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*U.S. Nat'l Museum*

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CAMBRIDGE, MASS., U. S. A.

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THE "GILA MONSTER."

BY S. GARMAN.

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*Salmon  
1890*



## ON THE "GILA MONSTER" (*Heloderma suspectum*).

BY S. GARMAN.

LATE in May, 1889, through the kindness of Miss Mary Woodman, the Museum of Comparative Zoology at Cambridge, Mass., came into possession of an unusually handsome specimen of the "Gila monster," one of the largest of the lizards and the only one reputed venomous. He had been secured at Casa Grande, Arizona, by Mr. Daniel H. Bacon and forwarded in such a manner as to reach us little the worse for the handling and the change of climate. His arrival in good health and in the warm season gave opportunity for taking a number of notes that may add something to what is already known concerning the species. For more than a year he was kept alive and under observation. Animals that have been brought any distance usually arrive very thirsty, and the first move toward domesticating them is made in giving them water. *Heloderma* was no exception. In an arid dwelling place such as his, four or five days, the length of the journey, would not be expected to prove a very long time between drinks, but he drank as if nearly famished. A stupid and impassive appearance did not prevent such manifestation of intense enjoyment as made it a pleasure to watch the slow process of satisfying what, for the time, was the greatest desire of the creature's existence. More than half an hour elapsed from the time the snout was brought down to the liquid and the tongue thrust into it until the

head was raised and, licking the lips and yawning to disclose the inky blackness inside the mouth, preparations were begun on a sleeping place. Shortly afterward an egg was broken into a dish and placed within reach; it was taken with evident relish, in the same manner as the water; the chin was dipped into it and the tongue thrust out, bent downward and drawn back again. The tongue is thick and riband-shaped, *i. e.*, long, narrow and somewhat depressed. In protrusion it first makes its appearance as a single sharp point; as it comes farther out the tip separates into two points, and the organ is seen to be forked for a short distance. When fully protruded, the aspect is changed and the outline of the extremity, as seen from above, resembles that of the tail of a shad. As the tongue is drawn in, the tips approach each other till once more closely applied. Thus, the forked portion moves sidewise like the blades of a pair of scissors as the tongue goes out and back. Any of the fluid that adhered was carried into the mouth by the retraction, and no doubt the tongue was followed by a slight current induced by suction that took in a little more; the amount of suction, however, must have been very slight, judging from the time occupied in eating a single egg. On each of four days one egg was consumed; then followed a week of fasting, the most of which was cloudy weather. Readiness to feed depended greatly on the temperature and brightness of the day; in consequence the meals were quite irregular.

On the bottom of the box there were some inches of sand with several rocks; under the side of one of the latter the burrow was made. The digging was all done with the hands; beginning with the left the sand was thrown back with some force in slow strokes, about thirty to the minute, then the right was used in the same way. The motions were outward or lateral, not vertical like those of

a dog. For a while the sand was dug out directly, until it began to pour back; then a position was taken up on the top of the heap that had been made, and it was thrown still farther back; gradually working forward, conditions were soon made favorable for continuance of excavation at the bottom of the burrow. At the depth of about a foot the body was hidden and only the tail exposed. This depth appeared to be satisfactory for a time, and the dwelling was occupied as if complete.

The tail is club-shaped, near six inches in length by one and a half in diameter, and retains its thickness back toward the end where it rather abruptly tapers to become more slender and pointed. When the tail was sticking out of the excavation, as in digging, the slender extremity moved from side to side, back and forth and around, with more flexibility than was to be expected from its size, as if constantly on the alert for unseen danger. The organ is very sensitive. While asleep the tail was stowed as if to insure its safety; it was either extended directly back into the burrow, half of the body remaining outside, or, when the animal was wholly under cover, it was bent forward along the side. In sleep, the body lies flat on the sand and the arms were usually stretched back, palms upward. After a few weeks, less care was taken in regard to entering the burrow during the day, and the naps were taken anywhere in the box.

The box was not well placed for the sunshine; it was covered with a strong netting. Some attempts to get through the net one morning caused the occupant to be taken by the shoulders and lifted over into another cage where he might get the full benefit of the sun. This was quietly enjoyed until the sun had passed, then there was another attempt on the cover, followed by return to the first box and retreat into the hole. This came to be the

regular proceeding: every morning about nine o'clock the fellow climbed up in the corner of his box whence he was lifted over into the sunshine to take a nap until the shadows came upon him, then he would climb in the corner again till returned to the larger box to take his favorite position in his den for a while. To forget or neglect him was out of the question; his scratching would not permit it.

The number of eggs charged to him does not average more than one per week; the other food given him amounted to very little.

