

Snakes : snake-bites and their treatment / by a Hindu.

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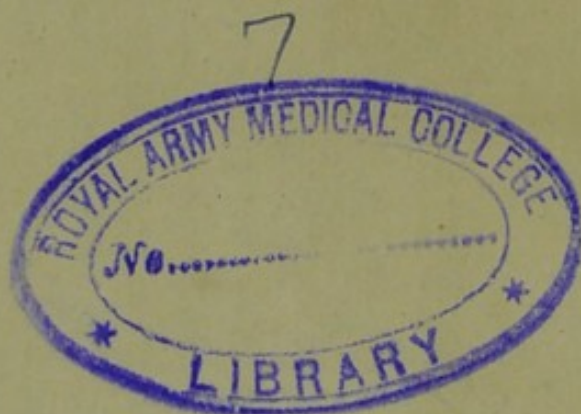


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Handwritten text in a cursive script, likely a ledger or account book. The text is organized into columns and rows, with some entries appearing to be dates or numerical values. The paper is aged and yellowed, with visible creases and a small dark spot near the top center.

Shute's gentlemen, half a dozen copies of which
have been sent to me for circulation in
this country to yourself and other gentlemen
who have made Indian matters a subject of
study. I have not been authorized to men-
tion the name of the writer, but should have
no objection to stating it to you privately in
case you should care to know it.

If it is not asking too much, I should be
pleased if you would be so good as to let
me know what you think of the statements
contained in the book, especially in chapters
6, 7, 8 & 9.

Dear Sir,

Yours faithfully,

Trudis.



Indian Medical Agency,

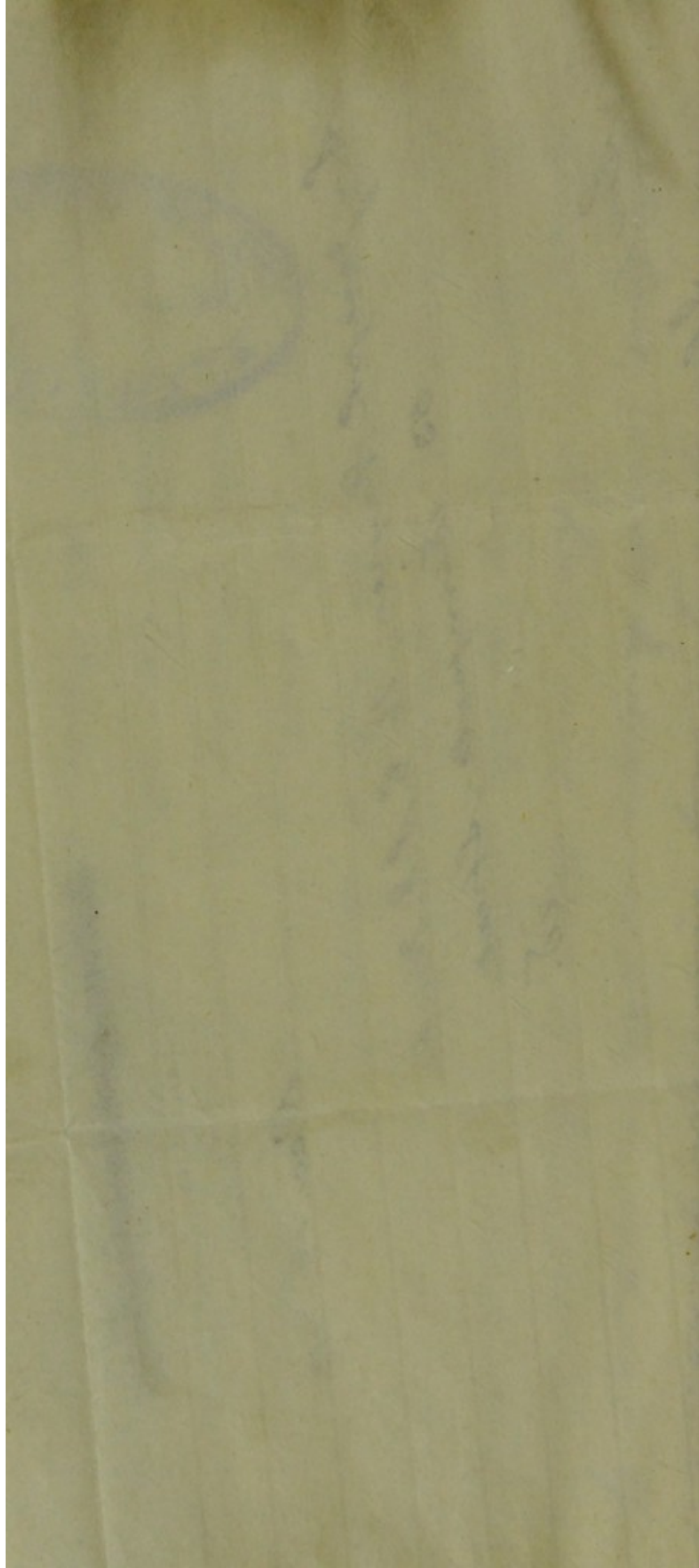
25, CRAVEN STREET, CHARING CROSS,
LONDON.

Dec. 18, 89.

Sir Joseph Paget, M. B. S. S. M. R.,
53, Wimpole Street,
W.

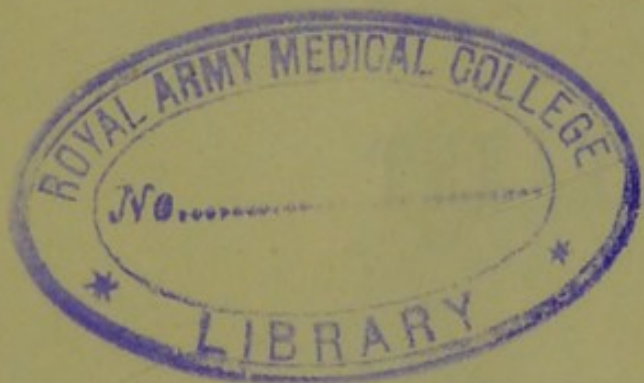
Sir

With your kind acceptance of a small
work, which found under another cover, entitled

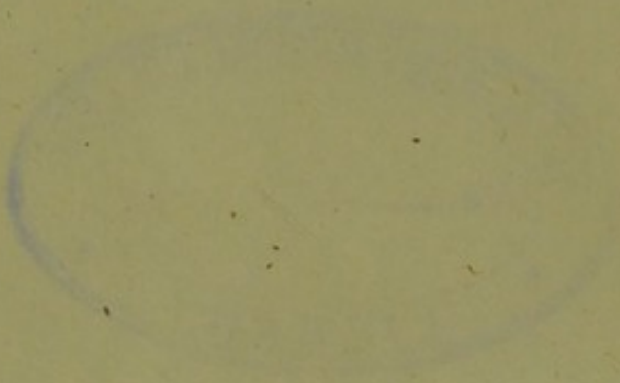


The Lagers gift,
June 1st 1916.

7



Faint, illegible handwriting at the top of the page.



SNAKES:

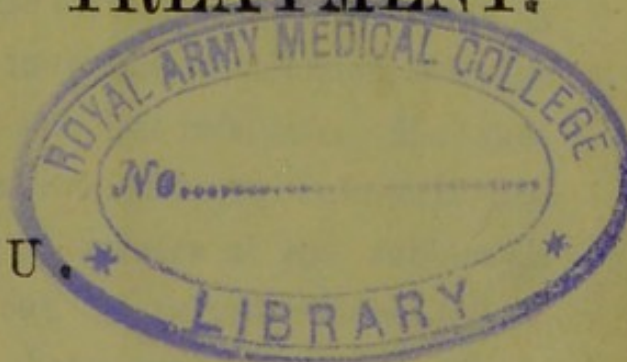
SNAKE-BITES,

AND THEIR

TREATMENT.

BY A

HINDU.



Calcutta:

PRINTED AT SMITH AND CO.'S PRESS.

1889.

SHAKES

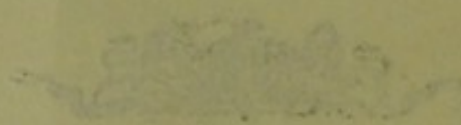
SHAKE-BITES

AND THEIR

TREATMENT.

BY A

HINDU.



TRO
RAMC
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CHICAGO:

PRINTED AT SMITH AND CO'S PRESS.

1880.

PREFACE.

THE following pages have been written by a distinguished member of our society, and though he chooses to remain *incognito*, the guarantee of his name is not necessary to add any value to his statements and observations. He bases his theory of treatment upon a few plain facts, and is opposed to the idea of the utility of drugs in snake-bites. He has demonstrated, I believe, for the first time, that it is neither possible nor necessary to cure snake-bites by the use of drugs. He carries the reader step by step, in simple language, to the inevitable conclusion, that the treatment he advocates is not only safe, but infallible. He takes you to a new world, a world which was hitherto unknown, and gives you the conviction, that he is master of the subject he treats, and knows what he is about. A perusal of the following pages will convince any man that a man need not die of snake-bite if he will only follow the treatment suggested by the author.

SHAMBAZAR PHARMACY, }
Calcutta. }

KALACHAND DEY,

Licenciate of Medicine & Surgery.

ERRATA.

Pages 4, in the extract from Dr. Ewart's remarks, after line 3, add the following lines omitted by mistake: "the chance of a consultation with another surgeon, to decide on the spur of the moment as to the course to be pursued. He may reason somewhat in this way: "If the ligatures be removed, absorption will set in; the blood will be charged with a fatal quantity of the poison; the functions of the great nerve-centres will be destroyed; the respiration will cease, and soon after the circulation also, coterminously with actual death. It is true that mortification will be prevented, but then this comparatively insignificant gain at the best will only be temporary, and attained at the sacrifice of the life of the patient. On the other hand, it is quite clear that little or no poison has as yet gained access to the."

Page 8, line 5. For Thanaphotodia read Thanatophidia.

Page 24, line 16. For muscle (the bivavel malluse) read mussel (the bivalve Mollusca.)



CHAPTER I.

INTRODUCTION.

THOSE who have never witnessed a death by snake-bite, can hardly realise the horrors which attend it. A man in the vigor of health is stricken down in a moment, and he finds that his life, in spite of all efforts, is slowly ebbing away. He feels a choking sensation in his throat, and he realizes vividly that a few moments more and he will not be able to breathe any longer. His friends with horror in their faces surround him, and he gazes at them with anguish and despair depicted in his countenance. His eyes become red and they grow dim every minute. Drops of sweat fall down his forehead, and he craves for a sip of water. If he drinks he is seized, if he has not drunk the water slowly enough, by a fit of cough and suffocation.

The pupils of his eyes dilate, and he is covered by a cold clammy perspiration. He becomes unconscious as the difficulty of breathing increases. His skin assumes a livid hue, and he is seized by convulsions before death. In certain cases of bites the body of the patient assumes enormous proportions by swelling. The tongue sometimes becomes too big for the mouth, and protrudes from it, and the cheeks swell so horribly as to cover the eyes. Sometimes the abdomen of the person bitten becomes as big as that of a dropsical patient, at the last stage. And last of all, within, say, one hour after the bite, a healthy and strong man may become a corpse, frightful to look at.

Yet many thousands of people,—the Government estimate is about 20 thousand,—die of snake-bites every year. The only method, adopted by the Government to stop the evil, is the extermination of the reptiles. For this a reward of 2as., I believe, is given. The reward is small and the reptiles are too many. As to the number of snakes, that creep over our country some idea may be formed from an account of a scene, which I my-

self witnessed, given elsewhere. Besides, the rewards are given in towns where there are municipalities, and it is not likely that any one will find it worth while to kill snakes for the small reward, when he has to walk for many miles to obtain it.

The other way to protect men is to find a treatment for the bites. When quite a young boy, I was very much affected with the sight of a death by snake-bite, and I always thought in my mind, that there must be a sure mode of treatment for it, and that it was quite possible to find it out. You all know the snake-charmers of India; snake-catching is their profession. They pass their time, day and night, with these reptiles. They will handle them as if the reptiles are harmless things, and they will not scruple to thrust their hands in a hole to catch a snake. I thought it in my mind, that if any body were in possession of the secrets of the treatment, it must be the snake-charmers of India.

Just then I fell in with a troupe of these people, called Mal-Vadyas in Eastern Bengal. They are half Mussalmans, half Hindoos. They live in bamboo tents, and rove about the country with all sorts of snakes for exhibition. It was from this troupe I first got an idea, though a faint one then, of the mode of treatment followed by the snake-charmers of India.

My first query to them was to know : How was it that they handled such dangerous creatures with such utter unconcern ? They said that they never permitted themselves to be bitten, and if bitten at all, they either extracted the poison or neutralised it. My second question to them was : Whether or not they succumbed, now and then, to the bites of venomous snakes. In reply they said that such a thing never happened ; excepting in one solitary instance. A lad of sixteen once died of snake-bite, but then he was a very foolish boy, and he was alone in a solitary place beyond the reach of their help. My third query to them was : Whether they depended upon any spell, *Jadu* or *Mantra* for their treatment. In this they replied that they have no faith, not only in any spell, but even in medicines. " How can," said they, " a medicine do good when a vigorous snake can kill a man in five minutes, and when it will take more time for the medicine to act than for the poison to kill ?"

As I said, I was first initiated into their mysteries by this troupe, but yet I could not learn all, for I had to part company with them too soon for my purpose. Since then I made friends with other troupes, and I kept also a leading *Mal-Vadya* in my pay for private experiments. When I came to know all about it, I found that their treatment is simple and is almost infallible. It is founded, besides, upon a scientific basis. When one has understood it, he can see, without any actual experiment, that the treatment must be sure and can never fail. Those who will do me the honor of perusing the pages will be able to see it for themselves.

