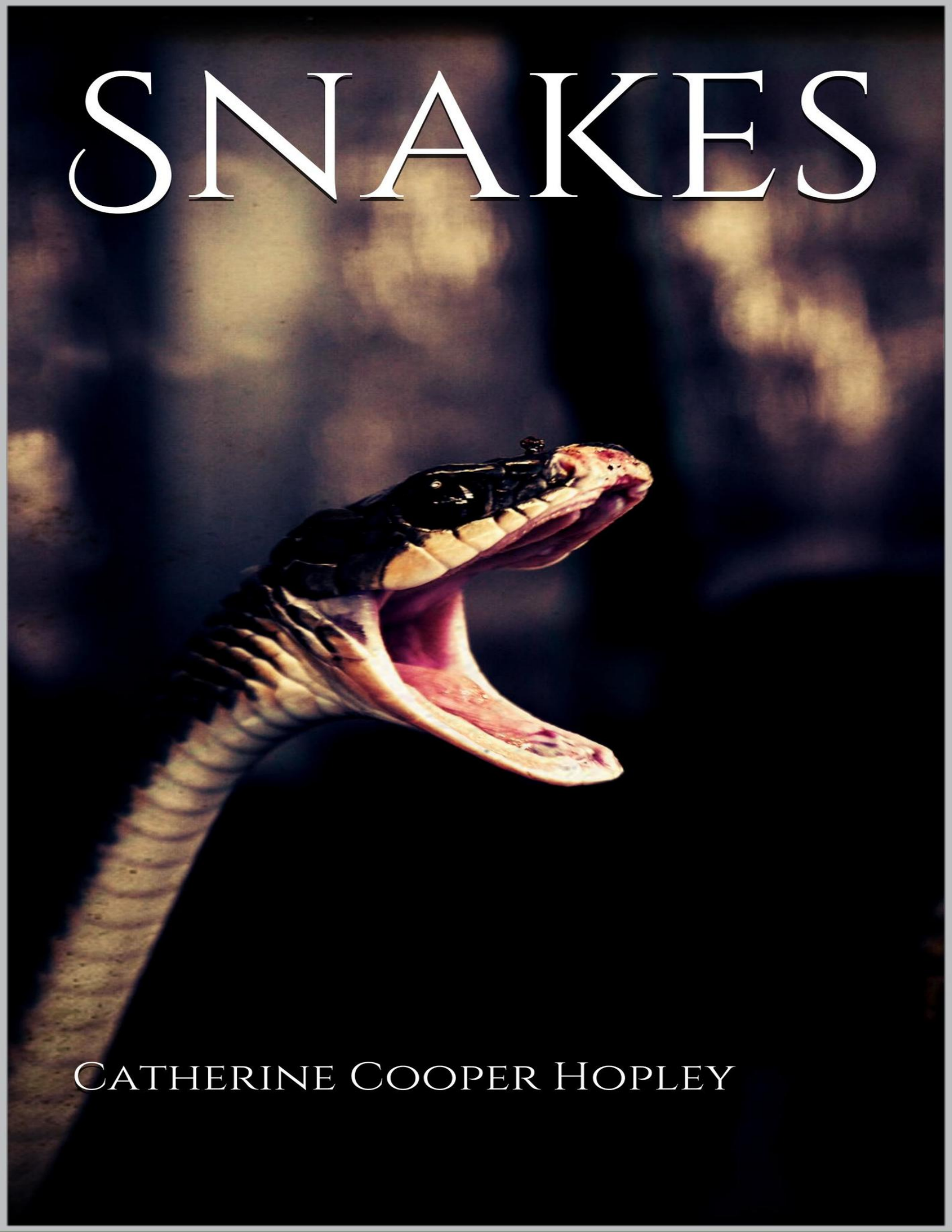
SNAKES



Catherine Cooper Hopley

Snakes

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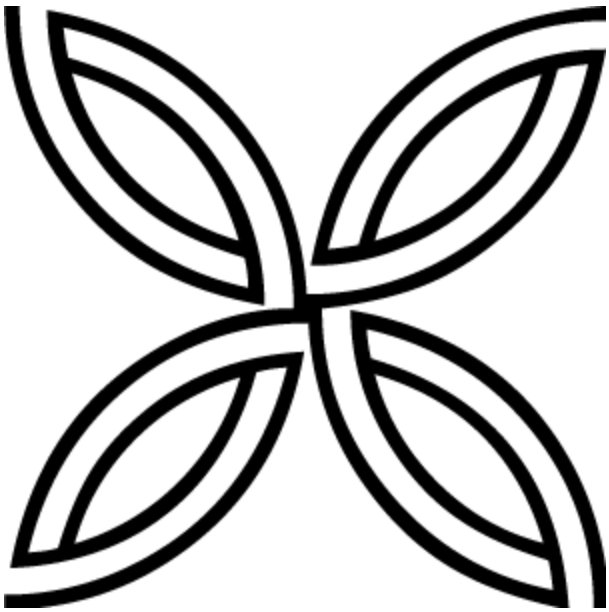

INTRODUCTION.

TO the many friends who have repeatedly asked me, ‘What *could* induce you to take up such a *horrid* subject as snakes?’ a few words of explanation must be offered. Some words of apology are also due that I, a learner myself, should aspire to instruct others. I cannot do better, therefore, than tell the history of this book from its birth, and in so doing cancel both obligations. The little history will be a sort of *OPHIDIANA* , or gossip about snakes; and in this I only follow the example of most herpetologists, who, when writing exclusively on these reptiles, preface their work with some outline of the history of ophiology, and generally with an excuse for introducing the unwelcome subject at all. There is still reason to lament that traditional prejudice invests everything in the shape of a serpent with repulsive qualities, and that these prejudices are being only very slowly swept away by the besom of science.