In the latter part of July he began to slough. The epiderm came off in a very ragged way, in shreds and patches. There seemed to be no effort to hasten the process and a month later it was not entirely finished. Thinking to hurry the matter, in case all had not gone along in the normal way, a bath tub was furnished with water sufficient to completely cover him. At once he showed a fondness for lying in the water with his snout sticking out; this was varied by lying on the bank with his tail sticking in, a position which he apparently found to be very delightful.

Heloderma was really good-natured. To be sure he was easily worried into self-defence, but there was nothing vicious in his disposition. To scratch him on the sides, or rub the knobbed scales of his back, or, more readily than either, to blow in his face would make him open his mouth, for which he was not much to be blamed, but even then something had to be put between his teeth to get him to bite, he had so little desire to take hold of his tormentor.

His thirst required more attention than his hunger; he drank frequently and always with great deliberation. To tempt his appetite various things, such as insects, worms, young birds, mice, meats and cooked foods were put be-

fore him. He took none of them voluntarily, but would swallow occasional offerings if they were put into his mouth. Some things he would not accept on any terms, they were put out of the mouth as fast as put in; others that he might be induced to swallow were held in his jaws for a long time. At the end of a year the only evidence of loss of flesh was to be noticed near the end of the tail, where it had grown a little more thin and pointed. The body had retained its plumpness, being rather more than three and a half inches wide to twelve inches long, without the tail.

His only sound was a long-drawn aspirate hah, like a sigh, produced by expelling the breath from the lungs. If teased till out of patience, this was given out with the mouth partly open, when it had all the force of a warning; whether it was intended for that purpose or was merely preparation for a struggle, by lessening the bulk, are still to be considered. It really answered both purposes.

In regard to the nature of the venom and fatality of the bite there is little to offer that is new. The results of the experiments suggest danger for small animals but little or none for larger ones. Large angle worms and insects seemed to die much more quickly when bitten than when cut to pieces with the scissors.

Acquaintance with this specimen has satisfied me, however, that the reports of the deadly nature of the species are mainly exaggerations, with little if any foundation in fact. Popular opinion and for that matter its manner of origin are illustrated by the following, credited to Col. A. G. Tassin, U. S. Army, in the *Overland Monthly*: "The Gila monster is an ugly reptile peculiar to Arizona, and as its name implies, most common along the Gila river. It is a sort of a cross between a lizard and an alligator,

"roughly striped black and white on a yellowish back-ground. Its length varies from ten to thirty inches, and a large-sized fellow is as thick as a strong man's arm. When prodded with a stick it hisses and thrusts out its heavy forked tongue, raising its head menacingly, but scarcely moving otherwise. Its bite is often fatal, the effect depending more or less upon the state of the saurian's temper and the depth of the wound. Its breath in hissing is offensive, and issues from a wide-open mouth in puffs of black vapor or smoke. The Mexicans I have questioned all told me that it was exceedingly poisonous, as much so as the bite, if not more, while many of the Americans thought it harmless. Having myself seen a chicken and a small puppy killed by the hissing of one in their faces, I am inclined to think that it is best to keep from coming in contact with it." Comment on this is unnecessary. Still more conclusive in its way is the following, originally from the Cochise Record, reprinted without comment in the Proceedings of the Zoological Society of London, 1888: "Sunday evening Dr. Mathews was summoned, by telegram, to Fairbanks (a railway-station near Tombstone, Arizona Territory, U. S. A.), to attend Colonel Yearger, who was reported seriously ill. Owing to delay in the telegram, the doctor did not reach the patient until several hours after his death, which had been very sudden."

"It appears that Yearger had been fooling with a Gila monster and in attempting to open the creature's mouth, was bitten on the right thumb. Instantly the poison took effect, and although every convenient remedy was applied, he lived but a few hours. An inquest was subsequently held, and a verdict returned in accordance with the above facts."

"As this is the third or fourth death which has occurred



"in the Territory from bites of this reptile, it should set at rest, at once and forever, the theory so prevalent that their bite is not poisonous."

For comparison with the foregoing we may bring forward the evidence of a couple of witnesses of scientific reputation. They have no interest in destroying the character of the accused and may be expected to give testimony without prejudice. If they are less positive in their assertions than the preceding, it is possibly due to their actual acquaintance with the creature.

Dr. F. Sumichrast under date of 1880, in the Bulletin de la Société Zoologique de France, page 178, remarks concerning *Heloderma horridum*: "J'ai peu de chose à ajouter aux observations de mœurs que j'ai publiées sur cette espèce, il y a quelques années, si ce n'est, qu'après de nouvelles expériences sur sa morsure, je suis arrivé à la conviction qu'elle occasionne rarement la mort chez les animaux d'une certaine taille et que, la plupart du temps, elle n'est suivie que d'une enflure de la partie mordue qui disparaît au bout de vingt-quatre heures au plus; c'est au moins le seul effet qu'elle ait produit sur plusieurs jeunes chiens que j'ai fait mordre dernièrement."

