

## **On the action of cobra poison / by Charles R. Francis.**

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ACTION OF COBRA POISON,  
with the Author's Comments.

BY

CHARLES R. FRANCIS, M. B. LONDON.

Att. Off. Physician the College  
(1868) Calcutta

THE subject of cobra poison is now attracting a considerable amount of attention, in the profession, in India and Australia. It is one of the highest importance in a physiological sense, and popularly as terrifying as cholera. To discover an antidote to the effects of the poison, based on its pathology, is worthy of our best efforts, and I therefore venture to ask to be allowed to contribute my quota of enquiry, (so far as it has gone,) in this direction, in your columns. The public is much indebted to Dr. Shortt, of Madras, who was the first to offer a pecuniary reward for the discovery of a *real antidote*, which has led to the offer of still further rewards, the sum total now amounting to £175. This may prove to be a useful and successful stimulus in some quarters, though it would be well if the area for observation were more extended.

It is well known that the natives of India, throughout the country, believe that there is one animal, viz., the *ichneumon*, or *mongoose*, vernacularly called "*nyoula*," which the poison of the cobra cannot harm. They believe that, if the mongoose be free, after a contest with a cobra, to go where it pleases,

Oct 10



it will scamper off in search of some (unknown!) herb, and, eating it, become poison-proof. This is an obvious fallacy. It is difficult to conceive the existence of an antidote which is ubiquitous, and always available *at once*, in the first place; and of such potency as to be able to overtake and neutralize the effects of the poison, in the second; for some time must frequently elapse between the bite and the *discovery* of the antidote. The fact is, that the mongoose, if fairly bitten, will die, and in the same way, *i. e.*, exhibiting the same set of symptoms, that other animals, dying from the effects of cobra poison, will. The mongoose, in its contests with a cobra, escapes by its wonderful activity. It may be compared to a light infantry soldier, while the cobra is like a heavy dragoon. I was for some years, however, a believer in the common idea, my belief being based upon the result of some experiments which I made when stationed at Banda, in 1851. By these it appeared that the mongoose *was* invulnerable, and I therefore endeavoured to make some preparation of this animal, to experiment with, as an antidote. The opportunity, however, for carrying on the enquiry soon passed away; and it was not till 1860, when I was quartered at Lucknow, that it occurred again; and I then became convinced that my former experiments must have contained sources of error. Major-General Sir R. Walpole urged me to repeat them, assuring me that the mongoose, if properly bitten, *would die*, adding that he and the late Col. Patrick Grant had proved this. I therefore collected, through the snake-charmers, as many cobras as possible, and in the course of a short time was able to muster seven fine lively specimens. These were kept in one of the verandas of my house, (which was well known as "Cobra Cottage," I myself being designated by the natives as the "Samp-wallah Sahib!") each in a deep earthen vessel, (*gurha*), covered over with a loose lid. I gave them an airing morning



and evening, taking one out at a time with a hooked stick, and offered them young frogs, birds, and milk for food ; but they, with one exception, refused everything, and all died within from twenty days to a month of being caught, having lived quite long enough, however, to enable me to carry out the required experiments. These were performed in the presence of several witnesses ; amongst others, of Deputy Inspector General Dr. J. Campbell Brown, C. B.; and the results were published in a local journal, the *Oudh Gazette*. Before commencing an experiment, the cobra was *tested*, a supply of fowls and small birds being retained for the purpose. In each case the tested bird died, shortly after being bitten, in the usual way. It faltered in its gait, limped, sunk on the ground, became lethargic, and then fell into convulsions, in which it was carried off. Sufficient time was then allowed for a copious re-secretion of the poison, and the animal to be bitten was presented to the cobra. As a rule, the latter would not voluntarily bite its victim ; and it became necessary to force the poison fangs into some fleshy part of the latter. In the case of the mungoose, the inner part of the thigh was selected. The operation was most successfully performed, in each case, by two snake-charmers, father and son. Three mungoses were operated upon, *and they all died* at intervals varying from fifteen minutes to six hours, each in precisely the same way. They were not allowed their liberty after being bitten, but were kept under observation. A dog, thus bitten, would, I believe, have succumbed likewise, but for the free exhibition of liq. ammoniæ. He foamed violently at the mouth, (one of the usual results of cobra poisoning,) and apparently evinced symptoms of approaching hydrophobia, which so alarmed the owner, that I believe he had the animal, which ran away, eventually destroyed. Three harmless snakes were then presented to three cobras in succession, and all died precisely as the fowls, mungoses, and little birds had died. In