My experiences were made use of by a friend, and a pamphlet in the Bengali language under the title of "Treatment of Snake-bites by Mal-Vadyas" has been published by him. It commands a large sale, and has been introduced into many educational institutions. But the secrets of the treatment ought to be more widely known, and I thought that a treatise in the English language might be of some use, not only in other parts of India but in places beyond it, infested by venomous snakes. Besides, if presented in the garb of English, the treatment will be made known to scientific men in all parts of the world. It must be susceptible of improvement, and it can be only effected by surgeons and other men of science.

I would have discharged this debt that I owe to my fellow-beings long ago, if I had not been deterred from that undertaking by many considerations. Many eminent scientific men have directed their attention to this subject. And when men like Drs. Shortt, Fayrer, Wall, Richards, Sarker &c. had taken up the subject, I thought that I might as well remain in the back-ground, and allow these scientific men to do their duty in a field where I had no right to encroach upon. But the result of these researches has not proved quite satisfactory, and I thought that, with a failing health, I should no longer delay to put down my experiences, in black and white, upon a subject in which vast numbers of my fellow-beings are so vitally interested.

Dr. Vincent Richards, the other day, had an opportunity of recording his own personal experiences as he was, unluckily for himself but luckily for the world, bitten by a snake during one

of his experiments. He applied the ligature, and suffered intense anguish from the application. This suffering was mainly due to his want of knowledge on certain points. He did not know when the ligature should be unloosened. If Dr. Richards had been in possession of this knowledge, he could have never run the risk of losing a limb and undergone the horrible sufferings of which he complained.

And then says Dr. Ewart:—

Doubtless mortification of the parts below the ligatures may be caused, if they are retained beyond from half an hour to an hour; but, in patients who have been effectively bitten by any of the venomous snakes described in this work, the danger to life from mortification, which can be easily dealt with by the surgeon in due course, is not to be compared to that to be encountered by the uncontrolled absorption of the poison into the blood. In the first case, life may be saved; in the second, judging from the vast experience of Sir Joseph Fayrer and others, death is almost certain to follow.

Now this mortification can only follow when the ligature has been kept long enough to cause it. This is only done by those who have not the knowledge how to ascertain whether or not the poison has been fully neutralised or extracted. The expert cuts the ligature when the poison has been neutralised, and the patient therefore never undergoes the sufferings to which Dr. Vincent Richards was subjected.

Then doctors Fayrer, Ewart and others advocate amputation in cases of necessity! Says Dr. Ewart:—

If the doctor be satisfied that the bite was inflicted by a poisonous reptile, especially by a *Cobra* or *Daboia*, and that it was an effective one, he is called upon, in a preponderating majority of instances, without the chance of consultation with another surgeon, to decide on the spur of the moment as to the course to be pursued. He may reason somewhat in this way: "If the ligatures be removed, absorption will set in; the blood will be charged with a fatal quantity of the poison; the functions of the great nerve-centres will be destroyed; the respiration will cease and soon after the circulation also contemporaneously with actual death. It is true that mortification will be prevented, but then this comparatively insignificant gain at the best will be temporary, and attained at the sacrifice of the life of the patient. On the other hand it is quite clear that little or no poison has yet gained access to the

blood and the great nerve-centres, and that to maintain this desirable condition, one of two things must be done : either the ligatures must be kept on until all chance of absorption be removed by gangrene, and the patient thus exposed to other risks of blood poisoning, such as pyæmia, and a protracted convalescence ending sooner or later in amputation ; or the poisoned member must be removed two or three inches or more above the site of the bite." In the case of fingers and toes, where the bite has been proved to be effective, either by the existence of the fang marks or unimpeachable testimony, there ought to be no hesitation as to the procedure to be adopted, *viz.*, immediate amputation. These minor amputations are generally unattended with much danger to life ; whilst if an attempt be made to save the member, life is almost certain to be lost. By amputation, before the symptoms of poisoning have become developed owing to the prevention of absorption by the successful application of the ligatures, life may often be saved. And I am persuaded it will be usually so saved if the ligatures, excisions and cautery have all been employed immediately after the poisoning has taken place, and, also in many cases, where only a very small quantity of poison has been poured into the soft parts or into the blood.

In poisoning of fingers and toes, where either from delay in the application of the ligatures &c., or from their not having been used at all, the symptoms of snake-poisoning have become unmistakably pronounced, when the surgeon arrives upon the scene, the question whether amputation is justifiable naturally arises, not because there is much risk attending the procedure itself, but because, as may be argued, all operative measures may be regarded as utterly hopeless. Under, such circumstances, the surgeon is again placed in a situation where self-reliance and prompt decisions are all important. In cases of this kind, there has probably been too much delay and hesitation already, caused by ignorance as to the measures to be adopted or dismay at the injury which has been inflicted. Neither the one nor the other can be permitted to influence the surgeon. He may however reason in this way : 'Life is in imminent danger and death will probably follow, do what he may. Perhaps sufficient poison has been introduced into the circulation to produce all the signs of snake-poisoning, but not enough to prove fatal, provided the ingress of fresh supplies be promptly prohibited. Thus, although a successful result is problematical, amputation is clearly the only hopeful proceeding.' The part bitten should be at once isolated by the ligature, if this has not been done already, and the member removed, in order to cut off all fresh supplies of the

poison. When I was serving with the Mewar Bheel Corps, at Kherwarah, near Oodipore, a Hindu was brought to me, having been bitten on the end of the thumb by a full-grown cobra. After getting up in the morning, he had put his hand into a *gurrah* or earthen vessel to remove something it contained. A cobra, which was secreted in the vessel, seized him by the thumb. The snake was secured and brought with the patient. He was presented to me, half an hour after the accident. The marks of the fangs were identified. The native doctor had seen him a few minutes after the bite, and had applied a stout cord round the thumb at two places. But the man was faint, depressed, nauseated and prostrated. After seeing the ligatures were tightened, as firmly as possible, I asked the Brahmin native doctor to prevail upon the patient to let me take up his thumb and so save his life. The thumb was first chopped off to economise time through the first phalanx, and subsequently amputated in the usual way at the metacarpophalangeal joint. He passed through a stage of severe nervous prostration, with intense nausea, vomiting and diarrhoea with bloody evacuations ; but eventually rallied and made a good recovery."

Dr. Ewart speaks, in the above, in the uncertain tone of an amateur. To an expert there is no uncertainty as to the mode of treatment that is to be followed, and to him the necessity of amputation should *never* arise. It is no doubt safe as regards the danger from the poison to cut off the limbs bitten, but then there ought to be, in the world of God, some more easy and less painful and dangerous mode of treatment. In the case of the Brahmin, recorded above, the cutting off of the thumb and the subsequent amputation were needless proceedings, which might have been avoided as I shall shew as I proceed.

It is a matter of regret that though the medical men, who have given their thoughts upon snakes and their bites, availed themselves of the services of the snake-charmers in catching and keeping snakes and experimenting with them, they never cared to learn the treatment followed by them in cases of bites. The processes of cauterization and the application of the ligature, no doubt, were learnt from them, but it is clear the experimenters never cared to put much value upon the knowledge the snake-charmers possessed. The way that, we think, ought to have been followed, was to ascertain all that they knew about the subject, and then to subject their knowledge to the test of experience.

This done, the experimenters might have experimented upon subjects not known to the snake-charmers. If the knowledge possessed by the snake-charmers had been in the possession of these scientific men, Dr. Vincent Richards would have never suffered excruciating pangs under a ligature for, we believe, 24 hours, and Dr. Fayrer would have never recommended amputation as a means to save life. The other day we were somewhat surprised to hear Mr. Phipson of Bombay calling the snake-charmers humbugs ! There is no doubt however that the knowledge possessed by the snake-charmers will be never disclosed by them to those who regard them as nothing but cheats.

Such is the absolute certainty of the mode of treatment these snake-charmers follow, that unnecessary pain to the patient is a great point with them. Madhava, an expert, in the town of Krishnagore, came to me once, and I asked him whether he had been ever bitten by a snake. He said, "yes, several times, and I was bitten only the other day. I thrust my hands into the hole, caught it (Cobra) and it bit me. I brought it out and put it into my basket." He was bitten in the palm of his left hand, and he continued : "I waited the poison to go up, for the skin of the palm is thick, and it would have given me much pain to take the poison out. When the poison came up, I extracted it with the point of my knife." This is the way they manage for which Medical men recommend amputation !

CHAPTER II.

The reasons, why snake-charmers have been treated with contempt by scientific men in India, are to be found in the ignorance that the former display in regard to the physiology, anatomy, and other matters connected with the mode of living of the snakes. I have seen that they make blunders so ridiculous as to be quite surprising in men who live by catching snakes, and spending their days and nights with them. There are some who will ascribe poison to non-poisonous snakes, and relate incredible stories about them. The fact is, they are not scientific men, and they care as little about the ways the snakes perform their natural functions, as to the beauties of their skins. They are eminently practical men, and they are quite content with the

knowledge that they possess of an infallible treatment for snake bites.

To Doctor Fayrer and others we owe a good deal about matters with which snake-charmers are unacquainted. Dr. *Fayrer's* magnificent work, *Thanaphotodia*, will perpetuate his memory for ever. By precise experiments, he has been able to divide the snakes of India into two great divisions—the poisonous and the non-poisonous. But to us the researches of these eminent scientific authorities will serve little purpose, as our purpose is to regard these reptiles, as carrying with them a deadly poison which cause death and sufferings to human beings and cattle. Our business is with the poisonous snakes alone, and the foremost amongst them must be regarded the *Naja*, (the cobra) the Indian name for which is *Gokhura*, *Khurish*, *Gohuma* &c. There are many varieties of this snake and each variety carrying distinct marks. We have the cobras which are whitish, blackish, yellowish &c. They are found in all parts of India, and perhaps the most numerous and widely-spread of all poisonous reptiles in India. In hilly countries they attain to a large size on account of the protection that the fissures of hills give them. In plain and open countries they are killed, but in hilly countries they live to long age. The popular idea is that snakes never die of age and disease.

The next in importance, considering the number and distribution, are the *kraits* (*Bungarus Ceruleus*) of Upper India, called *kanars* or poisonous *chittas* in lower Bengal. These reptiles are specially dangerous, because they do not avoid men like the other snakes, but are almost fond of the company of the human species. They are often mistaken for the ordinary *chitta*, (*Lycodon aulicus*) which is a harmless creature. The popular idea is that these *chittas*, though they have no fangs, have a saliva which is poisonous, and that though they do not bite, they lick, and this is followed by swelling of the parts licked. I cannot tell whether there is any truth in this statement. The black *krait*, called *kalaz* by the *malvadyas*, is perhaps the biggest amongst the species.

The *kraits* are found every where in the house,—in your bed, in earthen pots, fissures in walls, and in the folds of quilts. They

fall from the ceiling when it is a thatched house. I have seen it laying eggs in the upper storey of a large house. They are, as a rule, quiet, and will never bite unless hit. This makes them bold and almost unconcerned, and this brings them in contact with men. You may find in the morning that you had slept with a *krait* for your bed-fellow. It has not bitten you, because you have not, in your sleep, under the protection of Providence, hurt it ! There is a species of this snake which lives in water and is called *Pani chitta* (Gullophy machellundie.) They are ordinarily found in rice fields, and as such, are very much dreaded by the cultivators.

The hooded snakes are very fierce, but even they will not always bite unless provoked. I know of a case in which a gentleman, possessing some strength of mind, while sitting on a mat in a dark rainy night, found that a snake was creeping over his legs. He thought that if he made the slightest motion he would be hit, and so, by a supreme effort of the will, he remained motionless ; and the serpent crossed his leg without doing him any harm. When the danger was over he brought a light, and found that it was a *gokhura* (cobra.)

About the ferocity of the snakes, we will have something more to say when we come to talk about the *Hamadryads* (ophiophagus Elaps), called the *patraj*, the *dudraj* and the *sankarchur*. The *keuta* does not belong to the species of cobra called *gokhura* as is supposed by Dr. Fayrer and others, but to a distinct species. The *keutas* are much bigger than the *gokhuras* and necessarily stronger, and they have not the broad hood of the ordinary cobra.

Indeed, the *keutas* live together far from human habitation in fields and marshes, and the *keuta* is a better swimmer than the *gokhura*. It seems the *keutas* do not permit other snakes to live with them. The *gokhuras* live in couples, but the *keutas* in hundreds and thousands together. It is in the breeding season, however, that the *keutas* and *gokhuras* come together ; and by a cross between them, the "*Shanker*" i. e., the cross-breeds are created. The *Shankarchoor*, (*Hamadryad ophiophagus*) is a cross between the *patraj* and the *dudraj*. Indeed there is no doubt of it

that in the breeding season, even the hooded and unhooded snakes sometimes come together, and produce numberless varieties. We shall have a separate chapter about these *keutas* to describe a wonderful scene that we witnessed.

We now come to the *Hamadryads*, perhaps the most dreadful of all snakes in the world. They are hooded like the cobra, but they are much bigger. They sometimes attain a length of 14 or 15 feet. Their fangs are necessarily very long, and their bite is, therefore, very dangerous. They are fierce in their habits, and strong enough to defy man and beast. Fortunately they are very rare, and they avoid human habitations, and cannot bear the contact of man. They are found in Bengal in the *Sunderbans*, and caught there, though catching them is altogether a dangerous affair. I know of an instance, however, where one was caught in a field in lower Bengal, close to human habitation.

