there excitomotory instinctive actions, but also that there are cerebral instincts, and it is in connection with this subject only that he advances arguments.

The cases quoted from Mr. Madden, Dr. Ley, and Sir Charles Bell, prove nothing but what Dr. Hall, Mayo, Müller, &c., but especially Hall, had previously proved; namely:—1. That there are two kinds of muscular contraction. 2. That the involuntary form still exists in paralysed limbs. 3. That palsy takes place when the brain is perfectly healthy, and when, at the same time, the nerves are perfectly healthy; showing that here loss of voluntary muscular power results from pressure or disease of the white columns of the cord.

In fact, Mr. Carpenter makes an assertion with regard to the spinal ganglia being concerned in *voluntary* motion, but does not advance any of the proofs *I have given*, or *any at all*. He certainly makes the assertion in a more decided and marked tone than either Sir Charles Bell or Müller, who had, however, *previously* made it.

SOME REMARKS ON THE
TREATMENT OF WOUNDS
INFLECTED BY
POISONOUS SNAKES;

*Contained in a Letter addressed to the Editor
of THE LANCET.*

By Dr. KNOX, of Edinburgh.

The number of THE LANCET, for September 21, of the present year, contains a letter, addressed by Mr. John George Brighton, surgeon, of Kinner, Staffordshire, to F. Corbyn, Esq., garrison-surgeon, Fort William, Calcutta. Although I have not the pleasure of being acquainted with either of these gentlemen, I shall take the liberty, as the matter touched on is one of professional and public interest, to offer a few remarks on that letter, which I hope may be acceptable to the readers of THE LANCET.

The facts and observations contained in Mr. Brighton's letter, are chiefly as follows:—Mr. Hayman, an officer on board the *Algerine*, was bitten by a snake on the 9th Oct., 1837. About *two hours* after the accident, Mr. Brighton was called from another vessel (there having been no surgeon on board the *Algerine* at the time), who found Mr. Hayman in the following state:—"Countenance extremely anxious, and covered with a cold and clammy perspiration; great difficulty of breathing, pulse weak and irregular, lips covered with saliva, and great horror exhibited on being presented with any liquid." Mr. B. further ascertained that the snake had been taken by the crew from alongside the ship while washing decks." Mr. Hayman continued well for nearly two hours,

unconscious of the impending mischief; he then, all at once, "squinted horribly, and fell down in a fit." A fatal result being dreaded, another surgeon was sent for; "a ligature was applied at the wrist, and ammonia, in brandy and water, was offered him, which he could not swallow." Finally, mustard plaisters were applied to the calves of the legs, but all exertions proved useless; he gradually sank, and expired, apparently without pain, about four hours after the receipt of the bite. Mr. Brighton further adds, "that he felt for a long time subsequently much anxiety as to the treatment which had been adopted, and was not a little relieved to find that the bite of this snake is, by the natives, considered inevitably fatal."

Subsequently, on returning to Europe, Mr. B. ascertained, by consulting Dr. Stephenson's work on medical zoology and mineralogy (p. 80), that the snake in question, with whose name and nature and dangerous qualities, he was at the time unacquainted with, was the pseudo-boa facia, a snake familiarly known in India, and long ago described in Dr. Russell's great work on Indian serpents.

As my object in addressing this letter is in no step critical, I shall at once refrain from making any remarks upon the above communication. There are one or two points, however, which must strike even a casual reader, such as the fact, that the *most powerful remedy*, and, in my opinion, the *sole remedy* for the poisoned wounds of serpents, was not even thought of in the above case—I mean *excision* of the *bitten part*. The case is not a singular one, however, in this respect; for several others have come to my knowledge, sufficiently numerous, at least, to warrant me in saying that surgeons, and especially young surgeons, proceeding to the colonies, are not sufficiently aware of the importance of *excision*, or may possibly have taken up some unhappy prejudice against it as a remedy for such wounds. The only other critical remark I shall take the liberty of making here, is, the great regret with which I have seen so many young surgeons (and old ones, too, I fear) proceed to the colonies, not only ignorant of the structure of these dangerous reptiles generally, but totally inadequate to determine, by anatomical researches or otherwise, to what class of snakes may be referred the one at the time, perhaps, submitted to their inspection; thus causing, not unfrequently, great and unnecessary alarm and anxiety where none should exist, or lulling the patient into a fatal security, to terminate a few hours afterwards in death.

