canal for the conveyance of the poison, the fluid being secreted by a special poison-gland. One or more small ordinary teeth may be placed at some distance behind this poison-fang. In the other venomous snakes (Viperines and Crotalines) the maxillary bone is very short, and is armed with a single very long curved fang with a canal and aperture at each end. Although firmly anchylosed to the bone, the tooth, which when at rest is laid backwards, is erectile,—the bone itself being mobile and rotated round its transverse axis by muscles. One or more reserve teeth, in various stages of development, lie between the folds of the gum and are ready to take the place of the one in func­tion whenever it is lost by accident, or shed, which seems to happen at regular intervals. The gland which secretes the poison is described under Reptiles (vol. xx. p. 457).

All snakes are carnivorous, and as a rule take living prey only ; a few feed habitually or occasionally on eggs. Many swallow their victim alive ; others first kill it by smothering it between the coils of their body (constriction). The effects of a bite by a poisonous snake upon a small mammal or bird are almost instantaneous, preventing its escape ; and the snake swallows its victim at its leisure, sometimes hours after it has been killed. The prey is always swallowed entire, and, as its girth generally much exceeds that of the snake, the progress of deglutition is very laborious and slow. Opening their jaws to their fullest extent, they seize the animal generally by the head, and pushing alternately the right and left sides of the jaws forward, they press the body through their elastic gullet into the stomach, its outlines being visible for some time through the distended walls of the abdomen. Digestion is quick and much accelerated by the quantity of saliva which is secreted during the progress of deglutition, and in venomous snakes probably also by the chemical action of the poison. The primary function of the poison- apparatus in the economy of snakes is without doubt to serve as the means of procuring their food. But, like the weapons of other carnivorous animals, it has assumed the secondary function of an organ of defence. Only very few poisonous snakes (like *Ophiophagus elaps)* are known to resent the approach of man so much as to follow him on his retreat and to attack him. Others, as if conscious of their fearful power of inflicting injury, are much less inclined to avoid collision with man than innocuous kinds, and are excited by the slightest provocation to use that power in self-defence. They have thus become one of the greatest scourges to mankind, and Sir J. Fayrer@@@1 has de­monstrated that in India alone annually some 20,000 human beings perish from snake-bites. Therefore it will not be out of place to add here a few words on snake- poison and on the best means (ineffectual though they be in numerous cases) of counteracting its deleterious effects.

Chemistry has not yet succeeded in separating the active princi­ple of snake-poison or in distinguishing between the secretions of different kinds of poisonous snakes ; in fact it seems to be identical in all, and probably not different from the poison of scorpions and many *Hymenoptera.* The physiological effects of all these poisons on warm-blooded Vertebrates are identical, and vary only in degree, the smallest quantities of the poison producing a local irritation, whilst in serious cases the whole mass of the blood is poisoned in the course of some seconds or minutes, producing paralysis of the nerve-centres. That there is some difference, however, in the action of the poisons upon the blood has been shown by Fayrer, who found that the poison of Viperine snakes invariably destroys its coagulability, whilst nothing of the kind is observed in animals which perished from the bite of a Colubrine Venomous snake. The same observer has also experimentally demonstrated that the blood of a poisoned warm-blooded animal assumes poison­ous properties, and, when injected, kills like the poison itself, although the bodies of the animals may be eaten by man with impunity. On the other hand, he has proved that the opinion generally adopted since Redi’s time, viz., that snake-poison is

efficacious only through direct injection into the blood, is fallacious, and that it is readily absorbed through mucous and serous mem­branes, producing the same effects, though in a milder degree.

The degree of danger arising from a snake-bite to man depends in the first place on the quantity of poison injected : a large vigorous snake which has not bitten for some time is more to be feared than one of small size or one which is weakly or has ex­hausted its stock of poison by previous bites. The bite of some of the smaller Australian Diemenias and *Hoplocephali* is followed by no worse consequences than those arising from the sting of a wasp or a hornet, while immediately fatal cases are on record of persons bitten by the cobra or the large South-American Crotalines. In the second place it depends on the strength of the individual bitten : a man of strong physical constitution and energetic mental disposition is better able to survive the immediate effects of the bite than a child or a person wanting in courage. Thirdly, it depends on the position and depth of the bite : the bite may be merely a superficial scratch, or may penetrate into tissue hav­ing few blood-vessels, and thus be almost harmless ; or it may be deep in vascular tissue or even penetrate a vein, producing im­mediate and fatal effects. It must be mentioned also that Fayrer is distinctly of opinion that the poison of some kinds is more powerful than that of others. The mere shock produced by the bite of a snake upon a nervous person may be sufficiently severe to be followed by symptoms of collapse, although no actual poison­ing of the blood has taken place, or although the bite was that of an innocuous snake. It is said that persons have actually died under such circumstances from

mere fright. The local appearances

in the neighbourhood of a poisoned

wound, which soon after the bite is

much swollen and discoloured and

very painful, readily prove its char­

acter ; but this can be often ascer­

tained also immediately after the

bite by the inspection of the wound,

—the teeth, which are so differently

arranged in poisonous and non-

poisonous snakes, leaving a different

pattern on the skin. As a non-

poisonous snake has four rows of

teeth in the upper jaw, the pattern

of its bite will more or less resemble

fig. 4, whilst a poisonous snake

leaves two rows of more distinctly

marked punctured wounds in the

place of the two outer series in the

non-poisonous (see fig. 5). Of course, there may be modifications of these patterns, as, for instance, when one fang only hits or penetrates the part aimed at, or when the direction of the stroke is slanting, producing merely a scratch.

Unfortunately no antidote is known capable of counteracting or neutralizing the action of snake-poison. Some years ago injec­tions of ammonia or liquor potassæ were recommended, but there is the obvious objection that hardly in one out of a thousand cases of snake-bite would either the appliances or the operator be at hand. Fayrer’s experiments, however, have distinctly disproved the efficacy of this remedial measure. Equally useless is permanganate of potassium ; it is indeed true that a solution of this compound destroys the properties of snake-poison when mixed with it ; and therefore such of the poison as remains in the wound will be neutralized by the external application or injection of the perman­ganate, but the remedy is entirely without effect after the poison has passed into the circulation. Treatment is therefore limited to endeavours to prevent by mechanical means the poison from entering the circulation, or by chemical agencies to destroy or remove as much of it as possible that remains in the wound, and to save the patient from the subsequent mental and physical depression by the free use of stimulants. Whatever is or can be done must be done immediately, as a few seconds suffice to carry the poison into the whole vascular system, and the slightest delay diminishes the chances of the patient’s recovery. Courageous persons badly bitten in a finger or toe are known to have saved their lives by the immediate amputation of the wounded member. To the mode of treatment summarized by Günther@@2 but little can be added. (1) If the wound is on some part of the extremities, one or more ligatures should be made as tightly as possible at a short distance above the wound, to stop circulation ; this is most effectually done by inserting a stick under the ligature and twisting it to the uttermost. The ligatures are left until means are taken to destroy the virus in the wound and other remedial measures are resorted to, or until the swelling necessitates their removal. (2) The punctured wounds should be enlarged by deep incisions, to cause a free efflux of the poisoned blood, or should be cut out entirely. (3) The wound should be sucked either by the patient

@@@1 *The Thanatophidia of India,* fol., London, 1872.

@@@2 *Reptiles of British India,* London, 1864, 4to.