They are not caught as the cobras are done. To catch a *Hamadryad* the services of three men are required. This because the snake is so powerful, when big, that one single man is scarcely a match to it in strength. If caught in the neck, it attacks its captor with the tail, and coils its body round the leg, and will fell the man down, or perhaps fracture the bone. Then this species has another advantage over the cobra and the *keuta*. The cobra, when caught in the neck, becomes helpless, but not so the *Hamadryad*. The bone which protects its hood is flexible and not fixed as that of the cobra, and so, if you catch it in the neck, it may bend its head and bite you. So to catch it, you must close the hood itself in your hand, and if you make a trifling mistake in your aim, you are done for at once. This requires good deal of expertness. The snake can raise its hood several feet from the ground, and strike with the speed of lightning; so you are to catch it by the hood while it comes to strike you.

The *Malvadyas* go in the *Sunderbans*, (the extensive forest in the delta of the Ganges,) during winter to catch the *hamadryads*. They enquire of the villagers, and they are pointed out the place where a snake would be found. Now in the winter season these snakes ascend the trees, and bask in the sun. As soon as they do this, birds come to tease them. They hover round the reptile and

make a loud and peculiar noise. The villagers at once come to know that there is a snake on the tree which must be either the *Hamadryad* or the black snake, the harmless *Dhamna* (*Ptyas Mucosus*). The snake-catchers approach the tree, pointed out to them, usually in the morning, when the snakes ascend the trees to bask in the sun. When the tree is approached, the snake, if tolerably in good condition, hisses a defiance at the intruders. If it is very big and in the best of vigor, it attacks the intruders under the impulse of an ungovernable rage.

When its captors approach the tree upon which the snake is basking, it utters defiant hisses. If the captors are not frightened away, then, in its rage, it lets itself fall from the tree to attack the intruders. This, of course, when the snake is in vigorous condition, but ordinarily, it will continue to hurl defiance from its place of vantage. When such is the case, the captors tease it with a long pole. This is an indignity which it cannot bear, and it lets itself fall from the tree upon the disturbers of its peace. As soon it touches land, it rushes towards the captors. But then it has hurt itself by the fall, and it is very weak in winter. It is altogether a fool-hardy affair to attempt to catch a big *hamardryad* in the rainy season, when it is in a most vigorous condition; and when it has not been previously weakened by a fall from the tree, or by a blow with a stick.

When the captors are attacked, they stand in a line and watch the movements of the creature with the keenest interest. As the snake advances they recede. When the snake raises its head to strike, it cannot advance, hence its progress is retarded, and its progress is, therefore, slow. The captors stretch their left hands towards it to retard its progress. These points of attack presented to it, tempt the creature to raise its hood to strike. It strikes with rapidity and force, and as rapidly is the hand withdrawn which has been aimed. The result is that at every attack the hood of the snake comes in contact with earth, which hurts and weakens it, and causes a good deal of poison to come out of the fangs.

The hood, however, is not always caught when, in going to strike, the snake has come in contact with the earth. It

is sometimes done when the snake has raised its hood and is waiving it for a strike. Its eyes are concentrated upon one of the left hands presented to it for attack, and one of the party when he finds an opportunity, suddenly closes his palm upon its hood. As soon as this is done, another seizes the tail, and the third man catches the snake in the middle. The snake struggles to free its body from the clutches of the captors, but it cannot exert any strength through the head.

If it succeeds in freeing its body, then the party, who has caught hold of the head, runs the risk of having his legs or other members of his body coiled into the folds of the body of the snake. He, therefore, under such a circumstance, throws away the head and rapidly recedes back. The young *hamadryads*, or those which have just parted with their skins, can be caught by one man without much effort, though, as we said before, it cannot be caught in the neck like a cobra. When on trees the *hamadryads* find themselves at bay and may come to attack their intruders, but we cannot speak for certain whether they will pursue a man when on land. The *Malvadyas* say they do under certain occasions and circumstances, and I am inclined to believe that they are right. The universal belief is that the *Keutas* will pursue a man when it is approached. I have seen instances when they have not, and I have been further told that a *keuta* will only attack a man when it is in a vigorous condition. When passing an indigo field, near Damurhuda in Krishnagar, through which there was a foot-path, the noise which my bearers made, attracted the attention of a snake which was hidden there, and it hissed with great fury. The bearers ran away with the palkee, but the snake never pursued us. It was a *keuta*, for the hiss was too loud for a *gokhura*, and *gokhuras* are never so aggressive as the *keutas* are.

As soon as the *hamadryads* are caught, their fangs are extracted then and there, and then put in the basket. As for other snakes, they are not so treated, and sometimes their fangs are not at all extracted. A snake whose fangs have been extracted will not, as a rule, live long.

The *gokhuras* and the *keutas* are caught more easily. If a snake-catcher finds a *cobra* passing by him, he catches the tail

and raises it from the ground, and the snake becomes somewhat helpless. But yet a strong snake, when caught by the tail, will be able to bite his captor if some precaution is not taken. This is to give it a vigorous jerk or to give it a slight blow, with a stick, or to keep the reptile at arm's length from the body.

Usually the snakes are caught in holes in the ground during winter. When a hole is found, which has a suspicious look, it is examined with care. If spiders have covered the mouth with their net, it is then clear that there is no snake in it, for the nets would break to give passage to the reptiles which now and then come out of their holes, even in winter, to search for food. If the mouth of the hole is free from the nets, it is examined with a view to see whether the snake has left any mark upon the dust in the entrance to the hole. The dust is then smelt, as the snake leaves a peculiar smell to the dust through which it passes. Sometimes the shell of a snake indicates its presence in the hole. When the hole, which has a snake in it, is being opened, the reptile, which cannot, like a mouse, fly from its pursuer by digging the earth, views the proceedings of its captor with great terror. When he is reached, he does not show fight, but flies for life. He is then caught by the tail.

Snakes which are not hooded cannot be caught by the tail for they are sure to bite, if it is done. The way it is done is to press its head with a stick, and then it is held by both hands, one hand clasping the tail, the other the head. The *boas*, properly, *boras*, are too big to be caught in this fashion. In this case large baskets are used. The tail is caught first, and the *boa* attacks its captor with a terrible hiss. The assistants protect the body of the captor, by holding the basket before the snake. Finding the basket a good place for security, the snake tries to enter it. The tail is then let go, and the basket is covered as soon it has entered it. Big *boas* are unmanageable,—*boas* which swallow antelopes and buffalos. They are killed by hatchets and spears, or shot down by guns.

CHAPTER III.

HABITS AND OTHER MATTERS.

When the fangs of a snake have been extracted, it will not, as a rule, take food. The snake-charmers then thrust a frog, or a mouse down its throat. Non-poisonous snakes, like *boas*, which have no fangs, will eat readily and live long. I know, however, of an instance in which a big *cobra* was kept alive, for six years, by a *malvadya*. If kept without food they will not die sometimes in three months. The whole of the winter season they pass almost without food, not actually in a state of hybernation, but in an exceedingly weak condition.

As soon as the winter sets in, they enter holes, or fissures of rocks or walls, and pass almost the whole season within their protection. The only snake that I have seen to roam about during the winter is the *Trimeresurus Erythurus*. It is a green snake, poisonous, covered with thick and hard scales. These latter, we believe, protect it from the cold. Its look is not beautiful like that of the grass vipers, (*Trimeresurus Anamallensis*), which it however resembles very much. The green snake found in trees, is non-poisonous. I was surprised, when I saw the *Erythurus* roaming about in a chilly December moonlight night, in a hill station in the West of Bengal. I never saw these snakes in Bengal proper.

When the nights are hot, the snakes, even in the winter season, come out of their places of concealment to feed upon what they may find near. Thus they will swallow frogs, birds, mice, beetles, lizards, and other smaller reptiles. The *sakni*, or the *rajsap*, (*Bungarus fasciatus*) which is also a poisonous snake, will feed upon snakes. So will the *Hamadryads*. It is stated that the *sakni* mesmerizes other snakes. I have never been able to test this fact, but others who declare that they have seen it

say, that if a smaller snake comes across a *sakni*, it is 'at once rivetted to the spot, when the latter advances leisurely and swallows it. In some cases the *sakni*, it has been declared, never moves at all, but its victim approaches, and of its own accord enters the mouth of the former, which it opens to allow its victim to enter.

As the hot season sets in, the snakes come out of their hiding places just in the dusk. They are found to enjoy the breeze, and on the approach of foot-steps they move away slowly. Sometimes they do not move at all, and on hearing footsteps, assume an attitude of defence. If its presence is not perceived and the unfortunate man comes too close its head, it strikes with rapidity. The *kraits* do not move as a rule unless disturbed, and will scarcely bite you if you do not tread upon them.

The *gokhura* will not, however, as a rule, seek food in the evening. It commences its search for food when it is night, and men have gone to sleep. Then it will enter dwelling houses in search of rats and mice, fowls and eggs. Eggs they will swallow entire. When in search of food, all snakes, poisonous or non-poisonous, become ferocious. A snake, when in pursuit of its prey, will not care to go any where, even before a company of men, which it will never do under ordinary circumstances. If a mouse enters a drawn curtain it will follow it, and it is thus men have been sometimes bitten. Snakes are extremely fond of eggs and small birds, and will risk much to have such food. The *gokhuras*, however, cannot swallow a fowl, but it will swallow a chicken, and they therefore kill fowls from pure mischief.

The snakes ascend trees to seek bird's nests, and if there is a hole in a tree where a bird has made its nest, they will thrust their head immediately. It was in this manner that a black snake (*Ptyas Mucosus*) was found hanging, quite dead. It had thrust its head into a hole in a tree. In its eagerness to catch its prey it lost its balance, and the tail slipped from the branch which supported it. Thus it hanged till it died, and I saw it hanging and a crowd trying to get it down.

They breed in the hot season. When snakes of different species come together they produce a *Shankar*, that is to say, a cross-breed.

The copulation of the snakes is regarded with superstitious veneration by ordinary people. When it is seen, crowds assemble to witness it, and then clothes are thrown over the couple in the belief that if the creatures but only touch them, they will impart to them medicinal and other properties. We have thus frequently seen the black snake and the *gokhura* to come together. And hence no doubt the notion prevails that the black snake is the male of the *gokhuras*, and that it is only the female that gets a hood and fangs.

The snakes lay their eggs in dry places, and I have been told that, if soaked in water, they become addled. This accounts for the fact of snakes being numerous in one year, and scarce in another. When the young ones come out of their eggs, they spread themselves over the place, and each follow its own path in search of food. They ought not be despised because of their size and age. A *gokhura*, one day old, will ordinarily kill a man by its bite. A woman in the village of Hanskhally in Nuddea suddenly fainted away. The symptoms at once showed that she had been bitten by a snake. The village had *malvadyas* for its residents, and they were summoned for treatment. The woman recovered and when in her senses, said, that in the morning, while plastering her hut with cow-dung, she had felt a stinging sensation in her toes. She found that it was a very small snake, and she crushed it with the toe which was bitten, and she forgot all about it. The snake was found on search,—it was a *gokhura* which was scarcely older than one day.

Whenever a very young poisonous snake is seen, a search ought to be made for its companions. If it is quite young, others will be found here and there not far from where it is found. The snake-charmers, under a feeling of superstition, do not kill snakes. They make a living by these creatures, and they think it would be an ill-return to kill them. Whenever, therefore, they come across a brood they secure the creatures in an earthen pot, and carry them to a field to let them loose. The Government ought to give rewards for the destruction of eggs. For it is much more easy to destroy a dozen or two eggs, the number which the snakes usually lay, than to kill a live one. Fortunately for man, the

young ones are devoured by other reptiles, and destroyed by cats and ichneumons. It is for this, snakes cannot multiply; for if they are immortal, that is to say long-lived, and if each lays twenty eggs per annum, the snakes would fill the whole world in a few years, if they were not thus destroyed. If an adult snake is a deadly enemy of the frog, so is a frog a deadly enemy of the young snake.

The *kraits* make their habitations in the roofs of houses, and it is not unusual to see the young ones fall on the floor one by one. As the young ones carry the poison which is almost as deadly as that of the adult one, it is no joke when a young *krait* is found crawling on the floor. The young *cobra* is a most beautiful creature. It has inherited the valour of its parents, but has not learnt discretion from experience. It will roam about unconcerned, and will not take the least notice of men who are watching its movement. But touch it with a stick, and the child of proud parents raises its head with an attitude of defiance, or pursue you with anger. While running,—I was then a boy—a foot of mine came in contact with a very young *cobra*, and it struck me immediately. It missed its aim because I was running, but the offended snake pursued me a few yards and then it turned back.

CHAPTER IV.

PROTECTION.

The *cobra* enters a dwelling house in search of food. The *keutas* and *hamadryads* will, as a rule, never approach human habitations. Other snakes live in the fields. The *krait* loves to live with men. The house ought to be, therefore, protected only from the *cobra* and the *krait*. The *cobra* comes in search of rats, mice, eggs, kittens, and chickens. A house infested by rats and mice is sure to be visited by the *cobra*. The rats and mice are indirectly therefore very dangerous co-lodgers, and the cat is a friend. So are the dog and the ichneumon. The latter, however, has a very bad habit. It will wound a snake and bring it home! But yet it will guard a house from snakes, as a dog will guard it from thieves. The dogs, as far as my experiences go, will never attack snakes but bark at them, and thus draw attention towards them. The cats are more aggressive, and the fight between a *cobra* and a cat, is a glorious affair. It is a mortal combat, and it ends in the death of one or both of the combatants. Jackals fight with snakes, and, on one occasion, the fight ended in the death of both.