Serpents are intimately associated with our religious beliefs. Not that we *worship* them! Far otherwise. Many excellent and orthodox persons associate with a serpent all the sin and misery which ever existed on our globe, and are persuaded that the sooner everything in the shape of one is exterminated the better.

On the other hand, those who can look at a snake with unprejudiced eyes and study its habits, find continual reason to wonder at and admire the extraordinary features which exhibit themselves in its organization. Owing to their retiring habits, many of them nocturnal, and partly in consequence of preconceived errors, less is understood

about them than almost any other natural group of animals; therefore—as the reader will discover—a student, when left to himself, has to wade through ages of writers in order to find out what to believe regarding them. Scientific ophiologists are still engaged in settling mooted questions concerning them. But apart from science there is a glamour of poetry, romance, and mystery about snakes, and not without reason. There has been a great deal of what we may call ‘Drawing-room Natural History’ of late years—charmingly sensational and romantic; attractive also in illustrations and colouring, but not always intended as reliable guides for students.

All travellers are not naturalists; and though they may contribute valuable information in one branch of science, it is possible they may mislead in another; and from the very popularity of their books, such errors are rapidly disseminated. I aspire to a place on drawing-room tables for my book also, but let me assure my readers that my aim has been to assist by diligent search to establish truthfulness. Whatever of romance or sensation attaches to it, is due to the marvellous powers of the creatures who fill its pages, and whose true nature I have laboured to comprehend.

Schlegel and Dumeril are two authorities on serpents much quoted by English writers, and both give us a list of all the naturalists of repute who have done service to herpetology, up to the date of their works. As many of these are introduced in the body of my work, let us glance at the progress of ophiology since the date of these two distinguished authors. In zoology as much as in any branch of science progressiveness is observable; and in zoology the advance of ophiology has of late years been remarkable. In 1843, when Schlegel’s *Essai sur la Physionomie des Serpents* , 1837, was translated into English by Dr. Thos. Stewart Traill, of the University of Edinburgh, he mentioned as a reason for curtailing the

original (and not adding the atlas containing 421 figures, with charts and tables), that the low state of ophiology in this country did not invite a larger work, and ‘deters booksellers from undertaking such costly illustrations;’ but he hoped to be useful to science by cultivating a branch of zoology hitherto neglected. Ten years prior to that date, viz. 1833, the monthly scientific magazine *The Zoologist* was started; in introducing which the Editor, Mr. Ed. Newman, wrote: ‘To begin, the attempt to combine scientific truths with readable English has been considered by my friends one of surpassing rashness;’ that he had ‘many solicitations to desist from so hopeless a task,’ and many ‘supplications to introduce a few Latin descriptions to give it a scientific character,’ science being then confined to the scientific alone. Nevertheless the *Zoologist* has survived half a century, and under able editorship has taken its stand as a popular as well as scientific journal. Formerly you might have hunted the pages of such magazines year after year without finding mention of an ‘odious snake;’ but within the last decade, not only this but other periodicals have frequently opened their pages to ophiology, and a considerable removal of prejudice is noticeable.

Mr. Newman felt encouraged by the success attending the publication of White’s *Selborne* , that being one of the first works to induce a practical study of nature. Yet, until the appearance of Bell’s *British Reptiles* in 1849, our present subject occupied but very stinted space in literature. Indeed, we must admit that as a nation we English have *followed* , not *taken* , the lead as naturalists. So long ago as 1709, Lawson in his *History of Carolina* lamented the ‘misfortune that most of our Travellers who go to this vast Continent are of the meaner Sort, and generally of very slender Education; hired laborers and merchants to trade among the Indians in remote parts.’ ... ‘The French outstrip us in nice Observations,’ he said. ‘First by their numerous Clergy; their Missionaries being obedient to their

Superiors.’ Secondly by gentlemen accompanying these religious missions, sent out to explore and make discoveries and to keep strict journals, which duly were handed over to science. And what Lawson remarked of the American colonies was extended to wherever the French, Portuguese, and Italians established religious communities. We find our book-shelves ever enriched by foreign naturalists.

In Germany, also, ophiology was far in advance of us. Lenz, Helmann, Effeldt, and many others pursued the study practically; and produced some valuable results in their printed works, which unfortunately are too little known in England. Doubtless because we in England have so few native reptiles, there is less inducement to concern ourselves about them. Not so in America, where herpetology soon found many enthusiasts; and the researches of Holbrooke, Emmons, De Kay, and Weir Mitchell were published within a few years of each other. Dr. Cantor in India, and Dr. Andrew Smith in South Africa, Drs. Gray and Günther and P. H. Gosse in England, all enriched ophiological literature previous to 1850, to say nothing of the valuable additions to the science dispersed among the *Reports* and *Transactions* of the various scientific Societies. After the appearance of Dr. Günther’s important work, *The Reptiles of British India* , in 1864, published under the auspices of the Ray Society, another fresh impetus was observable, and we had Krefft’s *Snakes of Australia* , 1869; *Indian Snakes* , by Dr. E. Nicholson, 1870; culminating in *The Thanatophidia of India* , by Sir Joseph, then Dr. Fayrer, F.R.S., C.S.I., etc., Surgeon-Major of the Bengal Army, in 1872, which brings me to the commencement of my own studies.

A few years ago, I knew nothing whatever about snakes; and to them, though deriving my chief pleasures from an inherited love of all things in nature, a faint interest *at a respectful distance* , was all I accorded. In Virginia and

Florida, where a country life and a gorgeous flora enticed my steps into wild and secluded districts, we not unfrequently saw them and one or two ‘narrow escapes’ seasoned the pages of my notebook. When in such rambles we caught sight of one, we flew at our utmost speed, encountering the far greater danger of treading on a venomous one in our precipitous flight, than in shunning the probably innocent one from which we were fleeing.

