishes* who had trouble. He knew that there were gigantic "fish" in the seas—the whales—and he had to include them. There were numerous pictures that Gesner did not believe by any means, but they were source material and they were backed by Olaus Magnus of Upsala in Sweden.

Olaus Magnus had been a churchman, an archbishop and even the Metropolitan of all Sweden. He could not simply be called a liar. Besides, Gesner realized that he, living in Switzerland, could not really judge things of the seas. So he repeated the pictures, letting Olaus Magnus bear all the responsibility.

The contemporaries even had a special derisive term for them: "Olaus' Midnight Marvels."

We now know that Olaus did recount tall tales, but as regards those pictures, there is some repetition of the case of the pictures in Ryff. The artist had been confronted with "a fish in the seas that is called the marine unicorn." It was really great restraint not to picture the whole marine unicorn, modeled either on the traditional heraldic unicorn or the fish that had been served for supper the night before. He only pictured the head

(Fig. 6), however. What was really meant was, of course, the narwhal. He exercised similar restraint in the case of the "sea cow" (Fig. 7), which, in all probability, referred to marine mammals of the type of the dugong and manatee.

Fig. 6. The marine Unicorn

Fig. 7. The sea cow

WHEN it came to whales, restraint would have been unwise. There were lots of tales about spouting gigantic monsters, bigger than the whaling ship (not impossible, or not noticeably exaggerated, considering the size of ships then in use), which were eager to attack, but might be successfully diverted by throwing empty barrels overboard.

Fig. 8 shows such a scene while Fig. 9 illustrates an old story that had been around since Roman times and had made its appearance in such widely different places as the tales of Sindbad the Sailor and Norse folklore; namely, of the sleeping sea monster mistaken for an island so that the ship drops anchor and men go ashore to make a fire for cooking.

Fig. 10 shows the flensing of a whale (with bagpipe music) and is the most realistic of the whole batch. That fact is easily explained. The flensing of a whale washed ashore is the one aspect of whaling the artist could actually have watched.

Fig. 11 is strictly a "bonus" for those of my readers who like riddles. It is from Gesner's book; Gesner said that Olaus Magnus pictured it *sine nomine*—without giving it a name. Gesner, therefore, did not know what it was or what it was supposed to be. Neither do I. Nor have I found a guess about it anywhere else. But it certainly would ruin all theories about naval architecture and shipbuilding if it were true.

SUCH things could happen in 1450 and even in 1550. But then people grew more careful.

Possibly.

The unfortunate fact is that

Fig. 8. Whales on the attack

Fig. 9. The sea monster resembling an island

you can be careful and still make mistakes, especially if you venture into a completely new field.

There is the case of the bones of the Zeunickenberg, a small mountain—hill would be a better term—near the German city of Quedlinburg. Local peasants had told of big bones half buried there. One day in 1663, an enterprising man by the name of Otto von Guericke—now mostly remembered as the inventor of the air pump—started digging in that area. There were bones and teeth, so the peasants had spoken the truth. But what had these bones been when still alive?

Otto von Guericke decided that it may have been a unicorn. And he put the bones together into the shape shown in Fig. 12. The picture has been preserved only because it was published by Leib-

Fig. 10. Flensing a whale

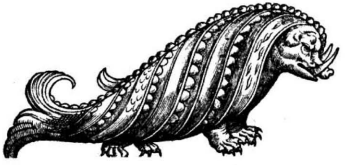

Fig. 11. The "Bonus"—a really fine example of Olaus' Midnight Marvels

nitz in 1749 in his work *Protogaea,* almost a century after the excavation.

Although the bones themselves have been lost, mislaid or discarded in the meantime, we can tell what they really were. The big tooth is very clearly a molar of a woolly mammoth and the other bones, allowing for some breakage, probably were, too.

It was only natural that the pioneers of the new science of paleontology, who began groping

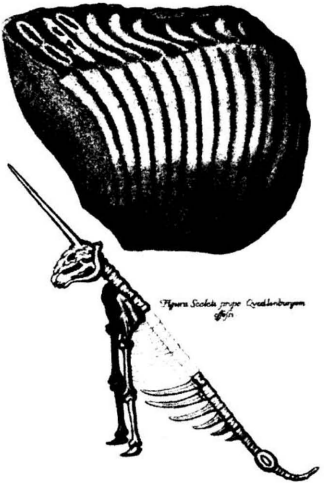

Fig. 12. Otto von Guericke's "unicorn"

their way into the distant past during the later part of the 18th century, would repeat some of the mistakes zoologists had made three centuries earlier.

In 1784, a scientist by the name of Collini came across an interesting fossil that had just been found in the lithographic slate of Eichstätt in Franconia. The fossil was in rather good condition.

There was a head with enormously long jaws, bearing comparatively few and small teeth. There were the vertebrae of a long, thin neck. There were the vertebrae and a few ribs of a small body, the well-preserved remains of a birdlike leg and foot and the less well-preserved remains of the other. And there were the bones of the "forelegs," quite clear and also quite large.

The problem was how all this had functioned when the animal was still alive.

Collini did not commit himself too much; he gave a careful description of the find and referred to it as the "unknown marine animal." The word "marine" crept in, I should think, because the fossils of the lithographic slate are (with a very few but also very important exceptions) decidedly marine in character, like crabs, fishes, sea lillies, etc.

Some twenty years after the discovery, a Professor Hermann in Strasbourg suggested to the great Georges Cuvier in Paris that he study this fossil. Cuvier did and realized that he was looking at what must once have been a flying reptile.

