# THE SNAKE-BITE PROBLEM

By CLIFFORD H. POPE
CURATOR OF AMPHIBIANS AND REPTILES

"WHAT should I do if a poisonous snake bites me?"

This is the question that the reptile man dreads more than any other because it is one question for which he has no ready answer. About the best he can do is to change the subject. Just why is this simple question such a dreaded one?

Looking at the matter from the broadest point of view, there are three difficulties presented by the bite of a venomous snake:

First, there is no way of telling how much venom has been injected (the necessity of knowing will be brought out herein).

Second, snake venom, once mixed with the fluids of the body, cannot be separated from them by any known process.

### TREATMENT A RISK

Third, every treatment for snake bite is of such a drastic nature that the victim must run considerable risk in subjecting himself to any one of them; his troubles are only initiated by the poison itself.

Any treatment might almost be described as adding insult to injury or, better still, adding injury to injury. Now it becomes clear why it is so desirable to know how much venom has been injected: if the amount is small, the effects of it may well be preferable to those of the treatment.

The first difficulty, that of being unable to determine the quantity of venom injected, has not been fully appreciated in the past because of the unjustified assumption that a snake discharges its full load whenever it bites. This is now known to be untrue. A large snake may bite and withold nearly all of its supply of poison, the process of biting being far from a completely automatic one.

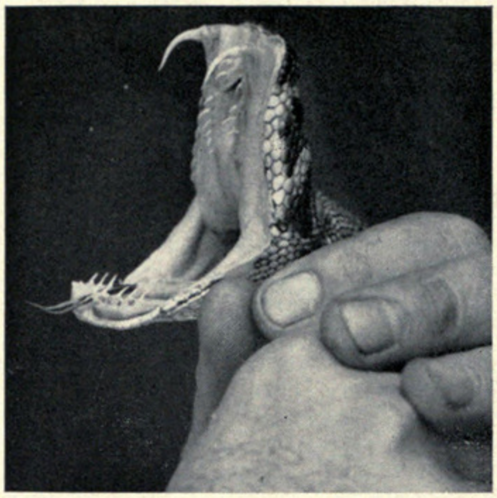
### AVOID FUTILE MAYHEM

The second difficulty, that of separating venom from body fluids, can also be disposed of quickly. One might think that a prompt cut at the site of the bite would cause the venom to flow out with the blood. However, the affinity of the body tissues for the venom is so great that the two become mixed instantaneously and the venom will not come out with any amount of bleeding. All the flesh surrounding the site of the bite would have to be cut out, and such mayhem is fraught with dangers. There is the story in point of the man who, bitten on one finger, seized a hatchet and cut the digit off at once. To his dismay he saw that, moving with such haste, he had hacked off two fingers instead of just one.

The third difficulty, the drastic nature of the treatments so far devised, cannot be dealt with so briefly.

Three scientific methods of treating snake poisoning have been developed, but no man can accurately say just what is the relative value of the three methods. Each method has advantages and disadvantages, and each one calls for much further investigation. Two schools of thought have grown up, and adherents of one school are often intolerant of the methods of the other. This state of affairs makes impartial investigation hard to carry on.

The three methods are correlated with three obvious ways of dealing with any poison: preventing its spread, extracting it mechanically, and neutralizing it. Extracting the venom by incision and forced draining and limiting its spread by a tourniquet are methods that may be almost as old as man. Neutralizing the venom is a recent scientific development based on medical knowledge that the ancients did not have. Immunization is not considered here because it would never have widespread use unless it could be achieved with great ease. Only those constantly exposed to danger from venomous snakes would need to be immunized.



'DON'T STEP ON ME'

Reproduction of a rattlesnake's head exhibited in Albert W. Harris Hall (Hall 18). Poison is ejected by the long, hollow, curved, sharply pointed fangs. A series of growing fangs is always ready to replace those broken in use or shed.

