



Science News-Letter

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ZOOLOGY

Deadly Snakes Now Conquered by Science

By **RAYMOND L. DITMARS**

Poisons of serpents have attracted the attention of many noted scientists. There is a lure and fascination in such studies. Attending their progress is the realization of contact with a high degree of specialization perfected through the ages, until the snake acquired a pair of hypodermic needles to take the place of teeth in the upper jaw, and glands secreting lethal fluids that have killed a million and more humans.

It is well to check up that latter statement. A million humans bitten and killed by poisonous snakes! "In how long a time?" asks the reader. And the answer is that in fifty years in India alone, statistics point to this appalling number of deaths from snakebite, as the annual average is slightly over twenty thousand each year. Add to this the fatalities from deadly serpents in Africa, where there is a large number of dangerous species; in Australia, where the greater number of the serpents are poisonous; and the vast tropics of Central and South America infested with poisonous snakes. There has been an estimate made (without actual statistics) that from three to five thousand deaths occur from snakebite each year in the American tropics. Statistics gathered by the writer, over a period of several years, and relating entirely to the United States, indicate an annual average of over one hundred deaths.

Immunization Now Possible

Like the history of a number of sinister human maladies, the death rate from snakebite is soon to change, with the application of scientific discoveries to practical methods of understanding and widespread use. The actual start was at the Pasteur Institute, in France, some twenty years ago. Dr. Albert Calmette immunized horses against the

action of cobra venom and obtained a serum for use in India. Unfortunately, the venom of the cobra is particularly rapid in action and the population of India rather slow to appeal for help when bitten. Calmette's discoveries have, however, started research work in many countries and there are now specific serums prepared in various parts of the world.

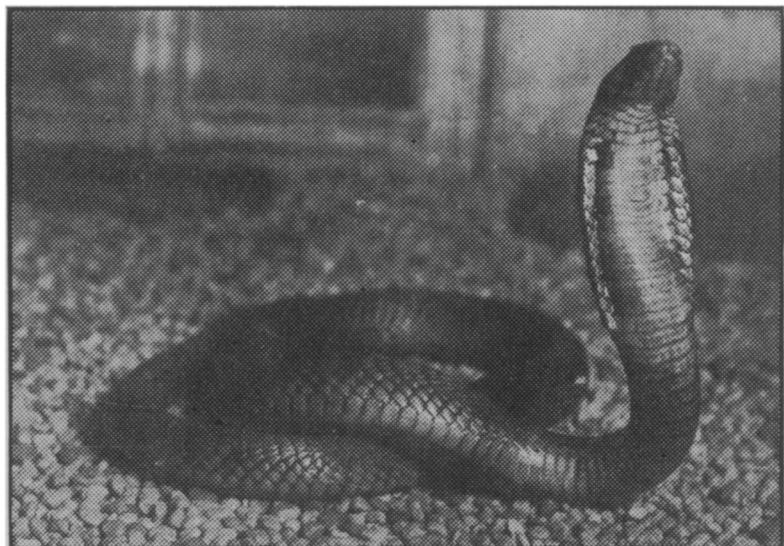
While Calmette must be credited as being the pioneer in the production of a curative serum, following the researches of venom composition by Wier-Mitchell, Noguchi, Langmann and others, the eyes of the scientific world were turned, a little over ten years ago, to Brazil, where was founded for the first time an extensive institution for the production of serum for snakebites. The name of the chief of this novel and modern establishment in the city of Sao Paulo, was soon to become internationally known. Dr. Vital Brazil has set a world-wide pace in producing a remedy, astonishing in results, not only of vast economic im-

portance to the American tropics, but already the means of saving many lives in the United States.

Dr. Brazil demonstrated that for specifically different kinds of snakes, specific serums were needed. He produced a serum for the deadly bushmaster, another for the tropical lancehead snakes, another for the South American rattlesnake, and a fourth grade of serum for the coral snakes. Hundreds of tubes of the rattlesnake serum have gratuitously been tendered for distribution in the United States, and the writer has witnessed the saving of life under remarkable conditions.

The process of preparing the serum is of great interest in demonstrating man's knowledge and control of perfectly natural forces—for the serum is not actually a man-made product, but a mysterious, invisible, non-analytical element or power added to the blood stream, by nature, to completely fortify the animal organization against one of the dead-

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THE AFRICAN COBRA, one of the most deadly of serpents. Its cousin, the Indian cobra, kills hundreds of natives yearly.

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Science Conquers Snakes

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liest natural poisons specifically evolved for killing.