My first startling adventure in Virginia was more ridiculous than dangerous. We were about to cross a little rivulet that ran rippling through a wood, in which there were many such to ford. Often fallen boughs or drifting logs, dragged into the shallow parts by the negroes, served as stepping-stones. These becoming blackened in the water, and partially covered with tangled drift-weed, were so familiar a sight that, without pausing to observe, I was making a spring, when my companion caught hold of my dress, crying out, ‘Don’t step on them! They will bite you!’ The supposed shining and tangled boughs were two large black snakes commonly known as ‘Racers,’ enjoying a bath; but until I had hastily regained the top of the bank, alarmed at the excitement of my young friend, I did not discover the nature of our intended stepping-stones. The snakes were not venomous, but very ‘spiteful,’ and might have resented the interruption by sharp bites. In moving, they probably would have caused me to fall upon them and into the water, when they might have attacked me with unpleasant results. Now, however, my chief vexation was that they got away so quickly, I could learn nothing about them.

Another ‘escape’ was on an intensely hot day, when in early morning we had started for a botanical ramble. Our way lay along a sloping bit of pasture land, bounded on the east and higher ground by a dense wood, which afforded shelter from the sun. Beguiled on and on, among the lovely copses of exquisite flowering shrubs and a wealth of floral treasures which carpeted the turfy slopes, we were

unconscious of time.
Though only in the merry month of May, blackberries of enormous size and delicious flavour, trailing on long briars yards and yards over the mossy grass, invited us to break our fast; and, all unmindful of the breakfast-hour, we feasted and rested.
Suddenly we found ourselves no longer shaded by the wood to the east of us, for the sun had mounted high; and at the first touch of his scorching rays as we rose to our feet, we glanced at each other in dismay, for we had open ground to cross in getting home. My Virginia companion said that it would be better to ford the streams in the wood, than risk sunstroke by crossing a cornfield, our nearest way home. This we decided to do, and having surmounted all obstacles, were almost within earshot of the house, when Ella, with a shriek, started and ran back, exclaiming, 'A moccasin!'
' What? where?' I eagerly inquired, trying to follow the direction of her eye.
' Oh, Miss Hopley, come back! Quick! Come away! Water moccasins are worse than rattlesnakes, for they dart at you!'
Sufficiently alarming, certainly; yet I wanted to *see* the terrible object, and ascertain how far off it was, and at length discovered the head and neck of a snake erect. About a foot of it was visible, and might have been taken for a slight stem or stick standing perpendicularly out of the swampy herbage bordering the narrow path. The fixed eyes and darting 'sting'—which I then thought the tongue to be—seemed to endorse the character my young friend had given it. Yet I lingered, 'fascinated,' no doubt, by its gaze, the fascination in my case partaking of curiosity chiefly. The reptile remained so rigid that I was inclined to venture nearer; nor did I welcome the idea of having to retrace our steps and risk the open field under that Virginia sun. But Ella would not hear of passing the deadly snake.

There were others, she was sure, in that swampy part.
Well, we reached home at last, more dead than alive, having discarded our treasured specimens and substituted sprays of enormous leaves with which to shield our heads from the sun. And I have ever reflected, that of the two dangers—snakes and sunstroke—we risked the greater in traversing that cornfield at such an hour.
Besides that ‘deadly moccasin’ and frequent ‘black snakes,’ there were ‘whip snakes,’ ‘milk snakes,’ and many others which the negroes would bring home as trophies of their courageous slaughter; but by no scientific names were they known there. Except this name *moccasin* or *mokeson* , which probably conveyed some especial meaning to the aborigines, few of the Indian vernaculars have been preserved in the United States, as we find them in other parts of America, which latter are treated of in chapters xxii. and xxiii. of this work; but common English names prevail.
After a time I proposed to write a book about snakes, starting with the stereotyped ideas that they all ‘stung’ in some incomprehensible way; that the larger kinds crushed up horses and cattle like wisps of straw; and that all, having viciously taken the life of the victim, proceeded with epicurean gusto to lick it all over and smear it with saliva, that it might glide down their throat like an oyster! There are those who to this day believe the same.
My proposed book was, however, simply to recount some adventures among the snakes which were encountered in our American rambles. It was intended for the amusement of juvenile readers, and to supplement the little work about my pet birds [1] , which had met with so kind and encouraging a reception.
But in order to merely recount an adventure with a snake, some knowledge of the reptile is essential. One must, at least, be sure of the correct name of the ‘horrid thing’

which lifted its ‘menacing head’ a few feet in front of us; such local names as ‘black snake’ and ‘moccasin snake’ affording no satisfactory information.

Nor were hasty references to books much more satisfactory. Mr. P. H. Gosse had been over the same ground, gathering many interesting items of natural history; but in his *Letters from Alabama* I could not decide on my moccasin snake. From this and his other works, and then from the authors quoted by him, I discovered only that there were many ‘black snakes,’ some deadly, others harmless. The same with the ‘moccasin’ snake, which was now of this colour, now of that. While one writer expatiates on the beauty of the ‘emerald snake,’ a ‘living gem, which the dark damsels of southern climes wind round their necks and arms,’ another describes snakes of emerald green which are dreaded and avoided. One traveller tells of a ‘coral snake’ whose bite is fatal within an hour; while elsewhere a ‘coral snake’ is petted and handled. Equally perplexing were the ‘carpet snakes,’ ‘whip snakes,’ ‘Jararacas,’ and ‘brown snakes.’