But the fight between the ichneumon and the snake has given rise to a proverb. "As bitterly opposed as a snake and a ichneumon" (*ahi nakulata*) is the proverb. The latter is the aggressor, and will go out of its way to attack a snake. The popular belief is, that the ichneumon knows a herb which is an antidote against snake poison. But ichneumons are sometimes worsted in such fights, and this shews that the herb is not at least known to all of them. The adjutant is also a great enemy of the snake. He kills the snake and devours it. Other birds of prey will also kill and devour them. The snake is no match for these birds. I have never known an instance in which a bird has been worsted in a fight with snakes.

The houses must be thus got rid of rats and mice, as far as that is possible, and the fowls kept at a distance from them. The snakes enter holes instinctively as soon as they come across them, but they cannot dig one. So if a snake has entered a hole and if its mouth is closed, the snake can not come out, and must die there. When a *cobra* enters a dwelling house at night,—and it will never be able to enter it if the doors are tight and there is no opening to allow its entrance,—it makes a search after food, and before day break leaves the house. But if it finds a hole, it will at once enter it. It sometimes happens, that the day breaks upon the reptile before it has been able to come out of it. It is in this manner the *cobra* is obliged to make its habitation in human dwellings. If it finds the quarters comfortable, and if it is not disturbed, it will live there, and in due time secure a partner. The female will then lay eggs and multiply the species.

I think it is possible for the poorest of men to close all the holes in his house and the fissures in his walls. I think that it is also possible to exterminate rats and mice. The *Kraits* are, however, more difficult to deal with. They live together with men, and live upon lizards, cockroaches and other insects which are found plentifully in the houses of poor people. The snakes however, possess a very sensitive nose, and they cannot bear smoke. To get a house rid of snakes, burn any pungent substance, and the smoke will expel them. The smoke will not enter a hole, but then put sulphur in the mouth of the crevice and burn it. When this has been done for a night, close the hole on the following day. The hole of a mouse, where snakes make their habitation, has several openings, so it will not always do effective service, if only one mouth is closed.

Thatched roofs, and the tops of walls which hold them, are the hiding and breeding places of the *Krait*. A good search will betray its whereabouts, and thick pungent smoke will expel it, Sulphur serves the purpose most effectually. It is needless to say that the most effective way of protecting the inmates of a house from bites, is to cover the ceiling with *parda*, and to use curtains, and sleep upon couches and sleeping stools. It is these stools (*khatias*) which protect the poorer people from snakes. There is a

saying, that the great Architect Viswakarma, when he prepared the first *khatia*, commanded the snakes never to bite a man sleeping or reclining upon it.

But people are also bitten when out. These people come across all sorts of snakes, excepting perhaps the *hamadr̥yad̥*. In the field a man may meet the formidable *daboia*, which he has no chance of meeting in his dwelling house. Men, who have money enough to protect their feet by boots and stockings, have very little to fear, if they but take ordinary care in their walks at night. Those who carry light have of course nothing to fear, but the poorer people can neither afford to pay for the light or purchase a lantern. In the hot season people either carry a lantern, or a stick to protect them from snakes. By the stick they make a thumping noise, to frighten away the reptiles away from the paths. In the absence of a stick, they clap their hands, and the sound gives the snakes warning to move. Let it be, however, borne in mind that the sounds will not always drive a snake from your path. For reasons best known to them, the snakes sometimes will *not* move away, but assume an attitude of attack and defiance, by giving a few bends to their body and raising their head. This is especially seen when the nights are extremely hot.

In hot nights you have greater chance of encountering snakes than when the rains have set in. Then the snakes move about in search of food, and do not lie across your path indolently, as they seem to do in the hot season. I have seen snakes in hot seasons which will not move away unless you force them to do it. But they will bite you no sooner you come across them. Sometimes they will not move, and do you no injury, even if you walk over them, provided you do not touch their body.

The most dangerous time for walking at night, in the year, and for aught I know to those who dwell in houses is, when the first shower of rain has fallen on the ground. On that day every snake comes out of its hole. If the snakes hate cold, they also do not like extreme heat. It is when the weather becomes cool they are most dangerous, and they come out to enjoy the weather when it has been cooled by a shower. Besides, the rain water fills their holes and they are compelled to come out.

Some especial care ought to be taken by those who walk at night when the first shower has fallen. The snakes, though they attain their greatest vigour in the rainy season, do not also like the rains. At nights if it rains hard, they seek protection in human dwelling-houses. During floods they ascend trees, and seek the dwelling-houses of men for protection.

The best protection, against snake-bites, is to throw off the snake by a jerk, immediately it has fastened its fangs upon you. If this is done, the snake will find no time to introduce the poison in the system. As we proceed we shall explain the philosophy of this procedure.

CHAPTER V.

POISON, FANGS, AND THE BITE.

The snake-charmers exhibit usually hooded-snakes, and sometimes the *daboia*, the latter for the beauty of its skin. The process of extracting the fangs is called "shaving" by the *malvadyas*. The *Hamadryads* and *daboias* are shaved as soon as they are caught, but the *cobras* and *keutas* are not unoften kept unshaved. This is done because unshaved snakes feed easily, and therefore live long. It is true that unshaved snakes are dangerous to handle, but the snake-charmers get used to such things, and do not much mind even being bitten,—and bitten they are rarely,—so expert they are.

The *keutas* are as a rule never shaved, especially when they belong to the black species. The poison of the *keutas* is used by Hindu medical men for medicinal purposes. The Hindu physicians will however never use any other poison except that taken from the *keuta* and that taken from the black species is the most valued. The usual belief is that the poison of the *keuta* is the most virulent of all. Any how its bites are more deadly than that of the *cobra*, but this may be accounted for by its size, the *keuta* being bigger than the latter. There is no doubt, however, that the poison of the hooded-snakes is more virulent than that of the unhooded. But of this hereafter. In shaving a *hamadryad* or a big *cobra* or a *keuta*, the services of more than one man are required, but sometimes the operation is performed by one man. The operator stands with the hood of the snake in his left hand, and he presses the tail with the toe of the left foot. With the thumb of his left hand, he presses the hood and lays the fangs open. With a sharp instrument in the right hand he removes the fangs with the poison bag.

Each snake has about six fangs, two in a state of efficiency and four in an elementary state. The poisonous wounds are inflicted

by the two efficient fangs. If by any chance one or both of these fangs are destroyed, the elementary ones, which grow in their root, replace them. These elementary fangs are just like the bigger two, only they are smaller in size. Some of them are so small that they are not very easily detected. The snakes come out of their eggs with these six fangs, and they can be considered harmless only when all these six have been extracted. If in going to shave them, the operator leaves one elementary fang unextracted by oversight, the snake in a few short days becomes as dangerous as it was before it was shaved. It takes only a few days for an elementary tooth to be able to inflict death wounds.

The snakes are shaved thus with great care. Negligence on the part of the snake-charmers has ended sometimes seriously. It has happened that an elementary fang has escaped detection. The snake, in a few days being furnished with an effective fang, has bitten its exhibiter. The exhibiter takes no notice of the bite, in the belief that all its fangs have been extracted. The poison enters the system, and it is at the last moment that the fact becomes patent that the snake had acquired an effective fang and inflicted a death wound. Such a bite was once inflicted on a *malvadya* in my presence. It was a *keuta* bigger than the ordinary *cobra*, but not as big as the biggest I have seen. The suspicion was aroused from the manner in which the snake fastened upon the arm which it bit. The poison was immediately extracted and the man was saved.

The poison bags are situated at the root of the fangs. The fangs lie flat at the palate. They are erected when the snake strikes. The fangs may be likened to the horns of a buffalo. They are not thicker than a pin, and curved as a buffalo horn. They are hollow within, and the poison is instilled into the blood through it. The poison, generated in the poison bag, is carried through the fangs into the parts bitten. When the fangs lie flat on the palate, the mouth of the poison bag remain closed. But the mouth is opened when the fangs stand erect, and it is thus whenever a snake strikes, some portion of the poison is thrown out. If the snake is made to strike repeatedly, the poison bag is emptied, and the snake rendered harmless for the moment.

But the poison generates soon after. The bite of a spent snake is weak, and even harmless.

The snake poison is an oily substance, which has the appearance of honey. But it is very bitter to the taste, so bitter, that if you put a drop on your tongue, the bitter taste will continue to affect you for several hours together. Taken internally it is harmless, if taken in small quantities. If taken in large quantities it produces distressing symptoms, such as headache, nausea, attended with a determination of blood to the head, and redness of the eyes. But if only a minute portion of it come in contact with blood, death is almost sure to follow. One, who has seen how the poison used for medicinal purposes is extracted from the poison bag, will get a clear idea how the bite is inflicted, and the poison instilled. As I said before, the poison of the *kenta* only is used by Hindu medical men. The head of the unshaved *kenta* is held by the left hand and a *muscle* (the bivalve mollusc, *self* used in India as spoon,) is forced into its mouth. The *muscle* is covered with a palm leaf. As the *muscle* is introduced into the mouth the snake presses the jaw, and the fangs pierce through the palm leaf. The mouth of the poison bag is opened, and the poison comes in a continuous stream through the fangs. After a second or two, the stream is reduced into drops, and at last the drops cease altogether, and this shews that the bags have been thoroughly emptied. *self*

It takes several seconds to empty the bags. The *muscle* is then removed, and seen to contain one to about four drams of poison. If you now take a drop and rub it on your skin, you will mistake it for soap. When used for medicinal purposes, the poison is mixed with mustard oil, and dried in the sun. When dried, it can be ground into a fine powder. When the poison is exposed to the air its power is weakened, and this the *malvadyas* have told me. *self*

If you now take the palm leaf which has been pierced through by the fangs, you find two punctures, about a quarter to half an inch apart. Then if you examine the *muscle*, you will find it to contain one or two drams of an oily substance, like honey. This is the snake-poison, a grain of which, if instilled *self*

into the system, will kill the biggest of animals in the course of a few minutes. If you examine the stream of poison, which flows through the fangs in the muscle, you will see that it will take some time for them to empty the poison-bags. It is clear, therefore, that in bites, a snake can only introduce a very small quantity of poison into the system. For, no living thing will allow a snake to keep its fangs fastened upon the body, and instil its poison in the system, without making an effort to throw the creature off. sely

When the snakes have been shaved, the fangs are ready for your examination. I have examined the elementary fangs with a microscope in company with a scientist, and I found them to be exactly similar to the effective ones. I have already said they are hollow within. Now if you pass a human hair through a fang, the hair will come out, not at the foramen, as the European authorities have said, but in the middle of the fang. *This is a most important point*, and which ought to be kept in the mind. Unfortunately, the European scientists, who experimented with the snakes, not only never cared, it would appear, to seek any knowledge from the snake-charmers, but neither even examined the fangs carefully. It is by this provision of the construction of the fangs, that God has sought the protection of the living creatures from the bites of snakes. If the passage through the fangs had ended at the foramen, every bite would have been poisonous, and the snakes would have been hundred times more deadly than they are now.

I must notice one or two points more before I conclude the chapter. The most virulent poison is to be found in the *cobras*, the *keutas*, and the *hamadryads*, I mean amongst all the hooded snakes. The *daboias* possess the longest fangs,—fangs which are longer than those of the hooded snakes of equal size. This *daboia*, (*daboia elegans*), called *uloobora* also *patcha-bora* in Bengal, is a beautiful snake, which is found in fields far from human habitations. Fortunately they are very rare. Their bites are however more fatal than even those of the cobra, on account of the depth

of the wounds they inflict. They are called *patcha-bora* for good reasons, for their bite is sometimes followed by mortifications, *patcha* meaning mortification. The cause of this mortification will be explained presently. I think, however, the most deadly of all snakes is the *hamadryad*. For, its poison is not only virulent, but its fangs are sometimes longer than those of the *daboia*, the latter being only one-fourth in length of the former. The big *keutas* ought to come next. The bigger *keutas* are twice the length of the *daboias*. The *daboia*, though it inflicts a deep wound, has a poison which is slow in its effects. But a big *hamadryad* will inflict a deep wound, and has a most virulent and energetic poison.

CHAPTER VI.

THE BITE.

The bites are of three kinds, the "*sole*," the "*tan*," and the "*tip*," or the *abrasion*, the *scratch*, and the *puncture*. The first two are non-poisonous, the last only is the poisonous bite. When a snake strikes, and the fangs come in contact, with the body, and the part struck is immediately removed, the ineffective bite leaves only an abrasion. The poison comes out of the fangs during the process of the strike, but falls either on the limb aimed or on the bare ground. This is the *abrasion*.

But sometimes the limbs have not been withdrawn quickly enough. And this allows the snake to penetrate its fangs into the body. But if the limb thus bitten has been just then withdrawn, you will find upon it one or two scratches just as one or both the fangs have been employed for the purpose of the bite. Now I have already said, that the passage in the fangs end in the middle, and the poison, therefore, cannot be introduced, unless the greater part of the fang has been made to penetrate. So if the limb has been withdrawn when the snake has penetrated a part of its fangs, the bite will leave one or two scratches. The poison jerked out of the bag by the bite will not enter the wound, but fall in the ground. This is the *scratch*. The *scratch* bite causes the blood to flow copiously.

The third bite is the *puncture*. When a snake has been able to thrust its fangs up to their root, it will fasten upon the bite, and will not easily let go the hold. It can be separated from the limb only by some degree of violence. And this is the *puncture*. You will find on the limb bitten, one or two *punctures*, as if made by a needle. A small quantity of blood will stream down the wounds. When the snake has been able to use only one fang, the other having been broken, there will be only one *puncture*. But whether the *punctures* are one or two, a fatal end must be the

result of this bite. Below the *punctures* will be sometimes found the marks of the natural teeth of the snake. This is especially seen in bites by the *krait*, and other unhooded snakes.