How Horses Help

Horses are used for the production of these antivenins. They are first injected with minute quantities of poison, extracted direct from the snake by causing it to bite through a parchment-covered vessel. After steady weeks of treatment, the doses are increased. Nature starts at once to protect her subject against this increasing menace of a natural poison. Keeping a step ahead, nature builds up an immunity that finally enables the horse to withstand what would otherwise be highly dangerous injections, and to finally endure quantities of what would be far in excess of deadly doses. With complete immunity finally established, a blood vessel is tapped and several quarts of blood are obtained. The animal is not injured, nor is the operation attended with anything more than superficial pain. The blood is placed in cylindrical vessels, the heavy red portion settles to the bottom, and the clear, amber-colored or serous portion which forms the top and greater depth, represents the natural-made remedy. This is placed in small ampules, these sealed with a flame, and each represents a dose for snakebite—two or three of them for the bites of very large snakes. The serum is injected into the human with a hypodermic needle.

Serum Acts Like Miracle

When the serum is injected into a human victim, even though grave symptoms have developed and there is great pain and swelling, an immediate immunity takes place. We cannot say that the serpent's poison is neutralized—in fact, we cannot accurately define the working of the

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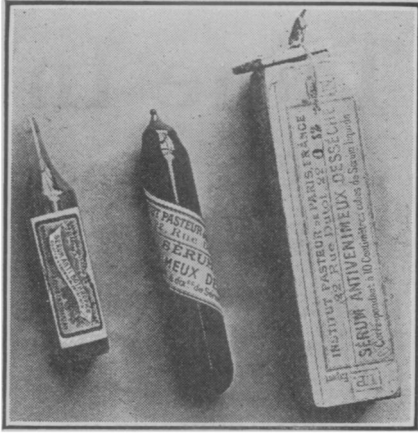
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SNAKEBITE REMEDY. These pro-saic little tubes contain the antivenom serum with which man can save himself from death after he is bitten by the most deadly snake.

Science Conquers Snakes

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serum. There is a change within an hour. Mental hallucinations give way to clear thought, reflex vomiting ceases, the great swelling of arm or leg quickly subsides, and the area of discoloration fades to normal hue. At the seat of the fang wounds is an area infiltrated and broken down with the poison. Without the serum—if the victim lived—there would be a steady and dangerous necrosis, probably going to the bones and invading their surface, but this area quickly clears up, in firm and healthy tissue, leaving nothing but an indented scar to tell the story.

Such are results as the writer has observed them, in several instances where death would have occurred within a few hours, or at most a day, and in other instances where the crippling of a hand or finger would have been the result, without the injection of antivenomous serum. Such also are the results observed by Colonel M. L. Crimmins, in his extensive work of distributing and utilizing the serum along the United States-Mexican boundary.

While visiting Dr. Brazil at the Institute of Serum Therapy, at Sao Paulo, first-hand information was obtained of the immense economic benefit of the serum in South America. One case had been recently treated close to the Institute. Two laborers struggled with a stricken comrade. He had been bitten on the foot, which swelled enormously. He could only drag his legs along, his eyes stared from an ashen face, breathing was labored, with pause between each breath, and he began to bleed from throat, mouth and

eyes—and Dr. Brazil went on to say that this man was back at work within a week.

Such remarkable results are possible, owing to the Institute's recent discoveries in concentration of the serum. It has been found that by filtration, certain elements adding to the bulk but not indicating antitoxic power, may be removed, and among these are the so-called pseudo-globulins.

The writer returned to the United States with ampules of serum treated by such processes, and specified by Dr. Brazil as being ten times more powerful than the type which so miraculously saved the life of Head Keeper Toomey of the Zoological Park, after he had been bitten by a huge Texas rattlesnake.

U. S. To Have Serum Plant

With poisonous serpents abundantly distributed all over the United States, except the extreme north-eastern portion, there has been a need, for years, of a serum-producing plant in this country. There appears to be no doubt that before the advent of inoculative treatment for rabies, that the death rate from snakebite exceeded fatalities produced by infected canines. Preventive treatment after bites of rabid dogs is generally understood and followed in this country, while the bites of deadly snakes are but little understood, and except in rare cases, are attended by treatment that is crude and shows a complete lack of knowledge of the composition of snake poisons. We have heard of instances of cauterization after a snakebite, where the direct opposite—generous drainage—should be induced. We also hear of immense doses of alcohol, which temporarily stimulates, but results in reaction and depression at the very time that the poison begins to batter at the gates of the vital organs.

General education is necessary; and we are to have it at once. Moreover, we are to have an institution, possibly two, similar to the famous plant at Sao Paulo. This will be a boon to a number of areas of hazard, and it will be of great interest to many thousands of hikers, campers and auto tourists, who have written to us for advice as to where serum might be obtained. Coming to this country as a courtesy, the Brazilian rattlesnake serum, efficacious for the bites of our own rattlers, copperheads and moccasins, is extremely

limited in quantity, and barely covers small areas of particular hazard.