Nor were names the only puzzle to unravel; for in almost every other particular writers on snakes are at variance. Those ‘moccasin snakes’ in Virginia were venomous, I was sure, having known of accidents from their bite. Hoping to become enlightened as to their true name and character, I repaired to the Zoological Gardens to ascertain if they were known there. Yes; there were several together in one cage, labelled ‘Moccasins’ (*Tropidonotus fasciatus*) ‘from America;’ but to identify them with the one in Virginia, of which I had seen only a short portion from a distance, was impossible. To add to the perplexity, Holland the keeper assured me these were ‘quite harmless.’

‘ But are you *sure* these are harmless snakes? They are poisonous in America.’

‘ Well, miss, they have bitten my finger often enough for me to know,’ returned Holland.

‘ Then there must be *two* kinds of moccasin snakes,’ I argued, ‘for the others are *extremely* venomous;’ and I related my Virginia experiences, and that I had known of a horse bitten by one that had died in an hour or so, fearfully swollen.

‘ They have never hurt me,’ persisted Holland.

Subsequently I discovered that in the United States this name *moccasin* is a common vernacular, first and chiefly applied to a really dangerous viper, *Ancistrodon pugnax* or *piscivorus* , the one, most likely, that we saw in the wood; and secondly, to a number of harmless snakes which are *supposed* to be dangerous, and of which those at the Gardens, *Tropidonotus fasciatus* , are among the latter.

Thus at the very outset the puzzles began.

Nevertheless, after some research I learnt enough of snake nature to feel safe in proceeding with my book of *Adventures* , and in presenting it to a publisher.

‘ As a gift-book no one would look at it, and as an educational work there would be no demand for it,’ was its encouraging reception.

This was about ten years ago; and so far from inducing me to relinquish the subject, I began to aspire to become a means of assisting to overcome these prejudices. For the space of two years the anticipated ‘sequel’ to my *American Pets* went the round of the London publishers of juvenile works, and to several in Scotland. It was read by many of them, who professed to have been unexpectedly and ‘extremely interested’ in it—‘ *but* ’—none could be persuaded to ‘entertain so repulsive a subject.’ One member of a publishing house distinguished for the high standard of its literature, positively admitted among his insurmountable objections, that when a child his mother had never permitted him to look through a certain favourite volume late in the day, ‘for fear the pictures of snakes in it should prevent his sleeping!’

An editor of a magazine told me he should lose his

subscribers if he put snakes in its pages; and another made excuse that his children would not look at the magazine with a snake in it.

Perhaps this is not so surprising when we reflect that until within a late date snakes in children's books, if represented at all, are depicted as if with full intent of creating horror. They are represented with enormously extended jaws, and —by comparison with the surrounding trees or bushes—of several hundred feet in length; sometimes extending up a bank or over a hedge into the next field, or winding round a rock or a gnarled trunk, that must be—if the landscape have any pretensions to perspective—a long way off. Slender little tree snakes of two or three feet long are represented winding round and round thick stems and branches strong enough to support you. Into the chasm of a mouth from which an enormous instrument (intended for a tongue) is protruding, a deer the size of a squirrel (by comparison), or a squirrel the size of a mouse, is on the point of running meekly to its doom.

No wonder children 'skip' the few pages devoted to snakes in their natural history books, and grow up full of ignorance and prejudices regarding them. In no class of literature are original and conscientious illustrations more required than to replace some of those which reappear again and again, and have passed down from encyclopædias into popular works, conveying the same erroneous impressions to each unthinking reader.

The strongly-expressed opinions of publishers convinced me that the prejudices of adults must first be overcome before children could be persuaded to look at a snake as they would look at a bird or a fish, or to enter the Reptile House at the Zoological Gardens without the premeditated 'Aughs!' and 'Ughs!' and shudders.

During the two years that witnessed the MS. of *Aunt Jenny's Adventures* lying in first one and then another publishing house, an especial occurrence acted as a great

stimulant, and induced an almost obstinate persistence in my apparently hopeless studies.

This was the sensation caused by the daily papers in reporting the case of ‘Cockburn *versus* Mann;’ and the ‘SNAKES IN CHANCERY.’ To the horror and dismay of the ‘general public,’ Mr. Mann, of Chelsea, was represented as ‘keeping for his amusement *all manner of venomous serpents* ;’ or, as another paper put it, ‘Mr. Mann had a peculiar penchant for keeping as domestic pets a large number of venomous snakes.’ (I copy verbatim from the papers of that date.) That these ‘water vipers and puff adders’ were ‘apt to stray in search of freedom;’ or, ‘being accustomed to take their walks abroad,’ had strayed into the neighbours’ gardens, to the terror of maid-servants and children;’ and were ‘now roaming up and down Cheyne Walk,’ and ‘turning the College groves into a garden of Eden.’ So an action was brought against Mr. Mann: for the neighbours decided that ‘there was no better remedy for a stray cobra than a suit in Chancery.’ ‘Everybody’ during July 1872 was reading those delightfully sensational articles, and asking, ‘ *Have* you heard about Mr. Mann’s cobras?’

Mr. Frank Buckland was brave enough to venture into the dangerous precincts of Cheyne Walk, and even into the house of Mr. Mann, to test the virtues and vices of both the ‘pets’ and their possessors. He finally tranquillized the public mind by publishing accounts of his visit, affirming that not *one* of the snakes was venomous, but, on the contrary, were charmingly interesting and as tame as kittens. The testimony of so popular an authority served not only to allay local terrors, but to modify the sentence that might otherwise have been passed on the ophiophilist, who was merely cautioned by the honourable judge to keep his pets within due bounds.