the experiment recently made by Dr. Fayrer in Calcutta, and recorded in the *Indian Medical Gazette* of the 2nd December, 1867, it would appear that a harmless snake was invulnerable; but, in the presence of the positive evidence of death occurring under the same circumstances, it would be well to have this part of the experiment repeated; and this it is, I believe, Dr. Fayrer's intention to do. It is probable, I think that an innocuous snake, when bitten by a cobra, *will die*. Such was the belief of the snake-charmer who witnessed Dr. Fayrer's experiment, and such, I know, is the belief amongst these men in Upper India. The *mode* of having the bite inflicted may be important. The snake-charmers at Lucknow maintained that, in the case of snakes, the ordinary method would not suffice; that it was necessary to bring the *jaws* of the two snakes into close union, and then, after locking them together, so to leave them. I therefore had this done. A slight contest ensued, during which it may be presumed the poison was emitted. It was thus that my harmless snakes were fastened upon; and they succumbed to the poison. *Two cobras* were now made to approach each other, the father and son each holding a neck, with the thumb well pressed upon the back of the head. Neither liked this part of the experiments, as, had either cobra struggled and overshot the mark, its fangs might have been fastened into a hand. Happily, however, no accident occurred, and the jaws were well locked into each other. As might have been expected, neither cobra\* suffered. This experiment was conducted twice, each time with fresh cobras, and in both instances the cobras were alive and well a fortnight afterwards. Thus, then, it seems to be distinctly proved

\* Dr. Mohendro Lall Sircar, a Medical practitioner in Calcutta, recently made a large cobra bite a young one. The latter became lethargic and evidently felt the effects of the poison; but, in the course of half an hour, it was quite well again. See Calcutta Journal of Medicine, Vol. I. No. IV.



—(a) that the mungoose\* is no more proof against the poison of the cobra than other animals, although, possibly, it may take a longer time to die ; in which case remedies, if early applied, would have a greater chance of success than in animals where death is more rapid ; (b) that even snakes themselves,† if innocuous, are no proof against it ; but (c) that poisonous cobras are.‡

Now what is the pathology and morbid anatomy of cobra poisoning ? For, upon an accurate knowledge of these should,

\* This has been again proved quite recently in the course of some experiments conducted by Dr. Fayrer. A mungoose died in six minutes after having been bitten by a cobra.

† This was the opinion which Messrs. Twining and Breton formed in the course of the experiments which they made in 1825. See *Medical and Physical Society's Transactions* for that year.

‡ In connection with this, it would be an interesting point to ascertain whether *similar* poisons only are inoperative against each other, or whether all poisons, no matter what their respective degrees of virulence, are inoperative in the same way. Messrs. Twining and Breton (see *Medical and Physical Society's Transactions*) believed in the latter doctrine. A Bora, (the Daboia of Russell, known to Europeans as the Cobra Monil, and to the Natives in Behar as Amaita and Seeah Chundur,) and a cobra were made to bite each other, without any unfavourable result occurring to either of them. A single experiment, however, is hardly sufficient to decide a point of this kind, there being more than one source of fallacy in experiments with snakes. The poison is not always equally virulent ; and, though a bite may have been inflicted, the poison-fangs may not have entered the flesh. I have seen this more than once in the case of mungoses. They have evidently been bitten by cobras, but no ill effect whatever has followed. A mungoose that has had the poison introduced into its system will surely die. The arrangement of the poison-fangs in the upper jaws does not admit of their *ready* introduction into the flesh of a victim. It must be remembered that they are *folded back*, and *curved*, the concavity facing the upper surface of the jaw, so that, before the points of the fangs can enter, they must be erected *completely* at right angles to the jaw, and the head must be thrown *well back*. A serpent may *bite*, and *blood* may be *drawn*, but the ordinary teeth only may have been brought into use, not those that convey the poison.