It is needless to say that no sort of treatment is necessary in the bites number one and two, *i. e.*, in bites called *abrasion* and *scratch*. The bite which leaves the *puncture*, either one or two, is the only dangerous bite which needs any treatment. Many medicines for snake-bites are found efficacious, because they are used in bites where the poison has not been instilled. A cure under such circumstances enhances the reputation of the drug, but when used in really fatal bites, it fails as a matter of course. The action of medicines, taken internally, upon the body, is more slow than that of the poison, which runs direct to the heart and stops its action. Medicines, taken internally, therefore will not arrest the progress of the poison.

Is it a snake-bite? And a snake-doctor has to decide the question often-times. The bite of a snake is followed by a stinging and burning sensation. The scorpions, the hornets, and the centipedes, inflict also painful bites. The bite of the snake must be less painful than the stings of the latter. At least men, who have been bitten at night by a *krait*, have been found almost dead in the morning. The bite failed to rouse them from slumber. A *cobra* bite is no doubt more painful than that of a *krait*, but it is extremely difficult to get out of the patient the sensations that he feels by the wound of the bite. The bite at once incapacitates him from the power of giving any description of his sensations. He will not be able oftentimes to tell you whether he has been bitten by a snake or any other creature. In almost all cases the patient will of course be able to remove the doubt, but in some cases, he will not be able to do it.

Under such circumstances, it is hard to determine whether he has been stung by a scorpion or a centipede, or bitten by a snake. The scorpion leaves one puncture, and the centipede two. The snakes likewise in their bites leave sometimes one, sometimes two, punctures. I myself have had, on more than one occasion, to make a critical examination to find whether the bite had been

inflicted by a centipede or a snake. We shall, therefore, lay down certain principles to determine the bites of each of the creatures named above.

The *punctures* made by the centipede are smaller than those made by a snake, and they disappear soon after the bite. But those made by an adult snake remain, sometimes for several hours together. The part bitten by the centipede becomes red. But in snake-bites, the surface round the punctures assumes a bluish or a blackish appearance. Besides, the punctures made by snakes bring out a small stream of blood which is found to have dried in the skin.

I have already said that in snake-bites, besides the two punctures made by the fangs, the natural teeth also, as a rule, leave their marks below. The wounds inflicted by the natural teeth cause also a flow of blood, sometimes profusely. These indications are not to be found in the stings of centipedes or scorpions. Besides, in a snake bite, a portion of its saliva will be found spread over the parts bitten. It dries soon enough, and gives a glossy appearance, before a light. This indication will not be found in other bites. The surest way of making the point clear, when there is still some doubt, is to apply a ligature and to examine the blood. If the bite is that of a snake, the part opened by a knife will either shew no blood or blood dis-coloured.

THE POISON AND SYMPTOMS.

As soon as the bite has been inflicted, and the punctures made, the parts begin to swell. A few moments after, this swelling will disappear. The parts may swell again after half an hour or so. But the first swelling is due to the poison, the second to the wound. The first swelling indicates that the poison is still in the punctures made by the fangs, and have not commenced "to ascend." This expression is that of the *mal's*, and we shall use this in describing the "ascension" of the poison in the system. When there is no swelling, it indicates that the poison has already left the wound.

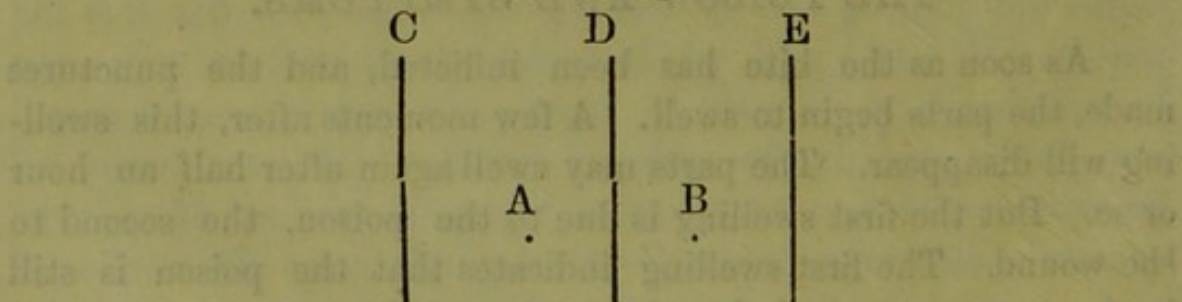
As soon as the poison has been introduced, it tries to find a vein to ascend upwards. It takes the substance some time to

find it, if the punctures have been made far from a prominent vein. Sometimes the fangs penetrate a vein, and then the ascension is rapid, and death almost immediate. By what process the poison enters a vein, the *malis* cannot tell. But as soon as the poison has found a vein it continues to ascend.

There are two fangs and therefore two punctures. The poison in each puncture will select a vein for itself. Thus two drops of poison will continue to rise side by side. If you stop the progress of one, the other will kill the patient. I have said that they will rise side by side, but this when both the bites have penetrated the veins, or parts far from the veins. If one fang penetrates the veins and the other where there is none, the poison from the former will kill the man, if its progress has not been stopped, before the latter has ascended only a few inches from the place where it was first located.

In ascending, these two drops of blood follow a curious law. They avoid each other. The drop which is on the left will seek the vein which is on the left, and they will both avoid the vein which is in the middle of the two. If they run towards the vein which is in the middle, they must both enter the same vein, yet they will never do it. They choose to remain independent, and adopt independent courses.

Let us explain the law by a diagram. A and B are the two



punctures made by the bite. C D and E are the three veins. The drop of poison in the puncture A will enter the vein C. And the drop of poison in puncture B will enter the vein E. None will enter the vein D.

The drops of poison will go on ascending till they stop the action of the heart. If the drops are not disturbed they will each take a separate course. The passage through the vein

can be traced from outside. In the progress upwards, the drops of poison affect the hairs in the human body. As soon as a drop reaches the root of a hair, that hair falls flat upon the body. But when the place has been left, and the poison has ascended on higher, that hair assumes its natural position, and the next one falls flat. In this manner the poison can be traced in the body, as the passage of a snake can be traced in a thick grass-field, which is big enough to cover the body of the creature.

It must be borne in mind, that snake-bites occur generally at night, and the doctor who takes charge of the patient, must require therefore a good eye-sight to conduct his treatment. If his sight is not clear, he should provide himself with a powerful pair of spectacles. Though I have never seen or heard it tried, there is not the least doubt that a magnifying glass would be of immense service under the circumstance noted above. The only thing wanted is to conduct the examination with care. First examine the punctures, and then find the veins that the drops of poison are likely to take. Then examine the veins, and if the drops are still within them, they will be at once detected in the way I have described above.

If a ligature has been applied, the progress of the poison will be arrested. As soon as the drops of poison find their passage obstructed, they draw back as if to gather force for a fresh attack, and rush again. If the ligature is not tight enough, they will, in this manner, break through the barrier and reach the other side of the ligature. If the ligature is tight, they will continue for some time the process of drawing back and rushing onwards. This movement of the poison in the vein, and the hammering upon the ligature, can be seen by the naked eye, provided the eyes are in a natural condition. When the drops or a drop reach the other side of the ligature, it rushes onwards with, it would appear, accelerated motion.

If the ligature is too tight, and does not allow the drops passages, they will continue to hammer it for sometimes. The push will however gradually shew a decreased force, when at

last the motion will disappear altogether. The poison has then left the viens, and spread itself over all parts below the ligature.

If the drops of poison have been able to make a passage through the ligature, they ascend rapidly, and cause a speedy death. The limb which the poison has been able to affect becomes insensible to the touch. The limb appears to the patient to be too heavy, and he can only move it with the greatest difficulty. The poison, it would appear, affects the nerves in a powerful manner, and this is, I believe, the cause of the death which follows snake-bites. The nerves are killed first, and the body afterwards ceases to perform its functions.

When the poison has entered the system all the five senses are affected. The eyes become red and the pupils dilated. The patient speaks in a nasal tone, and loses the sense of taste, and will not be able to distinguish capsicum from sugar, when applied to the tongue. His sense of hearing is affected likewise. He is covered by a cold clammy perspiration, and is seized by convulsions. When bitten by a *krait* or some other unhooded snake, the body swells, and sometimes the swelling is found in particular parts, and the patient presents a hideous appearance. Thus I have seen patients whose tongues have become too big for their mouth, or whose cheeks have acquired such proportions as to cover the eyes. Sometimes patients pass bloody and black stools before death.

CHAPTER VII.

THE LIGATURE AND THE TREATMENT.

The reader, who has carefully read some of the previous chapters, will be able to follow the mode of treatment of the *Malvadyas*, which we shall describe now. A few *mals* were exhibiting an un-shaved cobra to an audience. It had been caught only the day before, and was in prime condition. There was a *mal* who was sitting by the side of the one who was making the snake dance, or properly speaking, waive its hood. The former was suddenly bit in the calf of his leg. The man was sitting in such a position that he could not throw off the snake with a jerk. It was thrown off no doubt, and that with great agility, but then the work had been already done,—one of the fangs had been thrust, and poison instilled! The snake was immediately caught and put in the basket. The leader of the band caught hold of the leg bitten, examined it for a second, and applied his mouth to it. He sucked the poison out, and threw it on the ground. This was done several times, till he could no longer draw any blood. There was blood mixed with poison. But to make things sure, he also cauterized the part by applying a live charcoal on it.

This process of sucking ought to be avoided, when gums are not thoroughly sound. A man with a weak gum may kill himself, if he resorts to this process. The sucking also must be avoided, when the fangs, used for instilling the poison, are very small. When the fangs are very small, it is difficult to suck out the poison. Sometimes when the fangs are small, it becomes difficult to distinguish the marks at all, as in bites inflicted by very young cobras. A young cobra, one day old may, as I told before, cause death, but he will scarcely leave any marks upon the body by his bites. The bite will also

leave no marks when done by an elementary fang. Let me give here an instance.

A troupe of *mals*, composed of several men, were exhibiting a good many snakes most of them cobras, one only being a *keuta*, a moderately big one. A young man of about 20 was struck by the latter in his left hand. The snake, after striking, stuck to the limb, and there was a little difficulty in throwing it off. The snake was immediately put into the basket, and a cord was brought out of another bag for the purpose of applying a ligature. I apprehended mischief, and immediately joined in the treatment. I learnt that the snake had been shaved, but that the manner of the bite created a suspicion that the shaving has not been thorough. It was apprehended that one of the elementary fangs had been left unnoticed, and that it had grown efficient enough to be able to inflict an effective bite. This suspicion was owing to the manner in which the snake fastened on the limb bitten.

The young man was chid for his negligence in not throwing off the snake when it struck ; and then the leader of the band examined the bite. He found nothing there except one or two wounds from non-poisonous teeth. But still the ligature was applied, and then the snake was examined thoroughly. No trace of an elementary fang was found. The man told me that, sometimes by oversight, a fang is left in the gums during the process of shaving. It is, therefore, essential that whenever a suspicious bite is inflicted, a careful examination should be made to find whether the snake has got any elementary tooth left or not. If any punctures had been made, then no doubt would have remained of a poisonous bite.

A man thus can cure himself at once of snake-bites, if he has a sound gum, and if the wounds have been inflicted on parts which can be reached by his mouth. A man, if he has been thus bitten in a field far from help, say in the finger, has only to suck out the poison. We think it is possible for a surgeon to improve this method of sucking by instruments. If a sucking instrument could be invented, death by snake bites would be almost impossible. For, if bitten on any part of the body, the

poison could be, in this manner, sucked out by one having a sound gum. But though a man with a sound gum may not be rare, it will be found difficult to persuade one to suck out poison from the person of another. We think, therefore, that a surgeon, who can invent an instrument capable of performing the functions of sucking thoroughly, would confer a great benefit upon mankind. Indeed, as I said before, he would make deaths by snake bites almost impossible.

The application of the ligature needs great tact and judgment. To be proficient in it, one must learn it from a master. One who is a novice will naturally make the ligature unnecessarily tight, or worthless for the purpose it has been used. When the ligature has been made unnecessarily tight, the patient is subjected to undergo unnecessary pain. In applying the ligature, three considerations must be borne in mind. First, that it must be applied at the proper place. Second, it must never be too tight, nor too slack. And third, it must stick evenly to the skin, without producing any wrinkle.

What would make a good substance for a ligature I cannot pretend to tell, but what the *mals* use is a piece of *sone* cord when procurable, and, in lieu, jute. The cord must be as thick, at least as a lead pencil. For the purpose of making the cord stick evenly to the body, a stick may be used. The cord may be tied with a stick, the stick being removed afterwards. This stick will prevent wrinkles being formed, and also will help in applying the ligature tight. One desirous of mastering the art of applying the ligature, must learn it by experiments upon his own body, or that of another willing to submit to the process. A medical man, with a knowledge of anatomy and physiology will be able to learn the art more easily than one un-acquainted with them. Thinner cords are apt to cause mortification, and thicker cords will not serve the purpose of arresting the poison effectually. A cord twice as thick as a lead pencil is, I think, the proper size.

When the ligature has been applied immediately after the bite, it can be done only one or two inches above the bite. When considerable time has elapsed after the bite, and when it is im-

possible to find the precise position of the poison, one must be immediately applied at the highest part of the limb that has been bitten. For instance, if the man has been bitten in the leg, and a considerable time has elapsed from the time of the bite, and there is no way of knowing the whereabouts of the poison, the first ligature is to be applied on the highest part of the thigh, where the application of a ligature is possible.