After this, Mr. and Mrs. Mann and their domesticated ophidians held daily receptions. I was invited to see them,

and in company with a clerical friend repaired to Chelsea. It was the first family party of snakes I had ever joined, and I must confess to considerable fluctuations of courage as we knocked at the door. Nor could one quite divest oneself of apprehension lest the boa-constrictors to which we were introduced should suddenly make a spring and constrict us into a pulp. But they didn't. On the contrary, towards ourselves they were disappointingly undemonstrative, and only evinced their consciousness of the presence of strangers by entwining themselves about the members of the family, as if soliciting their protection. They were very jealous of each other, Mr. Mann said; jealous also of other company, as if unwilling to lose their share of attention. There were half-a-dozen or more snakes—viz., several boas, of whom 'Cleo,' or Cleopatra, has become historical; two or three lacertine snakes from North Africa; and a common English snake. The smaller ones were regaled on frogs for our special edification. At that time I had never been to the Reptilium at the Zoological Gardens on feeding days, and when Mr. Mann permitted a frog to hop about the table, and we saw the ring snake glide swiftly towards it and catch it in its mouth, we could not comprehend what was to happen next. 'What *will* he do with it?' we both exclaimed. We had not long to wait. Somehow or other the frog, caught by its hind leg, got turned round till its head was in the snake's mouth and the hind legs were sprawling and kicking, but in vain. Then head-foremost it vanished by degrees into the jaws of the snake; while the head of the latter, 'poor thing,' seemed dislocated out of all shape! It was a wonderful but painful sight; for how the snake's head stretched in that amazing manner, and how the frog was drawn into the mouth, was past our comprehension.

An equally wonderful but far more attractive sight was Mrs. Mann, a graceful and charming little lady in black velvet, with Cleo coiling around her in Laocoon-like curves. The rich colouring of the beautifully-marked reptile entwining

the slender form of the woman, the picturesque and caressing actions of Cleo, and the responsive repose of Mrs. Mann as the snake was now round her waist, now undulating around and over her head and neck, was altogether a sight never to be forgotten. Two sweet little children were equally familiar with the other boas, that seemed quite to know who were their friends and play-fellows, for the children handled them and patted and talked to them as we talk to pet birds and cats.

Such were the ‘vipers, cobras, and puff adders’ that had figured in the daily papers.

After this, the reptile house at the Zoological Gardens became a new attraction. From there to the bookshelves and back again to the Gardens, my little book of adventures was discarded for a more ambitious work; but still was confronted by disaffected publishers, whom even the Chelsea snakes failed to convince of public interest. Friends protested—and still demand—even while I write —‘How *can* you give your mind to such odious, loathsome, slimy creatures?’ and I boldly reply, ‘In the hope of inducing you to believe that they are *not* odious and loathsome, and especially not “slimy,” but in the majority graceful, useful, beautiful, *wonderful* !’ And I invite them to accompany me to the Zoological Gardens, and endeavour there to contemplate a reptile as they look at the other denizens of the Gardens, simply as a member of the wide family of the brute creation, appointed by the Great All-wise to live and feed and enjoy existence as much as the rest, and that have to accomplish the purpose for which they were created equally with the feathered families which we admire and—devour!

And as whatever may be original or novel in this book has been obtained at the Zoological Gardens, I now invite my readers to accompany me in imagination to the Ophidarium, where we may learn how that little ring snake was able to swallow his prodigious mouthful without

separating it limb from limb, as a carnivorous mammal would divide the lamb it has killed.

‘ But’—you exclaim in horror—‘we do not wish to contemplate so painful, so repulsive a spectacle! How *could* you, how *can* you, stand coolly there and see that poor frog tortured and swallowed alive?’

Dear, tender-hearted reader, I did not, I *could* not, unmoved, contemplate this sight at first; nor for a very long while could I bring myself to watch a living creature being drawn into that living trap. Nor could we—you and I—feel aught but horror in visiting a slaughter-house and watching a poor calf slowly die. Nor could we, for pleasure merely, look coolly on at a painful surgical operation. Yet we know that such things must be. The life of the snake is as important as that of the frog. If we are to talk about cruelty, this book of natural history, and of intended—let me say, of hoped-for—usefulness, would become one of political economy instead. We might discuss the sport of the angler, the huntsman; the affairs of the War Office; of railroad managers and of road-makers; the matters of the Society for the Prevention of Cruelty to Animals; followed by an examination into the questions that have been ventilated in so-called ‘benevolent organs;’ and how some of them employ writers who in every tenth line betray their ignorance of the creatures they attempt to describe. Not even theology could be dispensed with in this work; for, since the time when Adam was told to have ‘dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth,’ the question of ‘cruelty’ has never been satisfactorily solved. Morally and broadly, let us understand it to mean *unnecessary* torture—pain and suffering that can be *avoided* , and which offers a very wide scope indeed. In the animal world, ‘every creature is destined to be the food of some other creature;’ and by these economies only is the balance of nature maintained. Happily we are spared the too vivid realization

of the destruction of life ceaselessly going on throughout creation; the myriads of insects destroyed each moment by birds, the sufferings inflicted by the feline families and by birds of prey, the countless shoals of the smaller fish devoured—swallowed *alive* too!—by larger ones, or caught (and not too tenderly) for our own use. These things we dismiss from our minds, and accept as inevitable. We do not ventilate them in daily journals. Nor do we take our children to the slaughter-house or the surgery for their entertainment; or repair thither ourselves for the sake of minutely discussing afterwards the sufferings we have witnessed. You will, I hope, discover that the pain inflicted by the constrictor or the viper is not, after all, so acute as it is by some imagined to be. The venomous bite of the latter causes almost immediate insensibility; the frog which the ring snake ate probably died of suffocation, which also produces insensibility; the constriction of the boa—in its natural condition—produces also a speedy death. Besides, as Dr. Andrew Wilson, in a paper on this subject, has explained to us, the sufferings of a frog or a rat are not like *our* sufferings. Their brain and nerves are of a lower order. [2]

Permit me, therefore, in the outset, to dismiss from these pages the question of cruelty as not being a branch of zoology; and as we cannot prevent snakes from eating frogs, or the vipers from catching field mice (nor need we wish to do so, or the small quarry would soon become too many for us), let us examine the curious construction of a snake’s head and jaw-bones that enables it to accomplish the task so easily.