My time being exceedingly occupied as a lecturer on anatomy, I am forbidden to attempt any extended remarks on this interesting subject, and it is rather with a view to induce our colonial surgeons to collect materials for a practical history of poisoned

wounds, and thus provide the young and inexperienced with a few brief but useful principles and rules for conduct under circumstances at all times hurried and alarming, that I now make the following observations:—

During a period of about three years, I resided on the frontiers of our South African colony, the Cape, and accompanied, as surgeon, many expeditions or *commandos*, both regular and irregular, into Caffraria and into the Wild Bosjeman country, to the north of the Winter Bergen, and sources of the Black and White Ker rivers. In this way, and in consequence of the detached and scattered disposition of the troops, the whole of the country from the Snowy Mountains to the Indian Ocean, and from the Winter Bergen, and beyond it, to Litzikanne, became perfectly familiar to me; so also did the race of snakes, serpents, and venomous reptiles of all sorts; for this was peculiarly the land of serpents, then and perhaps still. I have encountered them, and seen them met with by the troops and individual travellers every where; on the desert, in the forest, haunting the muddy pools of the Groat Visch rivier, or crossing the clear and limpid streams of the Kat and Koonch rivers, in our gardens, houses, beds, &c.; thus we became familiar with this terrible class of animals, if such a term can be applied to the coolness with which they were met by the experienced, compared with the passionate, hurried, and, consequently, ill-directed efforts of those to whom such experience was wanting. When I first witnessed the alarm spread amongst the dark races of men, natives of the Cape, viz., the Hottentot, Boschjemar, and Caffre, by the sudden and unexpected appearance of a "snake amongst the grass," I was greatly surprised, and felt disposed to ascribe what I then considered overabundant alarm to a natural timidity. But after a prolonged residence in that "land of wild beasts," I feel inclined rather to ascribe the very great alarm shown by the dark or coloured races to an *instinctive* feeling of danger, based on early education—that is, an instruction commenced by their parents from their very earliest years, to hold all snakes in abhorrence; to trust none; to avoid them to the very utmost, and never, under any circumstances whatever, to hazard life by remaining a moment within the limits of the spring of the serpent. To this must, of course, be added the accumulated experience of ages telling on the races, and rendering their aversion to serpents almost instinctive. Now I never could observe that this great alarm for snakes existed in the white races, whether Dutch or English, whether colonists or strangers but recently imported; and although an anatomist, and physiologist, and medical man, and, therefore, doubly sensible of the just cause for dread in approaching any of these dangerous reptiles, it is a

curious fact, that, even to the latest day of my residence in the colony, a disregard for these animals, and perfect indifference when they showed themselves, and a fearlessness in attacking them, never altogether left me, nor any of the British officers and men with whom I was in daily intercourse. Dutchmen, in like manner, were perfectly cool under circumstances which greatly agitates the Hottentot race. I must leave to others to explain these remarkable differences in the feelings of the races under the same circumstances; but looking back dispassionately, I must declare the Hottentot and Caffre race to be in the right, however much at the time I made their well-grounded fears a frequent subject of ridicule and amusement to my brother officers. This is the conclusion I arrive at—*every human being should avoid snakes to the utmost of their power*; all foolhardiness in respect to them is little short of madness.

Of the numerous instances which might be offered confirmatory of these remarks, I shall limit myself to a few. A strong *commando* or scouring party was sent from head quarters to examine the Great Fish river Bush, and all the drifts (fords) across the river from the pass of De Bruin, to the Fronpetters Ford, it being strongly suspected at the time that the Caffre was in great force in the forest. The party saw nothing, returning to head quarters without firing a shot; but in passing along the northern slope of the beautiful range of mountains, known by the name of "Governor's Slop," the line of troops, composed essentially of Hottentots, was thrown into the greatest confusion, in consequence of one of the men having all but trodden on a *Bergadder*, a small, but most dangerous kind of serpent, whose bite, like that of the "*boa fasciata*," is deemed fatal by the natives, with how little truth will be shown hereafter.* Now I had witnessed the "*Bergadder*" trod over some half dozen times by white men, and twice on the Kaha Berg (mountains) stepped over it myself, and all but trod on it, yet, on none of these occasions, was there that extraordinary scene of confusion and alarm which I now remarked amongst the Hottentot troops. I feel now assured, however, that upon the whole, they are in the right, and that all the scoffing and ridicule I heaped upon the transaction when I got to head quarters, describing the corps as having been routed by a snake eight inches long, was ill judged, and injudicious on the part of a medical man. Indeed, on mentioning the circumstance some time afterwards to that most excellent officer and man, the late Major Fraser (who

