THE FEROCIOUS SAND VIPER.

HOW IT KILLS AND DESTROYS ITS PREY.

BY F. W. OELZE.

If we assume the primitive mode of feeding—to be the simple seizure and swallowing of the living prey, as practised by the ringed viper, two ways in which the process can be improved suggest themselves. The victim might be crushed to death and into a form convenient for swallowing—an important point, for the ringed viper, despite the remarkable extensibility of its maw, often finds it impossible to swallow a large frog alive. Or, the victim might be killed by a poisonous secretion injected by biting with poison fangs. This is a refined and elegant method of inflicting death, in comparison with the brutal crushing practised by the great constrictor snakes, and it does not require so great a development of muscular power. Many insects adopt the same method, using stings instead of fangs. The blow-gun and poisoned darts (tipped with snake venom, by the way) of some South American tribes are more effective weapons than the Australian boomerang or the heavy assegai of the gigantic Zulu. So, too, are the rifle and shotgun of the civilized hunter, which likewise kill by causing a foreign substance to enter the body of the victim.

The most venomous of European snakes is the sand viper (*Vipera ammodytes*) of the Balkan region. (Fig. 1.) It attains a length of three feet or more, and is characterized by prominent eye ridges and a horny excrescence on the upper jaw, which give it a terrifying aspect. In reality, however, it is not ferocious, either in disposition or in manner, and when attacked, it calmly awaits a propitious moment and then strikes its fatal blow.

The photographs tell the story of a white mouse which was put into a cage where two sand vipers were resting on their perches. One of the snakes

FIG. 1.—SAND VIPER (*VIPERA AMMODYTES*).

yawned widely and repeatedly, and then began to glide slowly to the ground. The mouse, after a brief display of agility and curiosity, had become quiet and was calmly licking and grooming itself. The viper approached, lifted its head, arched its neck and showed its fangs within a hand's breadth of the mouse before the latter perceived it. When the mouse, at last, sprang away in terror it encountered the other viper and received a bite in the ear. Meanwhile the first viper approached, raised its head and buried its fangs in the mouse's side. The snake retracted its head to strike again, but the poison had done its work. The mouse quivered, rolled over on its side and, after a few convulsive twitchings of the feet, lay motionless and dead. The viper at once proceeded to lick the body all over, and then to swallow it, head foremost. (Fig. 2.) The sand viper is admirably constructed for swallowing large objects, as its jaws open until they form a right angle, and their edges have corrugations directed backward, which make it impossible for the object to slip out of their grasp. The gullet is capable of great distension. The danger of rupture is averted by a network of superficial sinews, which cover the body and connect the scales with each other. These sinews are usually invisible and even in the act of swallowing it is difficult to distinguish them from the general surface, but in a side light they make an impression on the photographic plate by means of their shadows. (Fig. 3.)

The viper first worms its lower jaw under the prey, so that its head resembles that of a pelican catching fish. (Fig. 2.) The act of swallowing is very complex and difficult to explain, but both jaws probably work simultaneously, the upper jaw being thrust forward, little by little, and the lower jaw moving up and down and to right and left. In this way the prey is gradually drawn into the gullet.

In the case described, the second viper also attempted to swallow the mouse, beginning with its

hind quarters, but was shaken off, and the first viper soon assumed the appearance of Fig. 4, with paunch distended and only the mouse's tail still unswallowed.

The time which elapses between the bite and the death of the mouse varies greatly. It is usually from fifty to eighty seconds, but in some cases it is pro-

FIG. 2.—BEGINNING TO SWALLOW A MOUSE.

tracted to two, three, or even four minutes, while in others death is as instantaneous as death caused by lightning. The act of biting, or striking, is performed so quickly that no one has yet succeeded in photographing it. The operation of swallowing occupies from seven to twelve minutes. In a very few cases I have seen the strongest of my sand vipers hold the mouse fast after the bite and proceed to swallow it immediately, beginning, in one instance, with the belly of the victim.—Translated for the SCIENTIFIC AMERICAN SUPPLEMENT from Kosmos.

LOMBROSO ON THE HAPPINESS OF LUNACY AND OF GENIUS.