With reference to the rapid development of science, it has been said that a scientific work is old as soon as the printer’s ink is dry. Up to the moment of sending my concluding pages to press, I realize this; and remarkably so in the growing interest in the Ophidia. Writings on this

subject are becoming so frequent that, while correcting proofs, I am tempted to add footnotes enough almost for another volume.

Several circumstances have combined to enrich ophiological literature within a few years; one which, in 1872, I quite think established a sort of new era in this branch of zoology, was the appearance of Dr. Fayrer's magnificent work, *The Thanatophidia of India* . Mr. Bullen, then the Superintendent of the Reading-Room at the British Museum, knowing that the subject was engaging my attention, informed me of the arrival of this book, and, with his ever kind thought for students, ordered it into the room for my express use; and I think I may affirm, that I was the very first 'reader' who had the privilege of inspecting the work, and, I hope, of helping to make it popular. For as day after day those huge folio leaves stood open, with the conspicuous and lifelike illustrations almost moving before your eyes, readers would linger and gaze, acquaintances would stop to inquire and inspect; some with a shudder would ask 'how on earth I could endure the sight of such fearful creatures?' while a few would manifest sufficient interest and intelligence to be indulged with a full display, and to whom I eagerly aired my convictions of the tremendous errors afloat concerning the snake tribe.

' Beyond the pale of science but little is known of Ophiology,' were Fayrer's words. Two years previously to this, in 1870, Dr. Edward Nicholson wrote his book, *Indian Snakes* , 'in the hope of dispelling the lamentable ignorance regarding some of the *most beautiful and harmless* of God's creatures.'

This enthusiasm is gradually spreading, and we now not unfrequently hear of domesticated snakes in English homes; both from friends who keep them, and from the correspondence of the *Field, Land and Water* , and similar papers, in whose columns inquiries for information are often made regarding ophidian pets. Lord Lilford, one of

the kindest patrons of the London Reptilium, has, I believe, for many years been a practical ophiologist. There is one little favourite snake that figures in these pages of which his lordship gave an excellent character from personal acquaintance, ‘the beautiful species *Elaphis-quater-radiatus* , as being the most naturally tame of all the colubrines, never hissing or trying to bite though frequently handled.’ A noble lady not long since carried a pet snake to the Gardens. It was twined round her arm, where it remained quiet and content, though to the alarm of some monkeys who caught sight of it. Some members of our Royal Family, with the enlightened intelligence which displays itself in them all, have more than once paid visits to the Reptile House at the Zoological Gardens, where the keeper has enjoyed the high honour of taking snakes out of their cages to place in royal hands. The good-will and interest towards the inmates of the Ophidarium are likewise displayed by some country gentlemen in presents of game, in the form of ring snakes for the Ophiophagus and frogs for the lesser fry. Lord Arthur Russell, Lord Lilford, and other distinguished personages set excellent examples of this kind. All of which proofs of prejudices overcome are features in the history of ophiology, and especially in the last decade.

Then, in glancing at recent literature, a great change is discernible, more particularly so during the last two years, since the popular contributions of Dr. Arthur Stradling, a corresponding member of the Zoological Society, have imparted a novel interest to this branch of zoology. To this gentleman my own most grateful acknowledgments are due, as will be evident to the reader, not only for the zest imparted by his correspondence from Brazil, but for some important specimens presented to me by him, which have enabled me to describe them minutely from personal observations, as well as to add some original illustrations from them. Though my work and my studies were far

advanced, previous to his valued acquaintance, yet I have been able to enrich my pages from his experience, and have added footnotes from his published writings.
Already, however, some few dispassionate students of nature among editors were promoters of herpetology, and I must here express my acknowledgments to the talented daughters of the lamented Mrs. Alfred Gatty (and editresses of that *facile princeps* among juvenile periodicals, *Aunt Judy's Magazine*), for having been the first to encourage and accept from my pen a snake in their pages, and subsequently several papers on ophidian manners and habits for their magazine.
In preparing 'Sketches of the Ophidians' for the *Dublin University Magazine* , December 1875, and January and February 1876 (in all, about forty closely-written pages), I, by request of the editor, included a paper on the venom and the various remedies, though, reluctant to intrude within the arena of professional science, a sort of summing up of evidence was all that I attempted. Having been thus required to glean some crude ideas from technical writings (which necessitated glossaries and dictionaries to be ever at hand), I again add a chapter on the 'Venoms' to my present work. Left entirely to my own independent conclusions, if I have ventured to think in opposition to some popular writers, and have even presumed to offer some suggestions of my own, I trust I may be treated with clemency.
With regard to the terrible death-rate from snake-bite in India, it does, however, appear to me that journalists who hold up their hands in horror, and write strong articles on this subject, lose sight of the religious and social condition of the low-caste Hindûs, who are the chief sufferers, and whose superstition is so fatal to them. *Snake-worship* is the root of the evil! *Education* must lower the death-rate.
During the visit of H.R.H. the Prince of Wales to India, the entire programme was on one occasion interrupted

because some Hindû children, to whom a feast was to be given, could not eat in the presence of Christians, whose ‘shadow would have polluted their food,’ or some obstacle of this nature. Similar difficulties arise when they are snake-bitten; their creed prohibits their having recourse to approved remedies. ‘Snake-charmers’ and native quacks are sent for instead, and often when cures are possible the fatalists submit to death.