When I say of the first ligature, I anticipate that more than one ligature ought to be applied. Indeed the usual rule is to apply three ligatures, say a few inches apart from each other. The first ligature need not be as tight as the second, and the second as tight as the third. A single ligature is never safe, except in the hands of experts, and the object of three ligatures will be gradually understood, and I shall dwell upon it as I proceed. Suffice it to say for the present that ligatures, even where they don't absolutely stop the progress of the poison, will yet serve to give ample time for the successful treatment of the patient.

As soon as the ligature has been applied, pour water over it. This will cause the cord to stick firmly and evenly to the skin. If the ligature has been properly and timely applied, the patient has scarcely any cause of fear. But it must be borne in mind that ligatures can only be applied when the patient has been bitten in the extremities. Patients are however bitten in the trunk, though very rarely. I have known of only one instance. The man died, and he was bitten on the back, when in bed, by a *krait*.

CHAPTER VIII.

THE TREATMENT.

The *mals* divide their treatment under four heads *viz.*, *sati*, *ping*, *thubi* and *beri*, that is to say, bleeding, salt, heat, and cauterization.

Sucking is considered no distinct mode of treatment. Under proper conditions, it is however the safest and best. By it the patient, wherever bitten, can be cured as soon as he is bitten. But sucking is not always possible.

When sucking is not possible, apply the first ligature at once. The poison takes some time to seek a vein, and, if it is yet in the punctures, the parts will continue to swell. The swelling will indicate that the poison is yet in the punctures. While the poison is yet in the punctures, apply live charcoal to them. Red hot iron serves the purpose best. The *mals* carry with them a piece of iron, with a round head and a wooden handle. It looks like a seal. The head is thrust into a blazing fire, and when it is red, it is pressed upon the punctures. Two such pieces of an iron are used, when there are two punctures, and when the head of the seal will not cover both. It no doubt takes some time to heat the iron, but it also takes sometime for the poison to leave the punctures. Live charcoals would do very well, but they do not retain the heat as the iron does. Yet live charcoals can be very well used as a substitute. When the heat is applied to the puncture, the poison is destroyed, and the process is accompanied by a faint detonation.

It must be borne in mind that whatever mode of treatment is to be followed, the ligature must be applied as soon as possible after the bite. The treatment must *follow* the application of the ligature, unless it becomes possible to suck the poison out.

If the poison has left the puncture, the *thubi*, (application of red-hot iron) becomes useless. We must then have recourse to bleeding. If the poison has just left the punctures, let the part above the bite be bled by a lancet, or, in lieu, a knife. The point need not go deep, but must go sufficiently deep to cause the flow of blood. The parts must be thus punctured closely with the point of the knife as is done in tatooing the body. The blood will thus continue to ooze out from twenty or fifteen places above the bite. Then spread salt over it. This will increase the flow of blood.

This bleeding will either expel the poison entirely from the system, or a considerable quantity of it. The blood which has been affected by the poison assumes an inky colour. The part affected by the poison will give out blood of the colour of ink; and the part which has not been affected, will of course give out fresh red blood.

No trace of blood will be found for sometime in the vein through which the poison has ascended. The blood, after a time, however, will secrete there, but then it will be found to be quite different in color and quantity, from the fresh and healthy liquid. During the process of the bleeding, the poison will be expelled with this discolored blood. Besides, if the blood continues to flow from the openings, the progress of the poison onwards will be retarded.

The expert will not care to go through this tedious process. He will suck the poison out, and failing in that, will destroy it by cauterizing the parts. If the poison has left the punctures, he will ascertain the veins that the drops of poison have entered. He will be able to do it by taking into consideration the law that the drops follow in selecting the veins alluded to before, and he will also be guided by the sensations of the patient himself. In most cases the patient will be able to tell you, how far the poison has ascended. But the unfailing test is the rise and fall of the hairs upon the skin, described above.

When the expert has been able to find out the veins which drops have entered into, and the exact position which they

have reached, he will make an incision in the veins just half an inch above that exact place. The drops will continue to ascend, and, as soon as they have reached the place where the veins have been opened, he will press them out with his thumbs. Thus the poison can be expelled out of the system with the greatest ease, and without subjecting the patient to any suffering whatever.

I have said before, that the drops of poison make an effort to pierce through the ligature when they have reached it, and for this they draw back and rush on towards it with some force. In severe head aches, the beating of the artery is sometimes witnessed. A beating like that is seen below the ligature, that is, where the drops are exerting themselves to make passages. The expert watches the movement carefully, and makes openings below the ligatures, just where the drop of poison presses the ligature, and just as the drop has drawn back. When the drop comes back again to give its push, *it comes out*, through the opening, *by its own force*.

But sometimes the poison does not give any indication at all. In that case, the *mals* adopt a curious way of finding its whereabouts. They take hot water, and rub it over the parts just below the ligature with their hand. This process is followed by a round swelling on the spot where the poison is. As soon as it is found, it is expelled at the point of the lancet.

I have already said that this movement of the poison continues for a time, and then it spreads itself over the surface, below the ligature. The traces of the poison are then found wherever an opening is made below the ligature. The greatest art of the expert consists in expelling the poison without subjecting the patient to any suffering. The expulsion of the poison and the cure of the patient are small matters to him. But the expert carries with him the proud consciousness of being able to cure his patient, without subjecting him to any unnecessary suffering. He can do this either by sucking; by the *thubee*; by following the course of the poison through the vein, and expelling it by an opening; and by making an opening just where the poison pushes the ligature. When the poison has been brought out by the

lancet or by sucking, he takes the precaution of cauterizing the parts to destroy every trace of poison that may have yet remained after the operation.

But usually the expert has not the chance of displaying his tact. He is usually brought face to face with his patient, when the progress of the poison makes it impossible for him to treat his patient in the easy manner described above.

What usually happens is this. The Doctor finds his patient has been bitten, and that a ligature has been applied. His first duty is to see whether the poison has been arrested by the ligature or not. But before he makes the examination, he applies two other ligatures, and then sits to examine the condition of the patient. It rarely happens that he finds the poison yet ascending through a vein below the ligature. If that, however, be the case, he brings it out in the ways indicated above. Usually he finds that the poison has been arrested by the first ligature, and then he ascertains the state of affairs by the point of his lancet. If blood is let out, he finds it, if the poison is there, black as faint ink. He then commences his treatment.

He touches with the point of the lancet all the parts below the ligature, making incisions about a line in depth. From each of these incisions inky blood flows out, and the poison is expelled with the blood. As soon as the incisions have been made, salt is rubbed over them. This will increase the flow of the blood. When the blood ceases to flow further, the salt and the clots of blood are washed off by hot-water, which is poured over the parts for minutes together. Before, however, pouring hot water, sometimes, in bad cases, the *thubee* is applied. By bad cases I mean cases where the progress of the poison seems rapid, or when the patient has been bitten by a vigorous cobra, or any other hooded snake.

The *thubee* is nothing but dry heat. Heat, and only heat, has the power of neutralizing the poison when it is weak. The *thubee* alone will cure a man when he has been bitten by say, a *krait*, or any other unhooded snake. The heat may be applied in various ways. It may be, for instance, applied

by heating small sand or salt bags. It may be applied by spreading a fresh leaf, say a plantain leaf, over the parts, and a torch applied to it. Sometimes the cure is effected by pouring a continuous stream of hot water upon the parts affected. But usually the agency of heat is utilized when the poison has just entered the system, or permeated all over it.

But to continue. As soon as the clotted blood and the salt have been washed off, the process of letting blood ought to be repeated. This time, the blood will be found to have changed color. It will be found to have assumed a more reddish tint. After the incisions have been made, apply the salt, and wash it off again, continuing the process three or four times. It will be now found that the blood has assumed the natural color. The poison has been expelled or almost expelled.

Then allow the patient rest and continue to apply dry heat. After say, a few minutes, apply the lancet, and examine the color of the blood. If the poison has been thoroughly expelled, the blood will shew no change. The patient ought to have again a rest, and the heat to be applied as before. After a few minutes of rest another examination of the blood ought to be made. If, say, within half an hour, you see no change in the color of the blood you can take it for granted that the poison has been thoroughly expelled.

But it so happens and this is the usual rule, that when the blood is examined after the first process of rest, it is found to have again assumed the usual inky color. This happens because the poison has not been thoroughly expelled. The process described above may be repeated again, and fresh blood be will sure to make its appearance soon. Again give the patient rest and make frequent examination of the blood. After a couple of hours, if you find the blood still unaffected, you can safely cut the ligature.

It also oftentimes happens that while you are letting out blood from below the ligature, a particle of the poison has found an opening and pierced through it. To avert this danger, it is, necessary to examine the blood of the parts above the ligature.

If a portion of the poison has been able to pierce through the first ligature, it will be readily detected when it reaches the second ligature. A little blood let out from below the second ligature, if it has been affected by the poison, will shew the same inky color as has been seen in the blood taken from parts below the first ligature. Sometimes indications of the poison will be found in both the places, *viz.*, below the first and between it and the second ligature. Under such circumstances the treatment is the same as has been described above.

In this manner the poison may also be found to have pierced through the second ligature also. This may happen when the first and second ligature have been perfunctorily applied. If this be so, and if the third ligature is all right, there is no need for any apprehension.

When the first and second ligatures have been found unavailing, other ligatures ought to be applied above the third, if there is space for them. Indeed if possible there must be some space left for the fourth or fifth ligature when applying the third. I use the expression, "if possible," because experts will rarely find the opportunity of applying the ligatures at his sweet pleasure. He generally comes a considerable time after the bite, and therefore he thinks it safer, not knowing the exact position of the poison, to apply the ligature at the highest point of the leg or the arm bitten.

Let the principle be borne in mind, that under the treatment described above, the poison is made to lose its force. The application of the heat renders it almost innocuous. Then the expulsion of the poison, by letting the blood, also has the effect of reducing its quantity, and therefore weakening its power. So, when a portion of the poison has been expelled it gets attenuated in strength and its progress upward, is impeded.

Taking all into consideration, when the poison has been able to pierce through two ligatures successively, the case becomes rather serious, and I shall explain why it is so. The poison pierces through the first and second ligatures, not only when

they have been awkwardly and perfunctorily applied, but also when the fangs are long. Indeed when the patient has been bitten by a very big *hamadryad*, *kenta* or *daboia*, it will be very difficult to arrest the progress of the poison by the application of the ligature. The force of the poison may be weakened by the letting of blood, and the application of the heat, but its progress is not in some cases arrested, if the bite has been inflicted by a snake with a very long fang. The fact is, if it is found that the ligatures, even when properly applied, are not arresting the progress of the poison, it can be taken for granted, that the patient has been bitten by a very big hooded-snake or a *daboia*.

Under such circumstance the *beri* is to be applied.

This process is rarely resorted to, and the need of resorting to it also arises rarely. But when the ligatures fail to arrest the progress of the poison, the *beri* is the only means left to save life. For, if the poison be permitted to pierce through the third ligature and to enter the system, the case at once becomes serious.

The *beri* is the cauterization of the affected limb all round. It is applied in this wise. A couple of scythes are to be heated in fire made of cow-dung. When the scythes are red-hot, apply their backs upon the ligature, causing a deep scar about a quarter of an inch in depth all round the limb. A good deal of expertness is necessary to be successful in this operation. First, one scythe is taken out of the fire and half of the limb is scarred. The other half is scarred by the other scythe. The scythe first burns the ligature, then it penetrates the skin and flesh, and sometimes it touches the bone, where there is no thick covering of flesh over it. This done, the patient is safe.

The entire quantity of the poison is generally found just below the last ligature, and the application of the heat destroys it. Any portion of the poison that remains below the scar through does not find a passage as it cannot cross the chasm made in the limb.

The *beri* is to be so applied that all the superficial veins may be destroyed, but not the important nerves. If the nerves are destroyed the limb becomes weak, and sometimes useless. If the nerves are saved, the patient suffers no serious injury. The part becomes

sore, and cocoanut oil is applied over it. In the course of a few days the sore is healed, leaving only a deep scar round the limb affected.

I have never had an opportunity of applying the *beri*, neither have I seen it applied. But I saw one who had been saved by the process. He was a young *mal*, and had gone to the *Sunderbans* to catch *hamadryads*. He had entered the jungles to ease himself, the party being in a boat. He was bitten by a *hamadryad*, and he ran to the boat to his comrades. The elders saw the poison was ascending rapidly. They applied a very good ligature, but the poison was not arrested and they applied the *beri*. I saw the young man and the deep scar on his left arm just above the elbow. The arm seemed to have suffered nothing by the process.

The snake doctors have rarely an opportunity of applying *beri*, hence experts to perform the operation are only found among the elders of the *mals*. When applied by the inexperienced, either the limb may be paralyzed, or the wound may not be deep enough to ensure absolute safety. But medical men, we think, will find no difficulty in applying the *beri*. Indeed the treatment that has already been described, and will be described in future chapters, can be, we believe, vastly improved, if adopted by the medical profession.

The following from Dr. Ewarts may be of some use in determining the depth of the excisions and the scar :—

“ Over the shin the depth of shin and areolar tissue is small ; over the thigh the depth is greater, the cellular tissue is loose, and more easily penetrated by fluid, such as snake poison. Thus in the former situation, both the area and depth of the excised part would be less than in the latter regions, because the area of its diffusion would be less. Over the shin, the depth of the excision should be down to the periosteum, and to the muscles on either side, and it should embrace an area of a square inch or more. In the thigh, the excision should be down at least to the fascia covering the muscles, and ought to be even more extensive including an area of a couple of square inch or so. There is reason to believe that one reason why excision has not been attended with the expected success, has arisen from the

fact that all the inflicted tissue has not been removed. It is manifest that, if any be left behind, the remaining poison may be insidiously absorbed, and eventually destroy life. Then again if the bite has been inflicted by the daboia, on a thin and spare individual, the muscles of the calf or thigh may be penetrated. And, in such a case, muscle in addition to skin and areolus tissue, may have to be excised."