* Mr. Brighton in his letter considers the bite of the pseudo-boas, to be uniformly fatal; the Cape natives say this of every very dangerous snake, but there is no truth in such a remark.

commanded the Hottentot corps), he mildly assured me that I was in the wrong, and that the "Berg adder," notwithstanding its diminutive size, and comparative smallness of its head, was amongst the most dangerous of the snake kind. He had known numbers killed by it, and amongst others, mentioned *two*, whose cases may be considered from his high authority as good as official.

Case as related by Major Fraser.—Some soldiers of the Hottentot or Cape corps, were stationed at a signal post, about two miles from head quarters; two were bitten, nearly at the same instant, by a snake ascertained to be the "Berg adder;" a person was despatched, without an instant's delay, to the nearest point (the barracks and hospital) for assistance; but although not more than twenty minutes had elapsed from the time the bite occurred and the coming up of assistance, both men had expired. The Major concluded by assuring me that the bite was fatal, and no medical aid could avail; an opinion I had the pleasure of afterwards proving, to the satisfaction of the major himself, to be unfounded.

I beg my reader for an instant to attend to the following points:—1st, snakes are not dangerous in proportion to their size; the most diminutive may prove the most to be dreaded; 2nd, in respect to external appearances, the size of the head is not to be regarded as a proof of the poisonous nature of the reptile or otherwise; the head of the puff adder is, indeed, large and broad; but although the boldest amongst snakes, he is not the most dangerous. The heads of the pseudo-boas, the water snakes, and the Berg adder, are quite proportioned to their body. Before I proceed to lay down, or at least endeavour to establish some other practical points for the guidance of the surgeon, I shall here take the liberty of mentioning a curious opinion which I found some Hottentots maintained; they think that the puff adder (which they greatly dread) follows his prey or enemy by the scent. This opinion I first learned by the following circumstances:—The scanty pasturage during the season of drought, led to the practice of turning the horses at liberty to graze on the desert, and search for food wherever it was to be found. In this way they frequently strayed many miles into the wild Kloofs of Caffraria, or at least the uninhabited territory, which at that time formed a kind of neutral ground, and we were occasionally forced to meet them on foot. On one of these occasions, accompanied by a young Hottentot servant, I had explored, to no purpose, the wilderness for many miles, and was returning homewards, when suddenly my servant, who happened to be a good way in the rear, gave me notice, by several vehement cries and gestures, that I had passed a puff adder, and that the snake was at that moment advancing rapidly to-

wards me; at the same time he shouted out to me to leave the narrow foot-path on which I stood, and to ascend the low hill to my right, so as to place myself off the *scent of the snake*, and thus I learned that the Hottentot believed that the faculty by which the snake advances on its victim was the sense of smell. But I had no faith in such an opinion, and the result showed that I was correct; for adopting the good old English practice of remaining unmoved on the spot, until I could clearly see, not only whence the danger came, but its vicinity and magnitude, I soon found that this puff adder (the largest I ever saw) was simply advancing upon my footsteps and following them precisely. It happened that the slope of the hill on which I then stood, was partially covered with a low stunted bush about breast high, scattered in patches over the side of the hill; as the snake advanced at a tolerably quick pace after me, he was forced to rise up nearly straight, in order to see where I stood. I thus saw the swollen head and a considerable part of the body raised for an instant above the level of the bushes, and levelling the fowling-piece in my hand too tardily, lost sight of him instantaneously. I now resolved to fire the next time he raised himself up, and this opportunity occurred in less time than I take to narrate it; but here another difficulty presented itself; the head *alone* appeared above the bush, now I was anxious to preserve the head for dissection. I trusted, therefore, to a *third* chance, come what might. By this time the snake was within twelve paces; he raised himself once more above the bush, to take, however, his last look of me, for my fowling-piece, on whose precision I could entirely depend, having often hazarded life upon it, drove the shot through the neck like a ball, leaving the head uninjured.* The poison teeth or fangs of this snake were of great size, and I have them still in the museum.