if possible, be based our treatment. In the *British Medical Journal* of the 20th July, 1867, some investigations are recorded by Dr. Halford, Professor of Anatomy at Melbourne, wherein it appeared that, after a bite from a cobra the blood becomes somewhat altered in character, notably in the addition of molecules of granular germinal matter, which speedily grows into cells, at the expense, Dr. Halford believes, of the oxygen of the blood absorbed during inspiration.\*

These observations were partially confirmed by Dr. Fayrer, but the appearance of the cells, in the blood examined by him, was not uniform *i. e.*, they were not seen† in each case, when

\* This theory was held by Mr. Boaz, a Surgeon in Bombay, exactly 70 years ago. Mr. Boaz based it upon the fact that man and other warm-blooded animals expire when deprived of oxygen as they do when bitten by a serpent; that the appearances on dissection, in both cases, are very similar,—the blood becoming of a darker blue and coagulating about the heart and larger vessels; that the irritability of the fibres is nearly, to the same degree, destroyed; and that the body has a strong tendency, in both instances, to putrescence. Further, if two or three drops of the poison be mixed with forty or fifty drops of blood, the latter immediately loses its vermilion colour, becomes black, and incapable of coagulation; and again the poison of serpents has most power over those animals, whose blood is the warmest, and the action of whose hearts is the most lively; whilst, on the contrary, it is not a poison to the serpents themselves, nor in general to cold-blooded animals, the reason being that these do not require a large quantity of oxygen to preserve them in health. Upon these several data, Mr. Boaz bases his opinion, that it is the consumption of oxygen which ends in the death of the individual bitten; and he thinks that the fact of frogs, (which are scantily supplied with oxygen,) dying slowly after the introduction of the poison, helps still further to support it. See *Asiatic Society's Researches, Bengal Vol. VI. pp. 110—1799.*

† Dr. Sircar has also examined with a  $\frac{1}{4}$  and  $\frac{1}{2}$  inch object glass the blood of several animals which had been bitten under his observation by cobras; but the germinal matter and cell were not observed. See *Calcutta Journal of Medicine, Vol. I. No. IV.*



the blood was poisoned in this way ; and yet the microscope employed was one with a very high power—a Powell and Leland's  $\frac{1}{25}$  and  $\frac{1}{30}$  of an inch.

We have yet to learn whether this condition of the blood, which has been thus twice, but not uniformly, met with by careful observers in cases of cobra poisoning, exists in any other cases ?\* Alterations in the blood elements may be due to meteorological causes. Thus, Dr. Forbes Watson, in a paper read before the Society of Arts in 1855, and printed in their journal, states that, during the course of a series of observations made in India (in Bombay) on the direct influence of climate on the human body, he found that, after a period of continued rain, as during the monsoon, the blood became deteriorated in a remarkable and striking manner, the chief alteration being found to occur in the blood corpuscles,† as ascertained by the microscope, under every possible precaution for securing truthful results. The change presented itself in two ways ; in the first, the red globules of the blood were found to vary, and that to a considerable extent, some of them being not larger than half the ordinary size ; but the most striking feature was that the great majority of them, instead of presenting their usual smooth appearance, were found studded with small highly-refracting granules of a fatty nature. The blood cells

\* That the blood is very speedily altered in its character after snake bite, will be familiar to those who have seen it flow, sometimes almost uncontrollably, from such a wound. Its extreme tenuity, with loss of coagulating power, indicating absence or destruction of the fibrine, is remarkable. But whether this alteration, giving rise to further morbid changes, be the first step in the series ; whether it be the pathology of cobra poisoning is, I think, very doubtful.

† My object in bringing this fact forward is simply to show that more blood changes may occur under varying circumstances than are "dreamt of in our philosophy."



had undergone, in short, *fatty degeneration*.\* I may dwell for a moment, *en passant*, on the cause of this condition, highly interesting as it is to the pathologist and practical physician.

As Dr. F. Watson observes, "An excessive amount of moisture in the air interferes materially with the functions of those two great filters—the lungs and the skin,—and the result is, that the vital conditions of the blood itself become altered, and ultimately the general health impaired." Hence the great importance of removing from the air a certain quantity of its moisture (in cases where this is excessive) when possible; or if not, of removing the individual to a drier climate. This condition of the blood is worthy of further examination.