CHAPTER IX.

TREATMENT WITHOUT LIGATURES.

A man may be bitten in parts where the application of a ligature is not possible. Such bites are rare, but they are dangerous. Such bites are usually inflicted when one is in bed or sleeping. If bitten by the *krait*, the patient sometimes is not at all roused from his sleep. Children have died in this manner to my knowledge,

If the bite seems to be effective, the poison ought to be sucked out. I said it before and I repeat it, that if medical men can invent a sucking instrument, at least as powerful as the mouth of a strong man, death by snake-bites will become almost impossible. And after the poison has been sucked out, the parts indicating the marks of the fangs ought to be cauterized either with a red hot iron, or a live charcoal.

I have already said that the taste of the poison is very bitter. This bitter taste is imparted to the blood. In sucking therefore the presence of the poison may be detected by the sense of taste. I had said in another place that the blood is to be, sucked till no trace of the poison is found in it, and this can be determined by its taste. The taste of the natural blood is brackish and has no bitterness whatever.

If sucking be not practicable, let the punctures be widened by a knife and the wound deeply cauterized. This will be found quite effective if it can be done, when there is still the first swelling in the parts. The swelling indicates that the poison is still in the parts bitten. The poison may be also let out by cupping. Good many incisions may be made all around the marks of the fangs] and the blood let out by cupping. The expert will also follow the track of the poison, and bring it out as described above.

To the lay man, the best course is to hold firmly the part bitten with the fingers, draw them, and cut it off with a knife, thus

making a circular excision, about the shape of a half-pice. This done, the parts may be cauterized.

It is needless to warn our readers, that the methods suggested above, can only be useful when the poison has not yet been able to enter, what is called the *bhander*, (system). When the poison has entered the *bhander*, the case becomes doubtful, even in the hands of experts.

But still some means may be adopted, at least to weaken the power of the poison. For instance, let the parts surrounding the bite be touched with the point of the lancet and salt applied. Let also the *thubi* be applied, or the parts fomented by hot water. These measures will at least weaken the strength of the poison. If the poison has been thus weakened, its progress will be slow, and the expert will get time to treat his patient. When the poison has been considerably weakened, the patient sometimes will not die at all, though he may shew all the premonitory symptoms of death. A patient who is apparently at the last moment has been thus occasionally seen to revive.

When the poison has entered the system all the four methods, the *sati*, *thubi* &c become useless. The *mals* have no faith in drugs or charms. The only drug that they think, has some power over snake-poison is vegetable acids, such as tamarind, lemon juice &c. When therefore they see that the poison has entered the system or likely to enter it, they give a preparation of tamarind internally. Indeed this is also administered by cautious men even when the poison is under arrest by the ligature. But when the expert is sure that the poison has been arrested, the drug must never be administered.

The preparation is made of tamarind, mustard oil (pure,) and sulphate of copper. The last to be omitted when the poison is yet under arrest, by the ligature. If the poison has entered the system, the sulphate of copper is to be added. Let the tamarind be diluted in oil, and let 5 grains of the sulphate be added to each dose. An ounce or two be given every 5 to 10 minutes. The dose to be regulated, according to the condition of the patient.

The other medicine used is, what may be called, fish-water. Take up few fishes which have a strong fishy smell. Have them rubbed in two or three seers of water, so that the water may acquire a strong fishy smell. Let the water then be filtered through a piece of rag so that the water may be got rid of the scales. Let the patient drink the water.

As I said before, vegetable acid has some power of neutralizing snake poison, and the tamarind will at least weaken the virulence of the venom. But the main object, it would appear, is to make the patient vomit. If the preparation of the tamarind causes vomit, then the patient immediately revives, but he must be made to take it again and vomit again. After two or three such vomits, the patient is cured.

To induce the vomiting, he must be made, when in the last stage, to take as much of tamarind and oil ~~and~~ as his stomach can contain. This will induce him to throw out the contents of his stomach. If he still does not make effort to vomit, let him try with his finger, or the feather of a bird, to do it.

It would appear that the great object is to make the patients vomit out the contents of the stomach. If this can be done, then he can be cured easily. Other emetics may be tried, besides the tamarind and oil and the fish-water, but I have been assured that most emetics will not act under the circumstance. These matters however can be best decided by medical men. It is a question whether, when emetics fail, a stomach pump will not do the needful. I believe, it will serve the purpose very well, at least in some cases, though I have never seen it tried.

To my mind the stomach-pump ought to play an important part in the treatment of patients at the last moment, if what the *mals* say be true. They say that when the poison has entered the *bhander* a frothy substance fills the stomach and causes the patient to foam at the mouth. This frothy substance obstructs the passage of the wind-pipe and causes suffocation. The patient feels a choking sensation at his throat, and at last finds himself incapable of performing the process of respiration, the result of which is death.

The great object of the *mals* is to remove this frothy substance out of the throat and the stomach, and to prevent death by suffocation. It is alleged that if the patient can be kept alive for a sufficient length of time, a re-action will set in, which will cure him without the aid of any further treatment.

They relieve the patient of his suffocation by various ways. One way is to thrust a piece of rag or the hand in the mouth, and clean the throat of the saliva as far as that is possible. Another way is to get the patient drink small quantities of hot water at frequent intervals. The other way is to give hot water fomentation to the throat, or to make the patient inhale steam.

When the throat has been affected and the frothy substance is obstructing the passage of the windpipe, the great point is to keep the patient alive. He will suffer from intense thirst, and sometimes drink water in a hurry and kill himself. He must be given small quantities of hot water to drink. He must be then given to drink the tamarind and oil, or the fish-water.

Sometimes the patient will not be able to drink the tamarind and oil at all. Under such circumstance, the *mals* thrust a tube in his stomach and pour the drink into it. They use an undeveloped plaintain leaf for that purpose. Of course a medical man will be able to do it more easily by a stomach pump or any other instrument.

At the last moment the patient speaks in a nasal tone. His memory fails him, and he sometimes talks incoherently. But he must never be permitted to lie on his back. He must never be allowed to sleep or eat, but kept constantly engaged in conversation. If he can not speak, he must be made to hear, and give replies by signs. He must be given hopes of recovery every now and then, and that emphatically. His eyes will become red and he will see dimly. Let, then, a drop of vegetable acid fall in the eyes, and the redness will disappear. A patient of mine wanted to smoke his *hooka*, but as the poison was under the ligature, I felt no objection in acceding to his request.

After the patient has been made to vomit several times, he will be completely relieved of the effects of the poison. This, the

patient himself will be able to tell you. He will feel that he has got a new lease of life. He will feel free, buoyant, and happy. He will feel that he was under the influence of a horrible dream so long. Even after he is free, he must not be allowed to sleep or eat for several hours together. He must be made to sit with out-stretched legs, leaning upon something or some person. Let it be borne in mind, that this must be the position of all persons when bitten by a snake.

Our readers must have perceived that the treatment is difficult, and sometimes uncertain when the poison has been allowed to enter the *bhander*. But let me repeat here again, that even when bitten in parts where the arrest of poison is not possible by ligatures, the poison can be easily expelled by sucking out the blood. This sucking can be effected either by the mouth, or by cupping, or by a sucking tube. As soon as a person is bitten, cauterize the part by a live charcoal. If it is not close at hand, and sucking by the mouth is not practicable, touch all round the part with the point of the lancet and apply salt. This done, bring the blood out by cupping or by a sucking tube. Taste the blood, and when it has ceased to be bitter, end the treatment by cauterizing the wounds by a red hot iron.

We cannot conclude this chapter without referring to the last process adopted by the *mals* to save their patients. When the patient is apparently dead, that is, he has ceased to breathe, the *mals* make one final effort to bring him back to life. It is by pouring a stream of hot water over his head. The patient is made to sit below the roof of a house ; and hot water, not too hot to be unbearable, is poured upon his head in continuous stream from the thatch or ceiling. The process is continued for 15 minutes. A good many jars are filled with water, and put upon fire. A jar is taken and its contents emptied in the manner related above, and it is refilled with water and placed again upon the fire. It is in this manner a continuous stream is kept washing the head and trunk of the patient. If, after fifteen minutes of operation, the patient shews signs of life, the operation must be continued till he gets a shiver. When he gets a shiver, the process must be stopped. This process is called *jal sar* by the *mals*.

CHAPTER X.

THE BITES OF KRAITS, OR KANORS.

The symptoms, which follow the bite of the hooded snakes, are always almost the same. But those, of the hoodless snakes, are not always followed by the same symptoms. I have been assured that the bite of a certain snake, which I know to be very common in Bengal, is followed by a bleeding from the gums. The bite of the *daboia* is, it has been stated, followed by the disorganisation of the parts bitten, and hence it is called *patcha bora*, *patcha* meaning decomposition or disorganisation. But I believe, the mortification is caused by the severity of the ligatures applied in bites by the *daboia*. Our readers are already familiar with the fact, that of all snakes, this species has the longest fangs. This necessitates the application of a very tight ligature, and this is sometimes followed by mortification.

The *krait* is a dangerous snake, because it lives in our houses. Its poison is not as virulent as that of the hooded snakes, but yet it is strong enough to be fatal invariably, if not neutralized. It is dangerous because it lives in our houses; its bites are less painful; and because it is almost the only snake which has the opportunity of biting men in their trunk. A *krait* will bite you when you are asleep or half asleep. You will feel a stinging sensation, and forget all about it. You will go to sleep, and—rise no more.

A man who goes to sleep after being bitten by a snake has little or no chance of escape. A good many children die, every year, in this manner.

In bites by *kraits* the usual methods, described above, ought to be followed, *i. e.*, the methods of *sati*, *ping*, *thubi* and *beri*. But when the poison has entered the *bhandar*, the body begins to swell. This swelling indicates, that the patient has

been bitten by a *krait*. Sometimes the swelling is confined to particular parts of, sometimes it spreads all over, the body. In either case, the treatment is the application of dry heat or steam, the latter being more effective than the former.

We shall now describe how this is done. Just by the side of the patient, a small hole is dug in the ground, which is filled by cow-dung cakes. It is lighted and fanned, and when the fire is yet emitting a large volume of smoke, the hole and the patient are to be covered with a blanket, or a thick piece of cloth. Of course he must keep his nose uncovered, though he must cover all other parts of his body. He may lean against a wall, or if he is too weak, may be allowed to lie on his back.

The steam is applied in this manner. Water is boiled in a vessel in which some leaves of *piper chuba* are thrown. If the leaves are not procurable, simple water will do almost as well. Indeed the utility of the above-mentioned leaves I have never been able to ascertain, more than this, that they make the application of the steam more effective. Let the patient be covered by a blanket or a thick piece of cloth, and the steam introduced to him by a pipe or a tube.

Sometimes the patient is made to lie on a sleeping stool, or cot, (*khattias* called in India,) and the heat and smoke, or the steam, applied. The great object is to make the patient perspire. When the patient is subjected to this operation for a time, he will express an ardent desire to be relieved of it. But he must not be readily listened to. Of course when it becomes intolerable to him, he must be allowed some rest. Which means not that he must be uncovered, but that the cover must be removed from the fire or the steam, but not from his body.

It will be found, after the first process, that the patient has perspired profusely and his swelling has abated a little. He must be submitted to the process again after a few minutes. The process weakens the subject very much, but two or three applications will generally cure a patient. Sometimes the cover will be found to have been wetted by his perspiration. In that

case, it ought to be changed for a dry one. When applying dry heat, fire without smoke will not be as effective as fire and smoke.

The process is to be stopped when the patient is seen improving in spirits, and when the swelling shows symptoms of decrease. But as soon again as symptoms of increase are seen, heat or the steam must be re-applied.

There is a belief amongst the *mals* that a man bitten by a *krait* ought not to be given up for dead, even several hours after his apparent death. They say that men have been saved in this manner even twenty-four hours after they have been given up for dead !

Without asking our readers to put faith in the above statement, we may yet crave the indulgence of describing, what the *mals* do, when a man bitten by *krait*, is before him, apparently dead. He will put him upon a *khattiah*, cover his body, and apply the steam, or smoke and heat. The nose of the patient, of course, must be kept out. After a few moments, the patient, though apparently dead, will be found to be perspiring. He will sometimes continue to perspire without shewing any symptoms of life. But sometimes he will give unmistakeable proofs that he is not dead. And then the treatment must be continued.

Before I conclude, I shall offer a remark or two, for the guidance of amateurs who take upon themselves the task of treating cases of snake-bite. Though I have given full details of all sorts of treatment that are in vogue amongst the *mals*, usually they rarely find, for reasons stated above, an opportunity of making use of the less painful and more easy methods. But there is a vast difference between an expert and an amateur. An amateur will have to adopt only the method which he is capable of controlling, and not that which is the best.

The amateur should, I think, begin by adopting only two methods, the incision and the *beri*, when the poison is under the control of the ligature. He must make incisions with the point of a lancet or a good pen-knife below the ligature all

round the limb, if necessary. He will not oftentimes find it necessary to apply the lancet all round the limb for this reason, that, that portion of the limb which gives out pure blood has not been affected and needs no operation. In applying the lancet he must not touch the veins, but always avoid them. If the veins are touched it gives needless pain to the patients, and makes them subject to sores which follow such operation.

The *beri* must be given when the ligature fails to arrest the progress of the poison. It is a difficult process, but there is no help for it. The *beri* is the only way to save life, when the ligature proves unavailing. Neither do we see why the amateur should hesitate to resort to it in cases of necessity. It is neither a dangerous operation, nor does it require any great knowledge of anatomy and physiology. Only the operator must be a man of nerve, and must not quail before the shrieks of the patient.