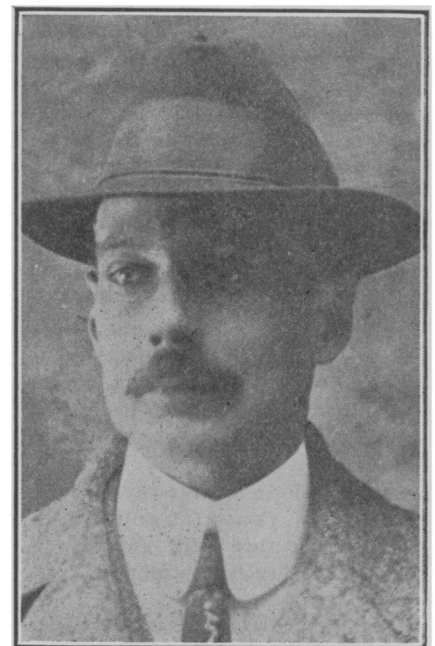
Serum for the United States will be ready in considerable quantities early this summer. It will be produced at the Antivenin Institute of America, at Glenolden, Pennsylvania, an establishment which came into being under the sponsorship of several scientific institutions, among them being Harvard University. The work of serum production is in charge of Dr. Afranio do Amaral, who was associated with Dr. Brazil in the work at Sao Paulo. He is a comparatively young man, of brilliant attainments, has already spent several years in the United States becoming accustomed to American methods, is a well-known authority on reptiles, and promises to produce the duplicate in this country of the Brazilian institution.

Dr. Amaral and the writer have already had a number of "poison parties" in which generous amounts of the venoms of rattlesnakes, copperheads and moccasins have been extracted for the work of immunizing horses.

Work to Cover Country

The establishment of the Institute is broader than the mere opening of the laboratory at Glenolden. Branches for the distribution of information will be located over the entire United States. The head-

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DR. RAYMOND L. DITMARS, internationally known authority on snakes and snake venom.

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quarters for information will be at the New York Zoological Park, in charge of the writer. An important branch in New England will be in charge of Dr. Thomas Barbour, of the Museum of Comparative Zoology, at Harvard University. The Zoological Society of St. Louis will be one of the mid-western branches, with Curator Perkins, of the Reptile Department, in charge. Another branch will be established in Texas, under the direction of Colonel M. L. Crimmins; another in California, under the direction of L. M. Klauber, Curator of Reptiles of the Zoological Society of San Diego. All of these branches will write and publish, throughout their respective areas, information treating with the character, habits, and occurrence of poisonous reptiles.

Another interesting development in association with this work is the establishment, in the Tela District of Honduras, by the United Fruit Company, of a "Serpentarium" similar to the snake park at Sao Paulo. There will be large enclosures, surrounded by moats, in which will be kept the representative deadly reptiles of Central America, and in

others will be those harmless, rat-eating species of the tropics which are of economic value on the plantations. Tela is a loading port, and tourists on Caribbean cruises will have an opportunity to visit this unique exhibition. Its main function, however, will not be as a zoological exhibit, but for the maintenance of large numbers of poisonous serpents, from which will be obtained venoms to be shipped to Dr. Amaral to produce specific serums for the tropics.

The writer understands that among the numerous plantations gathering their products for the United Fruit Company, there is an annual death rate of over two hundred workers from the bites of poisonous snakes. Thus the establishment of the serpentarium is a matter of substantial philanthropy and economic importance to Central America, which has never been able to obtain sufficient quantities of the Brazilian serum, owing to the large quantities needed south of the equator.

Perilous But Fascinating

A short time ago Mr. Douglas March visited the writer to say good-bye and sail for Tela. March is a young man on the way to a strange adventure. He is to have charge of the serpentarium, and no more unique occupation can be imagined. At the times when the plantations are being debrushed, he will follow the gangs with the machetes, on the watch for sinuous forms that glide ahead towards cover, or strike with the speed of release of a well-tempered spring. His prizes will be specimens of the fer-de-lance, the horned palm-viper, the parrot viper, the bushmaster, and slender, shining serpents marked like a stick of peppermint candy—coral snakes. These are beautiful creatures, but with a nerve-destroying venom as lethal as that of the cobras. Not only will young March be expected to keep his strange charges in good health, but he must, at frequent intervals, enter the large enclosures, hold down the head of each one individually, grasp it by the back of the neck, and allow it to bite into a glass vessel, to obtain the poison. He writes enthusiastically that everything is going well, and that he is sending us a large case of beautifully colored specimens. We well realize the care necessary in opening the case—as we are not so sure that our fairly varied stock of serums is efficacious for all of the types that come from Tela.

Science News-Letter, June 4, 1927

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