Another position I shall here venture to offer, for the consideration of the profession is, that no *external characters whatever* can well be trusted in the determination of a snake. What I mean is this: there are

* As the head of the snake was the only part I chose to take home with me, it was taken off a little above where the shot had struck the neck, and my servant threw the body, or remaining portion, on the top of the nearest bush. This nearly proved fatal to a farmer, who next day rode along the same foot-path in quest of his horses, which had, like my own, strayed into Caffraria. The part of the snake which was left by my servant entangled in the bush, came in contact with the face of the horse rode by the farmer, and the animal getting greatly alarmed, suddenly halted, throwing his rider with much force down the hill.

many *innocuous* snakes which are so closely imitated in their external appearance by others truly poisonous and exceedingly dangerous, that I feel warranted in laying down this term, viz., *that no snake* however much it resembles a harmless one, or those of a class known to be harmless, should ever be handled, until the person be perfectly assured of its death. Again, on the occasion of a person being bit by a snake, and the dead reptile being produced, the surgeon ought not to rest satisfied with the external appearance of the snake, but proceed, without a moment's delay, to ascertain the presence or absence of poison-fangs; the result must direct his practice. In case of the snake having escaped, *excision* of the part bitten ought immediately to be resorted to. I shall illustrate this point by a single observation, although many occur to me, and then, lest I tire my readers, hasten on to a consideration of the remedial measures. A large yellow snake, fully six feet long, was killed near the banks of the Great Fisch Rivier at Roode Waal; it was shown me by the soldiers before it was quite dead, and at first sight I harshly said that the snake was a harmless one; I handled it even before it was quite dead, and tossed it at some monkeys (chained to a post in the court-yard) whose horror for all sorts of snakes, dead and living, is like that of the Hottentot, indistinguishable. I remarked to the by-standers that the snake had none of the external characters of poisonous snakes; the head was small, somewhat rounded, and the body elongated, tapering uniformly and equally to the tail; it wanted also the strength of jaws which usually characterised the poison snakes of Africa. I remarked, notwithstanding these plausible reasons, that the Hottentots who were present, seemed to doubt my opinion; so to settle the matter, I examined carefully the mouth of the snake when dead, and found, to my great surprise, that it was armed precisely as the puff adder and viper, with poison-fangs of great length. I have never since that time spoken of the *external* characters of snakes.

I now come to the consideration of the opinion so generally entertained, that the bite of several poisonous snakes is almost inevitably fatal; and I believe that it is so, if proper remedial means be not speedily adopted. The sole remedy is *excision of the bitten part*; all other means seem to me only dangerous delusions. Of those cases which came under my immediate notice, and in which this powerful remedy (the only one I think recommended by Mr. Hunter) was resorted to, I shall select one, as the best calculated to bring out all the more difficult points for consideration.

CASE.—Bite of the Berg adder; recovery against the opinion of nearly all the colonists present.

I was sole surgeon in the great *commando*

against the Caffre chiefs, conducted by the late unfortunate Lieut.-Colonel Brereton. The troops consisted of a mixed force of British infantry, Hottentots in our service, and some colonial farmers or mounted boers. In advancing into Caffraria by De Bruin's Drift, the army crossed in succession the Koonass and Kel Rivers, and on the banks of one of these (my recollection does not now enable me to say which) the troops halted as usual after a day's march. I had gone down from my tent to the river side, with a view to ascertain the strength of the current, and the probable utility of the sheen for agricultural purposes, when an orderly came for me in great haste. He had been sent by Colonel Brereton to desire me to come immediately to the camp. There a very curious spectacle presented itself. The troops, grouped around, formed a circle, in the centre of which there stood Colonel Brereton and his officers, whilst on the ground sat a Dutch farmer, pale as death, supported on each side by one of his countrymen. Just before him lay the cause of all this; a small snake, with its head crushed to pieces; insignificant to look at, but then the snake in question was the terrible Berg adder, whose bite most present believed to be inevitably fatal. In this opinion they were joined by Major Fraser, who assured us that the farmer would die in about twenty minutes. But as neither Colonel Brereton nor myself were of this opinion, I proceeded without delay to examine the part bitten, and ascertained with a pocket magnifying glass that the bite was over the first (nearest) joint of the great toe. Before all this was done, five minutes had elapsed, Colonel Brereton having kept his watch in his hand from the moment of the accident, and therefore was prepared to give exact information on this point. I now gave the farmer two minutes more to make up his mind, informing him at the same time that I was ready to cut out the bitten part; that I knew of no other remedy, and that if not agreed to in *two minutes*, I should decline further interference. After consulting with his brother and son (for my patient must have been fully 50 years old), and being urged by Colonel Brereton to behave like a man, he consented, or rather his friends consented for him, since by this time a sudden vertigo, with vomiting and loss of sight, had taken place. I cut down to the tendon, and, to make sure, scraped it, washing the wound with brandy and spirits of ammonia, which were also given him pretty liberally. I had the pleasure of seeing the worthy farmer resume his duties on horseback four days afterwards, quite recovered.