Although, doubtless, changes in the blood *are* induced by the poison of the cobra, and more frequently, as Dr. Fayrer believes, in those cases where the poison is acting slowly, it is, I am inclined to think with him, more probable that the true pathology of cobra poisoning is to be found in the shock and disorganization of the nervous system, and that therefore our treatment should be directed to *it* especially. Like other poisons which threaten to destroy the life of the patient in their progress, this will wear itself out *in time*; and the great object, therefore, should be to *prevent life from becoming extinct*, to keep

\* Exception has been taken, by an intelligent medical observer, to this statement: but, as there *are* certain conditions in which *fat cells* may be found in the blood, I see no physiological objection to the theory. Fat is a normal constituent of human blood, (as it is of chyle); though, as it is usually *saponified* and *dissolved*, we do not see it in a free, suspended state.

In some special constitutions fat is found *unsaponified* and in a state of suspension; and then fat cells are visible. This is so, for instance, "after the use of fatty food, not unfrequently in cases of pregnancy, but most commonly in drunkards with granular liver." (See *Day's Physiological Chemistry*, page 76.)



the individual alive by various means, until the poison has passed away. *A ligature*, between the bitten part and the heart, to arrest, as much as may be, the introduction of the poison into the circulation, and *suction*, to withdraw what may not have been taken up, is sound practice *to begin with*, and commends itself as well to barbarous as to civilized nations. *Stimulants* are invaluable; there being nothing of this description probably better than the popular *Eau de Luce*, of which Ammonia (the professional remedy) forms the basis. *Oxygen gas*, (when available,) as recommended by a recent writer, would, I have no doubt, be of great value. I once had the satisfaction of aiding in the recovery of a patient, almost dead from diphtheria, by the careful inhalation of oxygen; and I have ever since been much impressed with the advisability of using it in all cases of depressed nervous energy, with a view to rousing a patient, and enabling him to "tide over" his temporary depression. And if, as Dr. Halford believes, the enormous number of cells (containing germinal matter) in the blood, and destroying its vitality, are formed at the expense of the inspired oxygen of the air, another powerful reason is furnished for its use.\*

With regard to the vaunted remedies, so-called specifics, for snake-bite, the profession generally has no confidence in any

\* Mr. Boaz, before referred to, thoroughly recommends that the staple of treatment should consist in *oxygenating* the system. For this purpose he says, the wound should be freely touched with Nitrate of Silver, which might be taken internally as well. The wounded limb, or even a part of the body, should be immersed in a bath of hot water acidulated with Nitric Acid: and the patient ought to be exposed to an atmosphere loaded with nitric vapours; or a more *highly oxygenated atmosphere might be breathed by means of a pneumatic apparatus*. See Asiatic Society's Researches, Bengal. Vol. VI. p. 125—1799. The Nitric Acid bath of Mr. Scott has attained great celebrity as a therapeutical agent in the treatment of chronic hepatic disease; but, its somewhat unmanageable dimensions have probably been the cause of its not having found favour as a remedy in snake bite.



of them. Mr. Hood, writing on the subject in the *Lancet* of February 15th, 1868, says that no antidote is required; all that is necessary being *continued* and *forced exertion*. To the value of this I can bear a very fair amount of testimony, having been called upon, in the course of a long service in India, to treat several cases of cobra poisoning. In all, where measures having for their object the prevention of lethargy were fully carried out, the result was eminently satisfactory, and the patient recovered.

There is one point in connection with this subject which I commend to the consideration of homœopaths! If, as has been suggested by a recent writer, *a dose of the poison itself is the best of all remedies*, homœopathy may see, in this fact, an illustration of the principle "*similia similibus curantur*," and say, "Why, if we have the poison of the '*trigonocephalus lachesis*' (a species of rattlesnake common in Brazil) as a polychrest in our homœopathic materia medica for the bite of the rattlesnake, should we not have cobra poison as an antidote for the bite of the cobra?" But if, in all seriousness, it should occur to any gentleman, professing the doctrine of Hahnemann, to try this remedy, I would suggest, not the introduction of the poison by the mouth\* and stomach, (which would probably be followed by vomiting and ejection of the antidote, (?)) but the hypodermic method.

"Fiat experimentum in corpore vili." Let him begin with a pariah dog.