To Professor Owen, who six years ago permitted me the honour of dedicating this contemplated work to him, and to others who were then led to expect its early appearance, I may be allowed to offer an excuse for tardiness. Like the creatures which fill its pages, I succumb to the chills of winter, and depend on the suns of summer for renewed vigour and activity. At one time impaired health, and the enforced suspension of literary pursuits under the threatened loss of the use of my right hand, were grievous interruptions.

Filial duties and domestic bereavements caused another two years’ delay. Banished to the seaside, and the pen prohibited during the winter of 1874-75, I had almost despaired of turning my studies to account, when a new impulse arrived in the shape of a note from the editor of *Chambers’s Journal* , begging to know if my ‘work on the Ophidia was out, and by whom published’? My ‘work on the Ophidia’? Could that mean my poor, despised little book that had been long ago submitted among others to those Edinburgh publishers? *My work on the Ophidia!* I began to get better from that day; and from that date, March 1875, I have had the inexpressible pleasure and privilege of including among my kindest and most sympathetic ophiological friends, the Editor of that popular journal. On the Ophidia, he entrusted me with work in various directions, encouraged by which I again returned to town, and to the Zoological Gardens.

If I am so fortunate as to afford instruction or

entertainment in the following pages, my readers will join me in congratulating ourselves on the possession of so large and valuable a zoological collection as that in the Regent's Park, without which this book could not have been attempted. And I may embrace this opportunity of expressing my sincere thanks to the President and Council of the Zoological Society for the privileges and facilities afforded me at their Gardens, where not only the Reptilium but the annual series of zoological lectures there, given by the first biologists of the day, have been of inexpressible use to me.

I would also express my thanks to Professor Flower, Hunterian Professor at the Royal College of Surgeons, London, for his invariable courtesy in facilitating my examination of the ophiological specimens in the museum of that College, to which my honoured father (himself a member) attributed all the love of the study of natural history which from our earliest recollections were encouraged in his children. My thanks are also due to Dr. Günther of the British Museum for similar facilities there. Indeed, the words of encouragement given me, no less than six years ago, by the distinguished heads of the zoological department of our great national collection, sustained my courage in opposition to all counter influences *outside* the British Museum. When first contemplating and presenting some outline of this work to Dr. Günther, he honoured me by expressing his opinion that such a book was 'much needed;' that it would be 'extremely useful and interesting.' He was even so kind as to promise to state this opinion in writing to any publisher who might consult him on the subject. I here claim the pleasure of thanking my present publishers for dispensing with the necessity of troubling Dr. Günther, and for entrusting me with the preparation of this book, which, before a chapter of it was completed, they engaged to publish. Deficient as I feel it to be, it is at length launched on the doubtful waters of public criticism.

If any scientific eyes honour it with a glance, they will with clemency remember that, with no scientific knowledge whatever to start with, I have had to grope my way unaided, plodding over technicalities which in themselves were studies; and if, as no doubt is the case, any misapprehension of such technicalities has here and there crept in and misinterpreted the true meaning, I anxiously trust that the truth has not been altogether obliterated by such obscurities.

In conclusion, let me not omit a grateful tribute to the invariable kindness of the heads of the Reading-Room at the British Museum; and for their assistance in obtaining books of which I might never have known. The kindness of Mr. Garnett extended even beyond the Reading-Room; for while I was invalided at the seaside, and could only read, *not write* , he translated and forwarded to me some important pages from Lenz, a German ophiologist. To him, therefore, the thanks of the reader are also due.

In the choice of illustrations my aim has been rather to exemplify a few leading features than to attract by brilliantly-figured examples. Some of the woodcuts are borrowed from Günther’s and Fayrer’s works; others I have drawn faithfully from natural specimens; but in them all I am indebted to the kind and patient work of Mr. A. T. Elwes in reproducing my own imperfect attempts. And as it was impossible to draw a snake *in action* from life, or to witness a second time the precise coils or movements which had at first struck me as remarkable, the composition of some of these subjects was by no means an easy one. Our united efforts have been to represent the natural actions as far as possible, and this I hope may commend them to the reader.

There are few English persons who have not relatives in India, Australia, America, and Africa, and from whom they are continually hearing of escapes or accidents from snakes. Many letters from these friends beyond the seas find place in the columns of the daily journals. Whether,

therefore, naturalists or not, a very large class of the intelligent public claims an anxious interest in the Serpent race, and to all of whom my OPHIDIANA or snake gossip is hopefully addressed.

CATHERINE C. HOPLEY.

CHAPTER I.

SEEING A SNAKE FEED.

IN any person who for the first time witnesses a snake with prey just captured, the predominant feeling must be one of surprise at the seemingly unmanageable size of the animal it has seized; and he probably exclaims to himself, or to his companion, as we did on the occasion described in the introduction, ‘What will he do with it?’ Let us again take our common ring snake, *Coluber natrix* , that ate a frog for our edification; only, in the present instance, instead of seeing a tame snake in a private residence at Chelsea, we will suppose ourselves to be watching one on the banks of a stream in fine summer weather. A slight movement in the grass causes us to turn our eyes towards the spot, and we are just in time to see the quick dash, and the next instant a recalcitrant frog held aloft in the jaws of a snake that with elevated head glides up the bank. Coluber’s head is no bigger than a filbert, and the frog is nearly full grown, its body inflated to twice its original size, and its legs, of impracticable length and angles, kicking remonstrantly.