### TOURNIQUET HAS HAZARDS

Preventing the spread of venom by a tourniquet is the simplest treatment and, used with discretion, it is very effective in dealing with some venoms. A tight tourniquet kept on too long will cause local congestion and prompt death from shock after its release. If this dire result is escaped, serious infections may develop to cause a slower death. Experiments have shown that the tourniquet need not be tight, and therefore the dangers from shock and infection can be avoided. Even so, the confinement of the venom in a limb for too great a period may cause loss of the limb. Again the importance of knowing how much venom has been injected comes to the fore, for it is certainly better to suffer the general effects of a sublethal dose of venom than it is to lose a limb by keeping the venom locked up in it with a tourniquet.

Venoms of the New World poisonous snakes, with the exception of the coral snakes, are in general held in check by the tourniquet. The damage they do is mostly to the blood and blood vessels; the poison is carried about by the lymph, which courses slowly through the body and is readily checked in its flow by a tourniquet. Venoms of the cobras and their allies, which are Old World snakes, and of our coral snakes are predominantly neurotoxic or nerve-damaging substances that do not seem to be easily checked by tourniquets, but the evidence on this point is contradictory and it is far from certain that the tourniquet is not of some value in dealing with neurotoxic venoms.

Application of a tourniquet, then, is an effective way of checking the spread of most New World venoms. The tourniquet should not be applied too tightly and it should be considered primarily a first-aid method to be used with discretion.

### THE INCISION METHOD

Extracting the venom by making incisions at and around the site of the bite is a method that has been used to advantage in dealing with the same types of venom that the tourniquet checks so well. In fact, the two methods are often thought of as parts of a single one. As already explained, cutting is not simply a matter of letting the venom flow out immediately, and it is doubtful that incisions made over the actual fang punctures are of any more value than those made in the surrounding area. A great number of cuts must be made, preferably after some swelling has taken place. Before this there is little to cut and great danger of severing blood vessels, tendons, and nerves. The object of cutting is merely to drain off slowly the mixture of venom, blood serum, and certain waste products that accumulate to cause the swelling. In this way the amount of venom that eventually reaches the blood stream via the lymph can be greatly reduced.

But, as with use of the tourniquet, cutting is fraught with serious dangers in addition to the one already stated. The first of these to be encountered by the victim is the psychological difficulty of cutting. Many persons cannot cut themselves, or even a friend for that matter, and if they force themselves the strain is apt to bring on shock, or rather to increase the shock already brought on by fear. The use of local anaesthesia would of course help, but it could not prevent the nausea brought on many individuals by the sight of blood. The second danger from cutting is the great chance of introducing infection. Some sort of mild suction must be applied over each cut for many hours, since the proper kind of drainage is a slow one. Anyone would realize that this incision treatment should be put in the hands of a competent physician as soon as possible.

#### DANGER IN ANTIVENINS

The third method, neutralizing the venom after it has spread more or less widely through the victim, was thought, when first developed within the century, to be the final solution to the whole problem. Experience of a few decades has slowly brought out the fact that grave dangers are associated with this method just as with the others. This serum, known as "antivenin," is made from the blood of immunized horses, and large quantities of it are required to neutralize appreciable amounts of venom. Many human beings react violently to antivenin, either by dying instantly or by suffering severely from serum sickness some days later. Just what the dangers from antivenin are can scarcely be estimated as long as the one school underestimates them while the opposing school exaggerates them.

After a century of investigation, modern science remains unable to cope with snake poisoning. There is little doubt that if the snakes of this country, let us say, annually killed thousands instead of scores, the problem would be solved in a very short time. It is hard to interest research physicians in a problem that does not exist in big cities where the institutions of medical research are concentrated. A real cure for snake bite might not save many lives but it would give tremendous mental relief to millions of persons living in the country and countless thousands of others who seek recreation in the wilds.

## AN EXHIBIT REJUVENATED

By EMIL SELLA
CURATOR OF EXHIBITS, BOTANY

The recent installation of a large epiphytic aroid (*Anthurium acaule*), native of tropical America, is really a partial restoration. Completed in 1910, this particular reproduction remained on exhibition until a short time ago.

The species shown grows either as an airplant on branches of trees or on rocks. Its creeping stem produces large masses of aerial roots and its leaves often attain a length of four feet and a width of one foot or more. The flower spike is erect but becomes pendent when the fruit develops. All in all, its total assemblage is indeed striking.