During the past few weeks the subject of snake-poison has not been allowed to slumber. It has been taken up warmly by the Profession and by the Press, and it may fairly be expected

\* A correspondent of the "*Lancet*" suggested that a dose of cobra poison, mixed with a glass of spirits, should be given to the victim of a bite.



that useful results will follow. Dr. Mohendro Loll Sircar has commenced a series of interesting experiments with a view to testing the truth of Dr. Halford's statements. These he has been unable to confirm;\* and additional negative evidence is therefore furnished in favor of the pathology of cobra poisoning consisting in *nervous† shock*. In Dr. Sircar's experiments, three fowls, a dog, a cat, a jackal, a fish, a young cobra, and a long slender snake, (*coluber lineatus*?) known locally as *kanore*,‡ were bitten by cobras. All died in the usual way, and even the

\* Dr. S. Weir Mitchell likewise failed to discover anything of the kind in the blood of those poisoned by rattle-snakes.—*Medical Times and Gazette*, 29th February, 1868.

† This view is quite sufficient to account for all the symptoms which result from the introduction of the poison of serpents into the blood: the slow and difficult respiration; the languid circulation of the attenuated blood, with the altered character of its elements; the dilatation of the pupils; the foaming at the mouth; and the general lethargy, followed by convulsions and death.

‡ This is not a poisonous snake. It is known also, in Bengal, as *Betachra*. The term *lineatus* has been suggested by Dr. Sircar, because of the resemblance of the snake to the one described under that name by Russel at page 32 of his book. The fact of its having succumbed to the poison of the cobra would appear to afford further proof that harmless snakes are not proof against those which are poisonous. This was one of the results, too, as before stated, which was observed by Messrs. Twining and Breton in 1825. In the course of their experiments, they caused an innocuous water-snake, called *dhonr* (*Tropidonotus stolatus*), to be bitten towards the tail by a cobra. It died in little more than two hours. And yet a "full grown, active *Ptyas Mucosus*, (*Dhamin*), was bitten in the mouth, on the 10th June, 1868, at 3-36 P. M. by a powerful, vigorous, and fresh cobra without any immediate result. It was quite well on the 11th idem at 2 P. M.;" and has remained so till the present time, July 24th, 1868.

Another *Dhamin* has been bitten by a cobra, subsequently to this, and it has succumbed. See Dr. Fayrer's experiments recorded in the "*Indian Medical Gazette*" of August 1st, 1868. This seems to dispose of the question as to whether *all* innocuous snakes die from the poison of those which are venomous. If there was nothing in the *experiments* to account for former *Dhamins* not succumbing at all, it would seem that they do so *very slowly*.



young cobra felt the influence of the poison. It became lethargic, and the snake-charmer thought it would die ; but in the course of half an hour it roused itself, and became as vigorous as ever.

It will be remembered by the readers of the *British Medical Journal*\* that, subsequently to his former experiments, Dr. Halford caused a cat, big with young, to be bitten by a cobra. The cat died, and the kittens in the uterus (there were four) were found dead on opening that organ. On examining the blood of the cat and of the kittens, the same appearances were found in each, *viz.*, an abundance of the "foreign cells." That the kittens were poisoned through the blood of the cat is perfectly clear, and the question arises, (setting aside for the present any enquiry as to the cause of the discrepancy, in the results of their investigation of the blood, between the observers in Calcutta and in Melbourne), can the young of any animal which has been bitten by a cobra be poisoned by *its milk* when swallowed and taken into the stomach? Physiology answers, No. That the poison, *once in the mother's blood*, will be reproduced in the secretions, we can readily understand ; and, if milk so impregnated were applied to an abraded surface on the young, symptoms of poisoning would doubtless follow ; but would they follow if that milk were presented to the stomach? It is well known that, as a rule, a poison which, if introduced into a *wound*, will rapidly produce a fatal result, may be *swallowed* with perfect impunity. I am not aware of any exception to this rule.