Bear this in mind, that the passage of the poison is not very deep in the flesh. Usually a ligature will arrest its progress. The red-hot scythe need not, therefore, go deeper than the skin to save life. Usually the operator overdoes his part under the belief, that it is safer to go deeper than what is necessary. I have said that two scythes should be put in the fire, but an amateur, who has not a skilful hand, must put more than two. An expert will cause a circular cauterization by a couple of scythes, but an unskilled amateur may need the use of four.

CHAPTER XI.

APPENDIX.

I was sitting with the Police official in charge of the station at Gopalnagore, then in the district of Nuddea, now of Jessore. It was during the great flood of 1871. I had sought his protection to procure me a boat to convey me, across the sea of water which surrounded me, to my destination.

Just then intelligence was brought to us, that a troupe of *malvadyas* have caught hundreds of snakes, in a village close by. We sent for them with their snakes, and they came. We saw the snakes that they had caught, but said they: "Will you go to see, Sir? It is a sight to see. It is snakes and snakes, all round. We have never seen so many together, no man ever did." And, as a matter of fact, we saw a sight which has been the good fortune of a few people to witness. The sight we saw will never fade from my memory.

We soon organized an expedition. We took three *mals*. The Sub-Inspector of Police, a strong man, took his double-barrelled gun. We entered the boat at about 11 in the morning. It was a small boat, and was rowed by two men. The current was favorable, and the boat ran like a dog in pursuit of a jackal. We had not to follow the course of a canal or a river, for we were in a vast sheet of water. It would have looked like a sea, but for the trees and huts, which yet shewed their heads above water. The flood was then at its highest, and the people in great distress.

We took the straight course over huts and trees, and in this manner we crossed the village of Gopalnagore. We then entered an open space, and saw in the dim horizon the marsh of *Choital*, our destination. The place was recognized by the presence of a couple of tall palm trees. We rowed all of us, and though the tiny boat swang to and fro by our vigorous

efforts at rowing, we had not much to fear. For, by a pole we kept measuring the water all the way, and though it was deep here and there, generally our passage lay over shallow water.

And at last we entered the *beel* (marsh) of Choital. It is a low land and paddy is grown there, but here and there were high spots, where there were trees. This big field has a diameter of, say, six miles. It is all plain land, with the exception of a few trees which shewed their heads above water. On the first tree on our way, we saw only a few snakes and an iguana. But the *mals* told us that the grand scene was yet before us.

Before us, we saw in that vast sheet of water, a couple of palm trees, a few date trees, and a banian tree. The heads of the palm trees were about thirty feet above water, the banian tree covered a large space of land, and the date trees only shewed their leaves. The palm trees were examined by us first. We saw that the snakes have coiled round the trunks of these trees from the bottom to the top. There was no empty space visible on the trunks.

At the bottom, we saw a few *kraits*, and we saw there a black one which is the biggest we have ever seen. But though we saw a few *kraits* and a few black snakes here and there, all the others were only *keutas*. There was not a cobra there, nor any *hamadryad*. The snakes not only coiled round the trees, but were found to have coiled one above the other. It was thus all black from bottom to top. The branches, which are thorny in palm trees, have been avoided, but the leaves had given space to as many as they could hold. We did not disturb them in their position of rest in the palm trees.

From there we proceeded to the date trees. All the leaves were covered by the snakes. The three *mals* stood to catch them. The rower who was in the front was pushed behind, and one of the *mals* took his oar. He rowed vigorously and caught a branch of the date. As soon as he caught the branch,

thousands of *keutas* fell from it into the water. The fellow not only caught the branch, but pulled it, and the head of our small boat was thus made to penetrate through the branches. It was then a truly exciting scene. Hundreds and thousands of snakes began to let themselves drop from the branches in the water, and our boat was soon surrounded by thousands of swimming *keutas*.

The Police Officer shrieked in anger and terror. "Let go the boat, you *haramjadas*" cried he, "they will soon fill our boat." But I was enthralled with the scene, and had not the power of feeling any terror. The *mals* were engrossed with the work before them, and they had no ear to listen to the commands of the officer. They three were engaged in catching snakes, and were not at all disposed to remove the boat from the position which it had been forced to take.

In a second or two the swimming snakes invaded our boat. Of course it was not their object to bite or swallow us, but they found a floating substance in our boat, and they wanted to make it a resting place. The officer was standing with his gun in his hand, and I told him to leave it and take a pole to protect the boat from the snakes. So he and I took a pole each, and so did each of the boat men. The snakes swam all around us with only their heads above water. They appeared like a shoal of fish. We began to splash all round our boat with the poles, with a view to drive them away. But their number was too many for us. A good many yet touched our boat in spite of the beating of the water.

They tried to climb the boat, but they could not. They could not raise their head much above water; and it is altogether doubtful, whether, even left to themselves, they could climb the boat. But surely they were not given much time to make the effort. The boat was small; we were standing and beating the water with our poles; the *mals* were catching snakes; and all these made the tiny thing reel like a drunken *mehter*, and prevented the snakes to gain a hold of the boat. But greater danger was a-head of us.

The head of the boat had penetrated the dense branches of the date tree, and the *mals* were catching snakes. They were not catching the reptiles at random, but selecting the biggest! A *keuta* is a creature which is rarely met with. A *mal* will purchase one from a comrade for more than rupees ten. But here they had such a large number to select from, that they avoided the smaller ones, and thought only of catching the biggest which they could reach.

Now their attempt to catch the biggest created more than one serious danger for us. If a big snake, which they had fixed their eyes upon to catch, was not accessible, they dragged the boat deeper, and this took our tiny vessel almost into the bosom of the branches of the date tree. Just bear in mind that all these branches had *keutas* upon them, each containing hundreds and more. The *mals* were catching snakes; the branches of the tree covered the boat partially, but covered themselves completely. *Keutas* hung over their heads and licked their foreheads. Snakes came in contact with their ears, arms, and backs. But the *mals* cared not.

When the boat came in contact with the branches, we raised an alarm. For there was nothing to prevent the snakes creeping over the branches and entering our boat. But we forgot our own danger when we saw to which the *mals* had subjected themselves. They were all "unshaved" *keutas*, and one touch of their fang and the strongest man would have fallen down dead in five minutes. These snakes surrounded the *mals*. Every one of the three *mals* might have been bitten by one thousand *keutas* at that moment.

We forgot our danger, and indeed at that moment none of us, the *mals* included, was in his proper senses. I recollect seeing a *keuta* licking the fore-head of a *mal*, and having cried aloud, and given a warning. But the warning had not much effect. The *mal* only lowered his head an inch or so, to avoid the contact of the tongue of the *keuta*. One of them muttered, without however stopping in his work, "No fear, Sir: at such times they do not bite." "But they do bite," said I, "during inundations." "Yes, but if they are hurt," was the laconic reply. The *mals*

deceived me with a view to work uninterruptedly. The snakes do bite during floods, but on that occasion, the sight produced extraordinary excitement which took away the senses of the *mals*. When *we* forgot the danger, it is no wonder that *they* should. Besides, they had gone well provided with lancets, and *sone* cords. Familiarity breeds contempt, and the *mals* have great contempt for these reptiles. On that occasion this contempt was heightened by their large number.

We too caught the contagion, and forgot temporarily our fear of the snakes, and entered into the pleasures of the exciting work. The snakes swam in shoals round our boat, but we became indifferent to their presence. Those in the date tree had an easy access to our boat, but we gave up the thought of driving them away. Every minute the number of swimming snakes was increasing. For, hundreds were dropping from the branches of the date trees every second, and the heads of the snakes blackened the water all around us. The date tree shewed no more snakes—on that side where our boats were—except a few small ones here and there.

The *mals* then wanted to go to the other side of the date tree, but we objected and desired to see the banian tree. The boat was turned towards it, and we rowed over shoals of snakes. They tried to give way to our boat, but the crowd was so great that they could not move at their pleasure. When we left the date tree, the thought struck us to make a search of the boat to see whether any snake had been able to find its way into it or not. It was when we had left the date tree that we felt, that we had been in great danger so long.

The banian tree was quite close, and its big trunk was about three feet above water. Just above the trunk there were two big branches stretching slantly in opposite directions. Between these two sat a wild cat. It was utterly helpless, and was surrounded by *keutas* on all sides. But he lived in peace with them. Or rather the snakes lived in peace with him. As our boat approached towards the tree, the creature looked at us piteously, and the sight excited my pity. There was no ferocity of the wild cat in his look. But bang went the gun

and the cat fell in the water beneath. While I was gazing at the cat, the Sub-Inspector was steadying his aim at it from behind, from the moving boat. The cat fell, as also a few snakes, shot dead or wounded, for the gun was charged with small shots.

This exploit of the Police Officer I did not like, as it shewed neither any courage nor any delicacy of feeling. But the cat was only wounded if wounded at all, for it reached the trunk again, though it took a new position which concealed it from our view.

We gazed at the tree—it was a canopy of snakes. The *mals* wanted to catch more snakes but I opposed. They had caught enough, and no snake could be caught from the banian tree without incurring serious danger. So we only gazed at the snakes, at their beauty, their variety, and their doings. As for their doings, they did nothing. They coiled round the branches, sometimes one above the other, and kept quiet and immovable. The beauty of their heads surpasses description, but this beauty was only seen when they were moving about or raising themselves up in anger or terror, which they only did when teased by us. The variety was so great that it seemed to us that each snake belonged to a separate species. One had a yellow hood, the next one a white, and the next a white and reddish, and so on. The color of the skin also differed in this manner. The *kentas* have no doubt more than a hundred variety.

While gazing at the snakes, a *mal* cried in excitement: "Lo, there is a *bara bharee samp* (very big snake.)" The other two *mals* saw it at once, but we could not. It was on a branch high above our heads. We could not however identify, which snake was meant. But while we were looking for the "very big snake," one of the *mals* was rowing the boat towards the trunk. The trunk was reached, and he caught it, left the boat, and began to ascend the tree!

Now this we could not permit. The man wanted to ascend a big tree, every available space of which was covered by the most deadly of all snakes. There his expertness and his agility would avail him little. We bawled out to him in tones of anger to come down instantly. But the

man said, *bara bharee samp*, and paid no heed whatever to our commands. I threatened to shoot him if he did not come down, but he repeated, "the snake was very big, Sir!" The fact is, the temptation before him was great, he could not resist it. The *mal*s who were in the boat were intently gazing at the snake, and muttering: "he won't be able to catch it. Its position is bad."

But my eye was fixed towards whom I considered the doomed man. As he moved on the branches, there was a rustle amongst the snakes. A good many fell from the branches, and some moved up before the man. These disturbed the others, which were sleeping quietly. Some finding their progress barred, were coming back towards the man. The proceedings of the man would have caused amusement if the matter were not serious. He was moving over a branch in all fours. Now he sat to give the snakes an opportunity of making way for him. When the way was clear for a few paces, he advanced a little and waited again. The snakes which were coming towards him, he pushed away with his hands. In this manner he employed his feet too. But the snakes shewed no disposition to bite him. None raised its hood, or hissed in anger. It was because they were not touched. Those caught in the date tree shewed a good deal of ferocity, but then their tails had been caught. In the banian tree none was touched, and those which were touched were shoved into the water.

The man then caught hold of another small branch. It was on that branch the big snake was. He began to crawl over it with great care and difficulty, for the branch was small. And then we saw the big snake—it was a jet black *keuta*. On the approach of the *mal*, the snake shewed signs of uneasiness, and then it moved. Just as it was eluding his hand, the *mal* caught the tail. If the snake had then turned round and attacked him, the only way of saving himself was to throw it down below. But the snake acted otherwise. There was a small branch before it, and it coiled its head round it, and held it firmly. The *mal* pulled it by the tail, but the snake shewed no signs of giving way. The man then held the tail by both the hands and began to pull with all his strength. In the struggle and under the excitement, he lost his balance.

The branch was about sixteen feet above water, and he fell down with a splash into the water below. There was silence for a few seconds, for the water was rather deep there, and he had gone to the very bottom by his fall from such a height. I thought it was all over with him, but he rose again. He was not cowed, but was on the contrary in the highest spirits, and he cried: "I have it, here it is." While he said this he raised his hand, which had clasped the tail of the snake! Surely the tail was in his grasp! Another *mal* from the boat caught the tail and dragged the snake up. The third held it in the middle, and then it was put into a jar. Under ordinary circumstances a snake like that would have demanded the exertions of two or three men to catch it. But fortune was against it. It was caught in a position where, none of its predecessors perhaps had ever been caught. Talking of position, it had every advantage over the *mal*. If the man had not fallen from the tree, the snake would have never been secured, for it was not in the power of the *mal* to compel a big snake like that to let go its hold of the branch. And then in the water, it could have not been also caught. But the fall hurt it, for, in spite of its strength, it is a tender creature; and in spite of its ferocity, it is usually timid. The fall hurt it, and gave it such a fright, that it never raised its head when it was put into the jar.

I came back to Gopalnagore about 4 P. M. On the following day I wrote to the Lieutenant-Governor of Bengal, to the Commissioner of the Nuddea Division, and to the Magistrate of Nuddea to take prompt measures, for the destruction of the snakes. I wrote to them that at a trifling cost the Government could destroy millions of snakes. The Magistrate asked for permission of the Government to do it, and the Government wrote to the Magistrate for report. At last it was admitted that my suggestion deserved consideration, and the cost was sanctioned. But then the flood had subsided, and the snakes had entered their holes! The *beel* of Choital is to this day notorious for its *Kentas*.