Dr. R. W. Shufeldt is one who, from having been incautious enough to get bitten, is entitled to speak with some degree of assurance. His statement is found in the American Naturalist for 1882, page 908. He was bitten on the right thumb, the teeth going to the bone, by a specimen at the Smithsonian Institution. The lacerated wound was in a few moments the starting point of severe shooting pains that passed up the arm and down the corresponding side. A profuse perspiration was induced. The pain made him so faint as to fall. The hand swelled rapidly, but the swelling went no farther than the wrist. The treatment included suction which drew not a little blood

from the wound, a small quantity of whiskey, external application of ice and laudanum and a lead-water wash afterward to reduce the swelling. He passed a sleepless night. By the next day the swelling was considerably reduced and thereafter disappeared gradually. The following is the conclusion of the doctor's statement: "Taking everything into consideration, we must believe the bite of *Heloderma suspectum* to be a harmless one beyond the ordinary symptoms that usually follow the bite of any irritated animal. I have seen, as perhaps all surgeons have, the most serious consequences follow the bite inflicted by an angry man, and several years ago the writer had his hand confined in a sling for many weeks from such a wound administered by the teeth of a common cat, the even tenor of whose life had been suddenly interrupted."

The most conclusive of my own experiments on the subject of this notice, *H. suspectum*, eighteen inches in length, was made with a young cat less than one-third grown. The cat was bitten on the right hand and wrist, the lizard holding fast like a bull dog, and blood was seen to flow when they were released. That there might be no doubt of the effectiveness of the bite, in two minutes the teeth were inserted a second time, the saurian retaining his hold and sinking his teeth deeper as the cat struggled to get free. For half an hour or more the wound occasioned some distress and was licked and dressed by the kitten, which then went to sleep for about an hour and a half. In expectation of its death it was left undisturbed. To my surprise it awoke as lively as if nothing had happened. Though the hand was somewhat swollen, it was but slightly lame. Twenty-four hours afterward when it was as bright as ever and apparently without ill effects from its mishap, the same cat was again bitten twice on the fore-

arm, a little higher than before. As in the first experiment there was no room to doubt the penetration of the teeth. The cat again licked the wounds and for a considerable time was occupied in dressing them. There was no disposition to go to sleep as on the day before. In two hours, as soon as the cat was inclined to pay no farther attention to its wounds, it was killed and the skin removed the better to note the effects of the bites. The fore-arm and hand were found to be swollen to twice the size of the opposite hand and arm. The track of each tooth was marked by the blood in and close around it, and the number and depth left no doubt of the conclusiveness of the experiment; the teeth had gone to the bones and between them. I saw nothing by which to distinguish the cuts from those made by a needle. There were no signs of disorganization in either the first or the second bites. Nothing could be seen in the way of discoloration or otherwise to give reason for any other conclusion than that the kitten would have entirely recovered in a few hours, by the time the swelling had gone down, if it had been allowed to live.

The outcome of such observations as have been made on this specimen has been confirmation of the opinion that the species is venomous to a certain degree, to an extent that, while it may most often prove fatal to very small animals, is only in exceptional instances deadly or perhaps even dangerous to larger ones. The effect on the kitten was identical with that on the puppies in Sumichrast's experiments. That poison was introduced by the bite was evident from the distress and swelling occasioned.

Dr. Fischer has described and figured secretory apparatus on the lower jaws; no glands have been found on the upper. There is an important question to be solved in connection with this apparent lack of venom-secreting organs on one of the jaws, which is quite as well prepared for its use as

the other on which the glands are so well developed. On both upper and lower jaws each tooth has a lateral groove on each side ; these furrows are supposed to be for the purpose of inserting the venom in the wounds made by the teeth. Unless there are, not yet discovered, means of supplying venom to the upper teeth, it is difficult to see how their furrows are made available, if not by means of a quantity set free in the mouth, from the lower jaws, before the attempt to bite, a process of such uncertain efficacy as hardly to be considered probable.

Averse to torturing the creature, no attempt was made to verify the statement made by Sumichrast concerning the habit of turning on the back to defend itself when struck or beaten with a club. However, it might be expected to do just what is asserted of it under such circumstances, for the position would be that which would enable it most effectively to use feet and claws in aid of the teeth in self-defence.

The breath is no more colored than that of human beings ; neither is it nor could it be any more offensive in its odor than the incense wafted from the lips of multitudes of the representatives of proud humanity. In regard to the breath being venom-laden, that of the specimen before us certainly was not so ; here again it would be no very difficult undertaking to select an army of men with whom a comparison in this respect would undoubtedly prove complimentary to the "monster."

And, finally, it may be said that unprejudiced consideration of the matter as it stands between the reptile and his detractors will not fail to convince any one that a great deal of the disrepute with which so much of the testimony is weighted should not by any means be attached to the lizard.