Professor Christison mentions, in his book on Poisons, that "a pupil of Professor Mangili swallowed at once the whole poisons of four vipers without suffering any inconvenience, and that of six vipers was given to a blackbird, that of ten to a pigeon, and that of sixteen to a raven, with no other effect be-

\* Of December 21st, 1867.



yond slight and transient stupor." Such facts as these settle the point at once. The question then arises, can a poison, which, when presented to the stomach in all its original virility and entirety, is not absorbed by that organ, but which passes through the intestinal canal without doing any mischief, be taken up into the system when introduced into the stomach after having been secreted from the blood into the milk? Before answering this question, we must know in what shape the poison exists under the two circumstances. Is it the same in the milk as it is when swallowed into the stomach? or has the essence of the poison, as it were, been secreted in the former; and is the active principle, thus brought into contact with the absorbents, taken up by them when the original poison would be rejected? The readiness with which milk becomes impregnated with active principles is well known. Drugs given to the mother find their way through the milk of the former into the stomach of the child, and operate occasionally more energetically upon the one than upon the other. Some kinds of food, which have little or no effect upon the parent, act like poison upon the infant. To quote once more from Professor Christison. He tells us that at Aurillac, in France, the milk of certain cows caused violent vomiting, with other symptoms of cholera, in consequence, it was believed, of the cows having fed upon a particular herbage—the *euphorbia esula*, a species of *spurge*; that Professors Orfila and Marc were appointed by the Society of Medicine of Paris to report upon the accident; that they did not consider that any of the received explanations were at all satisfactory; *and that they were disposed to ascribe the poisonous alteration of the milk to new principles formed by a vital process.\** Now what are we to understand by this last state-

\* There is no difficulty of course in understanding that a vegetable, which poisons when eaten, will act deleteriously also when it has found its way into the milk. The question here is, will the active principle of a vegetable, which will not poison when eaten, have that effect when taken into the milk?



ment? It is not, I imagine, presumed that the poisonous alteration took place independently of any poisonous constituent in the blood. May it not have been that what was comparatively innocuous in the food, or even in the blood, became intensely deleterious in the milk? This, I am aware, is very like begging the question; and it may be urged "why go so far for an explanation when we see, and especially in India, how readily milk is vitiated in stormy weather in the rainy season, when the air is charged with electricity; and this quite irrespective of poisonous food?" True; but, *in the first place*, the milk so vitiated has first *left* the animal. It is *drawn milk*, milk left to stand, which becomes changed, not the milk as it is secreted in the gland. This, I believe, is the general opinion\* as stated in works on Physiological Chemistry. It *may* indeed be that the milk is already vitiated *before* it is drawn, and the fact of the milk *appearing* good is no argument against its being quite the reverse, as sometimes the purest *looking* stream of water will be shunned by cattle which know instinctively that it is poisonous. But granting that milk is thus vitiated before it leaves the animal, we are not told, *in the second place*, that there were any electrical phenomena which might account for the vitiation in the cases examined by Professor Orfila and Marc. I confess I am inclined to believe that the milk became poisoned by the deleterious material which was introduced into the blood through the stomach, and that the *vital principle* of the Professors led to the poison being intensified. "Of what is snake-poison composed?" is a question which must be answered before we can determine the difference between its constitution when secreted from the poison-gland, and its constitution after it has passed through the blood into the milk. In the

\* Undoubtedly the milk of a parent, whose health is deranged, may be vitiated; but this is not the question.



course of the experiments conducted by Dr. Fayrer, and recorded in the *Indian Medical Gazette* of February, 1867, the fresh poison appeared to be a viscid homogenous fluid, displaying no distinctive characters when examined either by the naked eye or the microscope. Dr. Buckland examined fresh poison under the microscope, and was so startled by the magnificent appearance, marvellously gorgeous and resplendent, that he rushed into the mess-room to call his brother officers to come and see; but, when they arrived, the entire surface was changed, the beautiful apparition had vanished, nothing tangible being left. Dr. Mohendro Loll Sircar, on the other hand, tells us—see the *Calcutta Journal of Medicine* for April, 1868—that he found fresh snake-poison to consist of a fluid which he calls *liquor purus*, and contained cells; and he argues very justly that, because these cells were not found in the blood of animals poisoned by cobras, therefore the active principle could not reside in them.\*

The question is at present involved in some obscurity, and it will be desirable to make further observations upon the constitution of snake-poison when fresh, in the blood, and in milk after it has passed through the blood. That cobra poison will pass from the mother to the young has been proved by Dr. Halford's experiment upon the cat, whose kittens were afterwards found dead in the uterus; and now, whether the young of an animal, impregnated with snake-poison, will die after swallowing the parent's milk, can only be proved by a like direct experiment, which I propose to make on the first opportunity; and I hope others will be induced to do the same. A bitch (of a dog) will