In the course of rearranging the exhibits in Martin A. and Carrie Ryerson Hall (Plant Life—Hall 29) to take greater advantage of the recently introduced case lighting, we occasionally come across an individual specimen that requires something more than the usual cleaning and refreshing treatment. The anthurium was one of these; a close inspection of it revealed hidden damage to the leaves. This and the considerable darkening of the various pigments made it necessary to replace the foliage as well as some of the other parts in order to justify its remaining alongside the other reproductions. There were undoubtedly other causes for this condition than the natural aging processes, such as an accidental blow at the time it was being moved from the old Museum building in Jackson Park or possible exposure to some oxidizing agents that may have been present in the exhibition case.

Fortunately the necessary living material for these replacements could be obtained through the co-operation of the Garfield Park and Lincoln Park conservatories. Yet an unpredictable amount of time is always needed for the discriminating task of replacing part of the old with the new and matching the remainder so that one may not easily distinguish between them. This reconstruction, shown in the accompanying illustration, is the result of the combined efforts of Frank Boryca and Samuel H. Grove, Jr., Assistants in Plant Reproduction, and Artist-Preparator Milton Copulos.

ANTHURIUM ACAULE
**Model of a tropical American aroid. This creeping or climbing perennial grows on trees or rocks. Exhibited in Hall 29.**

### Australian 'Mountain Devil'

The Museum has received a specimen of an Australian reptile, the Moloch lizard (*Moloch horridus*). The creature, resembling American spiny desert lizards, is known in Australia as "mountain devil." Specimens are difficult to find. The one received at the Museum is a gift from A. R. Main, of the Zoology Department at the University of Western Australia in Nedlands.

The Moloch lizard, about 6 inches long, lives on a diet of ants. It looks somewhat like the horned toad.

## BIRDS FROM NEPAL

The Museum recently had word that Dr. Robert L. Fleming is safely back from his successful bird-collecting trip to Nepal. Bird study and bird collecting have always been a hobby with Dr. Fleming, who is a teacher in the mission school Woodstock at Mussoorie in the United Provinces of India. He has visited the Museum staff when on vacation in Chicago, and he has long been one of our most valued correspondents.

Last summer he broached the possibility of a bird-collecting trip in the little-known country of Nepal to Boardman Conover, Trustee of the Museum and Research Associate in Birds. Mr. Conover was enthusiastic, for his own notable private collection of game birds would be enriched by collections from this region, which is remarkable for its wealth of pheasants. Nepal, lying just south of Tibet, has been a "forbidden country" and our knowledge of its birds dates back over a century to the times of Sir Brian Hodgson, who was British resident there. The opportunity to learn more of its avifauna was too good to miss, and the costs of a three-month trip on behalf of the Museum were assumed by Mr. Conover. (Mr. Conover died last month—*see page 2.*)

From Dr. Fleming's preliminary report we learn that a collection of some 700 bird skins was made during the three months spent in Nepal (November, 1949, through January, 1950). His glowing letters tell of climbing to 15,000 feet among the towering Himalayas, of travels by elephant in the tropical valleys and bird shooting from elephant-back, of his cordial reception by the administration, and of the friendliness of the people. We gain the impression of an outstanding success. The Museum collection will be notably augmented by the birds obtained by Dr. Fleming. Further report of the Nepal Expedition will be made on arrival of the collections. —A.L.R.

## ECONOMIC GEOLOGY FIELD TRIP

The Museum's 1950 Mississippi Valley Field Trip left Chicago early in May. Robert K. Wyant, Curator of Economic Geology, is in charge. Collections of the ores from three lead and zinc mining areas of the Mississippi River Valley will be made. The areas and their features are as follows:

I. *Wisconsin-Iowa-Illinois District:* Lead and zinc mining activity has been partially rejuvenated in this area by recent geological investigations.

II. *Southeastern Missouri Lead Belt:* Located in the Flat River area, this belt contains one of the most important lead deposits in the world.

III. *Southeastern Illinois:* A new zinc-producing area is adjacent to the important Illinois fluorite deposits.