When I sat down to write this hurried and, I fear, very imperfect notice, it was my intention to have added a short section on the specific characters (with reference, I mean, to the teeth) of these poisonous snakes,

which in their dentition resemble strictly the common viper of Britain, and the puff adder of South Africa, contrasted with those which, like the *hydrus* of Schreber, and pseudo-boas of Russell, have a peculiar dentition, intermediate between the altogether harmless snakes and the genus puff adder, viper, &c.; but perhaps it would better serve the public, and might be acceptable to many surgeons proceeding to the colonies, were you to publish a memoir, printed (I cannot say published) in that singularly unknown work, the *Transactions of the Wernerian Society*. In the fifth volume, part 2, of that Society's Memoirs, will be found an essay on the poison fangs of serpents, in which the results of a fair field for observation, and numerous minute dissections, have been stated by me as briefly as I well could. But should it be at variance with the principles of conducting this journal, to reprint *entire* any paper, how obscure soever the work may be in which the paper originally appeared, I shall feel happy to prepare an abstract for THE LANCET of my "Memoir on the Poison Teeth of Serpents," in which I hope the young surgeon proceeding to the colonies will find several facts and observations worthy of his consideration.

Edinburgh, Oct. 9, 1839. R. KNOX.

P.S. I find I ought to have added, that I do not consider any *lapse of time* as contra-indicating the employment of excision of the bitten part; alarming symptoms which may have appeared will then subside.

THE LANCET.

London, Saturday, November 2, 1839.

THE Council of the *Royal College of Surgeons, London*, has "established" a new set of "Regulations, respecting the professional education of candidates for the diploma." We have looked in vain for any sign of liberal, enlightened views in the new Regulations. The College turns about, and sends forth new editions of its by-laws, every twelve months; but, unlike the vane, it never indicates that the wind blows from a favourable quarter. Amidst all its oscillations and vagaries, the corporation is constant to the principles of its corrupt existence—monopoly and short-sighted selfishness. Certificates—the old story—will be required, of having been engaged during four

years in the acquirement of professional knowledge, *six months* of which shall have been occupied in the study of *practical pharmacy*, *six months* in attendance on the *practice of physic*, and the remainder of the period on the *practice of surgery*, at a *recognised hospital or hospitals in the United Kingdom*. Hence it would appear that the College in Lincoln's Inn Fields proposes to supersede the Blackfriar's Company, and the Halford College. "Practical pharmacy and the practice of physic" are to be studied during six months by candidates for its diploma! So the practice of physic may be acquired in six months, but the practice of surgery will occupy the student *three years*! Physic and surgery are two things, according to the enlightened Solons of Lincoln's Inn Fields. Anatomy, physiology, pathology, and therapeutics, are to be split into two halves, and the physical half is to be acquired in six months. The horror of practical pharmacy has subsided in the College, and its members may now ring the mortar, as well as wield the lancet. The occupation of the Rhubarb-hall Company is gone.

It will be remarked that the *practice of surgery* is to be acquired by attendance at a "recognised hospital or hospitals in the United Kingdom." The reason of this is too obvious. The legislators have an eye to the "perpetual fees"—the fifty or hundred pounds, which they extort from the student in the recognised hospitals. They get but five guineas for their courses of lectures; but they convert the charitable institutions of the country into Zoological Gardens, and show the sick poor, like wild animals, for money. Then they compel the student to pay the heavy admission fees. He has no alternative. He must produce certificates of attendance. He must purchase those certificates of attendance at the "recognised hospitals," or he cannot go up for examination; cannot enter the army, or the navy, or any other department of the public service. It would be impossible to match the shameless extortion and effrontery which