PROF. CESARE LOMBROSO, of Turin University, the famous Italian alienist and criminologist who some years ago, in his book "The Man of Genius," set forth the correspondences that he believed existed between genius and insanity, has written an article entitled "Happiness in Idiots and in Geniuses," which may be found in the issue of the Roman Nuova Antologia. According to the American Review of Reviews, the professor here shows that supreme happiness is enjoyed by maniacs and by men of genius, a happiness far transcending the emotions of ordinary mortals, but that the duration of this blissful state differs strangely with the two classes mentioned. In maniacs, the feelings of great felicity endure permanently, indefinitely, while men of genius experience them only for the briefest moments. And he bridges over the distance between these two classes by a trait which he finds very common in them both; that is to say, megalomania. It may perhaps be well to note that Prof. Lombroso is usually considered as very much of a pathological experimentalist; this does not necessarily mean that he goes by guesswork, but his theories are not always of such a nature that they can be accepted as conclusive. Nevertheless, his ideas are invariably interesting and provocative of thought and discussion; "The Man of Genius" was attacked and defended all over Europe.

Pleasure is usually a fugitive thing, he commences; it lasts but a short time, and is followed by long

FIG. 3.—THE MOUSE HALF SWALLOWED.

periods of annoyance or weariness or regret. Pain, on the other hand, is more persistent and continuous, so much so that cessation therefrom is often accounted a state of enjoyment.

"Strange to say, the state of complete and lasting happiness, so foreign to sane persons, seems to exist in maniacs. Any one who visits a lunatic asylum for a few hours, where he hears desperate shrieking,

imagines that he has come to a place of suffering. But after remaining there for some little time, you agree that only there can be met a type of happiness so prolonged and so complete as to offer the key to the condition of joy that is so extremely fleeting in normal beings. . . . The most common delusion of one afflicted with progressive paralytic dementia is that of wealth: millions of lire, five hundred billions, all the money in the world, to the limit of the idiot's imagination and powers of arithmetic. But mostly the delusion of importance or greatness expresses itself in all manner of forms without particular cohesion. The idiot first boasts of his physical qualities and capabilities, his excellent singing, his enormous weight, his chest of steel, his speed that enables him to run a thousand miles a minute, his bodily secretions of fine wines and precious metals. The women boast of their beauty and of their husbands, who are princes and emperors. The very entrails of the maniac seem attuned to the height of festivity, as if through intoxication; and this air of perennial joyfulness radiates externally from eyes shining with satisfaction in the height of conscious pride. . . . A man will brag of having dug a tunnel through the whole earth, of having slain ten lions, of singing bass, baritone, and tenor all at once; and he will promise you palaces and honors as the reward of a trifling favor or a kind word. To-day he is general of Europe, king of Rome and the stars; to-morrow he will be pope, anti-pope, coin-specialist, and prime minister. And with the decline of his mentality his elation increases. A woman who was a hopeless case of paralytic dementia persisted in repeating on the two last days of her life, and even in the throes of death, 'Oh, how happy I am! How happy I am!'"

FIG. 4.—THE MOUSE SWALLOWED.

Then there are some peculiar lunatics afflicted with what is known as the circulating mania. For a few months in the year they manifest extraordinary activity and cheerfulness; they rush about transacting innumerable business affairs, they talk incessantly with a most exuberant flow of language, they display immense altruism. But all of a sudden they collapse, their energy leaves them, and their buoyancy as well; they take to their beds and refuse to speak to any one or to touch food. Instancing some men of genius analogously smitten who enjoyed periods of marvelous exuberance and buoyancy and creative fervor, which were succeeded by long fits of the most terrible, calamitous depression, the author cites the names of Poe, the philosophers Comte and Schopenhauer, the French poets Verlaine, Baudelaire, and Gérard de Nerval.

Stating that with megalomaniacs happiness is of yet shorter duration, because they are so sensitive on the subject of their ambitions, so apprehensive that these be opposed or thwarted, Prof. Lombroso passes on to some cases of geniuses who had megalomania. Tasso and Cadano wished it inferred that they were inspired by God. Mahomet declared openly that he was. Any criticism of their opinions they looked upon as extreme persecution. Newton was said to have been infuriated against his scientific contradic-tors. The poet Lucius would not rise when Julius Cæsar entered the Assembly of Poets, because he considered himself the better versifier. The poet Lenau, in an access of delirium, fancied he was King of Hungary. Wezel, a German novelist, conceived the idea of starting a bank and of making his own bank notes; he finally believed he was God, and gave his books the title, "Works of God Vezelius." The Princess di Conti, informing Malherbe that she could show him the most beautiful verses in the world, he replied: "Excuse me, I have already seen them; because if, as you say, they are better than any others, I must have written them myself." Victor Hugo was governed by the obsession of being not only "the greatest