‘ How in the world is the snake going to manage it?’ again you exclaim, and your amazement is not exceptional. It is what has been witnessed and heard weekly in London when the public were admitted to the Reptilium on feeding days, and it is what the reader will recall in his own case when first informed that a snake was going to swallow that monstrous mouthful undivided.

In the present instance, the injury to froggie’s feelings thus far partakes more of moral than of physical pain, for the grasp of the snake is not violent, and he finds that the more he struggles the more he injures himself. Yet he kicks and struggles on, at thus being forcibly detained against his will. In the mouth of the snake he is as proportionately

large as the shoulder of mutton in the jaws of the dog that has just stolen it from the butcher’s shop. How do the canines manage unwieldy food? The dog can tackle the joint of meat, big though it be, because he has limbs to aid him, and he was prepared for emergencies before he stole it. He knew of a certain deserted yard up a passage close by, and of some lumber stacked there; he watched his opportunity, and is off to his hiding-place; and once hidden behind the lumber, he settles down quietly with his ill-gotten dinner firmly held between his fore-paws, while, with eyes and ears on the alert, he gnaws away.

The snake, no doubt, knows of a hole in the bank, or in a hollow tree, in which he can hide if alarmed; but he cannot set his frog down for one instant, nor can he relax his jaws in the slightest degree, or his dinner hops away, and he has to pursue it, or wait for another frog, when the same thing may happen again. He has only his teeth to trust to, and these have all the work of paws and claws, and nails and talons, to accomplish, while yet, not for one instant, must they relinquish their hold.

‘ Besides!—how much too big that frog is for Coluber’s small mouth!’ And we continue to gaze in wonderment, filled with amazement that brings us to the bookshelves, to endeavour to comprehend the phenomenon. Not, however, until we have seen the end of that frog on the banks of the stream, where the reader is supposed to be waiting.

First, let me explain that in the manner of feeding, snakes may be divided into three classes, viz. those that kill their prey by constriction or by smothering it in the coils of their body; those that kill by poison; and some smaller kinds, which, like the ring snake, eat it alive—the latter a quick process, which may also be said to be death by suffocation. Our little Coluber is in a spot where we can watch it easily; so we keep rigidly still, and soon perceive that though the snake just now had hold of froggie’s side, he now has the head in his mouth. How can this be? and how has he

managed to shift it thus, almost imperceptibly, while seeming to hold it still? Now the head begins to disappear, and the snake's jaws stretch in a most distorted fashion, as if dislocated; its head expands out of all original shape, while slowly, slowly, the frog is drawn in as if by suction. Now its legs are passive; they no longer kick right and left, but lie parallel, as by degrees they also vanish, and only the four feet remain in sight. These presently have been sucked in, and the skin of the snake is stretched like a knitted stocking over the lump which tells us just how far down Coluber's neck the frog has reached. Gradually the lump gets farther and farther down, but is less evident as it reaches the larger part of the body. The snake remains still for a few moments till his jaws are comfortably in place again; then he yawns once or twice, and finally retires for his siesta, and we to the bookshelves.

' Snakes work their prey down through the collapsed pharynx,' says Günther. That is, the muscles of the throat seize upon what is presented to them, and do their part, as in other animals. Only, in most other animals there is the *action* of swallowing, one mouthful at a time; whereas in serpents the action is continuous, the throat going on with the work begun by the teeth, which in a snake is only grasping and working the food in with a motion so gradual as to simulate suction. The reason why the head and jaws have been so enormously stretched and distorted, is because all the bones are, in common language, *loose* ; that is, they are not consolidated like the head-bones of higher animals, but united by ligaments so elastic as to enable them to separate in the way we have seen. This extends to the jaws, and even to the palate, which is also armed with teeth, two rows extending backwards. The lower jaw or mandible being extremely long, the elastic ligament by which the pair of bones is connected in front, forming the chin, enables them to separate widely and move independently. This is the case in a lesser degree with the

palate bones, and the upper jaw-bones, all six being furnished with long, fine, recurved, close-set teeth, adapted for *grasping* and *holding* , but not for dividing or for mastication in any way.

For, as we have seen, if a snake were to open its mouth one moment for the purpose of what we call *biting* , the prey would escape. In addition to a very unusual length, the lower jaw is joined to the skull by an extra bone,—one which is not found in mammals, but only, I think, in birds,—a long ‘tympanic’ bone, which forms an elbow, and permits of that wide expansion of the throat necessary for the passage of such large undivided prey.

The illustration of the skeleton of a cobra, on p. 33, will enable the student to distinguish the principal head-bones. There is so much similarity of construction throughout the whole ophidian families that a cobra is chosen here, because the unusually long anterior ribs which form the hood can be observed, and the expansion of which is described elsewhere. The longer teeth in the upper jaw are here fangs; the inclination of the other rows of teeth and the bones sufficiently illustrate those of the non-venomous kinds generally, such as the little ring snake that has just swallowed his frog. A few of the larger constricting snakes possess an additional bone—an intermaxillary in front between the upper jaws, very small, yet sometimes furnished with two or four teeth, thus facilitating the expansion of the jaws as well as the retention of the food.

It is this adaptive development of head-bones that enabled *Coluber natrix* to turn his frog round to a more convenient position, and then draw it into his mouth so gradually that we scarcely comprehended how it disappeared. The six rows of small teeth form six jaws so to speak, each one of which advanced a very little, while the other five were engaged in holding firmly. In those largest pythons which have the little bone in front between the two upper jaw-bones (intermaxillary) we may say there are *seven* jaws. As