It was the first known to science and Cuvier named it *Pterodactylus.*

CUVIER'S ability to recognize something that had no living counterpart was superlative —but he could not convince his fellow scientists in a hurry. They simply did not take to the idea of a flying reptile. Birds could fly and so could bats, but flying reptiles?

Hence, Prof. Johannes Wagler reasoned—as late as 1830 and after Cuvier's third publication on the subject—that Collini had probably been right with his term "marine animal" and he reconstructed pterodactylus as shown in Fig. 13. Just how "pectoral fins" of such disproportionate size could operate is something he never explained. But he would not have liked the modern concept (Fig. 14) of how pterodactylus looked and behaved.

Just as there is no true flying reptile around any more, there is no known living reptile that habitually walks on its hind legs only. The Australian lizard *Chlamydosaurus* does it when in

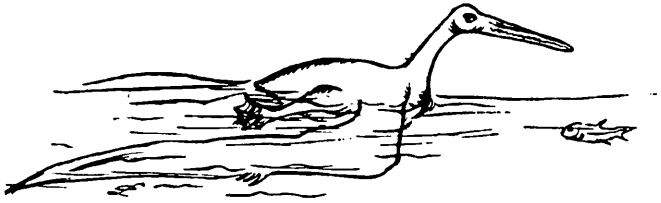

Fig. 13. Collini's "unknown marine animal"

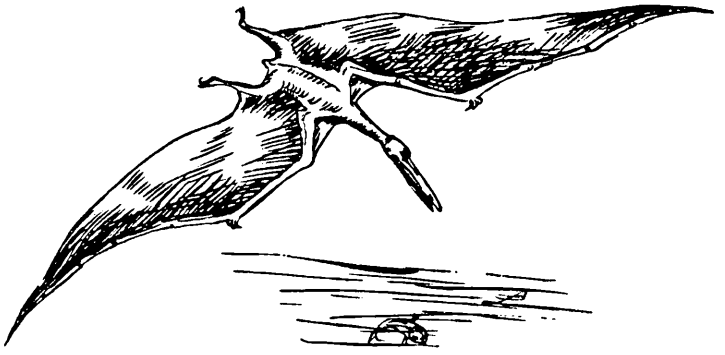

Fig. 14. Pterodactylus from the Jurassic Period

a hurry and some of the Old World monitor lizards and of the New World iguanas have been seen to do the same. But none walk around on their hind legs in the manner of an ostrich. In the geologic past, many large reptiles did just that; *Iguanodon* comes to mind quickly as a classical example. However, when its first remains came to light, the fact that many dinosaurs had a bipedal walk was not yet known. And iguanodon itself was slow to reveal it, for what was first found of it were just a few teeth.

Here Cuvier made a mistake; he thought they had belonged to a rhinoceros. It was Gideon Mantell in England who saw that the

Fig. 15. Iguanodon, first guess

teeth from the past resembled the teeth of the living iguanas and concluded that the original owner had been a very large reptile of plant-eating habits.

Then a few bones were found, a piece of the skull and a strange bony spike, like a straight horn. (They also found large three-toed footprints, but they did not know yet that these were made by iguanodon.)

Gideon Mantell was especially happy about this horn, which, incidentally, had been found by his wife. The teeth were rather similar to those of the living iguanas and some of the living iguanas carry a small horn on the tip of their noses. Here was proof that the extinct and mighty iguanodon had also possessed a nose horn. Mantell even developed an idea of "necessary resemblances," which he termed the "law of correlation."

NOW it was time to draw a picture. An artist by the name of John Martin sketched something like a very large and overstuffed iguana. Since the

hind legs were not yet known, the feet turned out to resemble those of a bear. The front feet, partly known then, ditto. The tail was made short and plump, the neck likewise. The head was largely fantasy, but Mrs. Mantell's bony spike was placed on the nose.

This was in 1838.

A few years later, plans for the Crystal Palace began to take shape and, since "the gigantic animals of the past" had just become fashionable, they had to be there, too. The sculptor Waterhouse Hawkins was commissioned to put "life size" statues of some in the garden of the Crystal Palace. Even considering the knowledge of the time, he did a very poor job (Fig. 15).

A critic of the time wrote, especially about the iguanodon, that this was an inexplicable whim of the scientists who draw pictures of animals they cannot possibly believe themselves. It would be interesting to confront this critic with a picture of iguanodon as it actually looked. (Fig. 16.)

Iguanodon was admittedly a rather specialized character, as could easily be seen when, in 1878, more than a dozen complete and well-preserved skeletons were discovered in the Sainte Barbe mine near Bernissart in Belgium. Walking upright on three-toed hind feet, it carried its head high

Fig. 16. Iguanodon bernissartensis

and the beak must have looked like that of an enormous turtle.

It was hornless. The alleged horn was found to be something else entirely that could not possibly have been guessed.

The spike was actually the thumb of iguanodon. Its front feet greatly resembled human hands, but with both thumbs converted into enormous immovable daggers. To substitute for the immobilized thumb, the "little finger" had become opposable. We aren't sure yet whether the other three fingers were movable; it seems likely.

Little remains to be added, but I can't help thinking of something Sir Winston Churchill once said. Speaking of political mistakes of the past, he declared: "These mistakes will not be repeated; we'll probably make our own set of mistakes."

I'm afraid this is applicable in science, too. —WILLY LEY