\* Since the foregoing was written, Dr. Fayrer (see the *Indian Medical Gazette*, July 1st, 1868,) has met with cells containing granular matter in the poison of the cobra. The sketches, alluded to in the communication, did not appear with it. They will have appeared in a subsequent number of the journal.



probably be the most satisfactory animal to manipulate with. The fangs of a genuine, well-tested, cobra should be forced into some fleshy hairless point,—the inner part of the thigh will be as good a spot as any,—and the pups should shortly afterwards be allowed to suck from the mother. If any one of the pups should die with symptoms of snake-poisoning, the evidence will be clear that the poisonous principle has passed from the mother to the young through the medium of the milk. The experiment is worth making, as, if such a result should ensue, much light will be thrown upon the pathology of certain diseases which are transmissible from the parent to the offspring.

I have recently been made acquainted with two apparently incredible cases, which have led to the foregoing remarks. It is stated by two very intelligent native assistants in an office, whose word I have no reason whatever to doubt, that a Hindoo mother was sleeping at night on a native bed (which was slightly raised from the ground) with her two children, one being an infant at the breast. In the course of the night the elder child called out that she had been bitten by a snake ; and presently, in the confusion which ensued, the mother was bitten likewise on one of her hands. Both died under the influence of the poison, which was that of a cobra. And the infant, whom the mother had taken to her breast to pacify, (for it had begun to cry), died also with symptoms of poisoning. A source of fallacy exists in the possibility of the infant having been bitten too ; but my informant assures me that it was not. The other case is that of a calf which died after sucking milk from its mother, who had been recently bitten by a snake. Here again we have the same source of fallacy ; the probability being indeed greater, in this case, that *both* mother and young were bitten. The explanation given by my informant is this : the snake had (as is alleged to be the custom of such snakes) entwined itself round one of the



hind legs of the cow, and sucked its milk; that the mother remained unaffected, but the calf imbibed the poison which had been left upon the udder. This is evidently an error. The cow was doubtless, if poisoned at all, *bitten* by the snake. What gives a show of probability to the truth of the statement is that the calf was seen *foaming at the mouth*, which led to a suspicion of its being under the influence of snake-poison. Moreover it died shortly afterwards, *convulsed*. The teller of the story adds that the cow was taken ill subsequently to the calf, and was found dead in the stall two or three hours afterwards. I can only say in conclusion, as I said before, *fiat experimentum in corpore vili*.

The primary object of these experiments should, of course, be to discover an antidote to the poison, of undoubted value. In the journal "Engineering" of March 20th, 1868, a letter is addressed by Mr. W. Clark, R. E. to the editor, pointing out the efficacy of creosote, (and probably of analogous chemical compounds,) in destroying serpents, and in keeping them away from premises where their presence might be dangerous. Mr. Clark, when engaged in railway operations at Synthia, in 1854, discovered that cobras were not to be found concealed amongst certain railway sleepers where they were sought for,—sleepers as a rule being a favourite hiding place with them. The reason of this was that these particular sleepers had been coated with *creosote*. Acting upon this hint, Mr. Clark, with a view to testing the effect of creosote upon cobras, poured two drops of the fluid into the mouth—held open by a snake-charmer—of one of these reptiles, which was then put into the charmer's box, and taken away. The following day the cobra was brought back dead. Subsequently, Mr. Clark destroyed several cobras in this way; and he suggests the application of "creosote, carbolic acid, and other analogous compounds" as therapeutical agents, and to



prevent the "intrusion of these reptiles into dwelling houses." Dr. Fayrer has recently shewn the fatal effects of carbolic acid upon a cobra and a bungarus,—a compound which will probably be as efficacious as creosote in "keeping off" the serpent family. But the therapeutical effects of either are very doubtful. Mr. Clark inoculated a chicken with creosote, and it died in 5 minutes. He inoculated another with a mixture of creosote and poison. That lived twelve hours. The creosote therefore, though it may have delayed the action of the poison, is no antidote.

Inspector General of Hospitals (Madras) Charles J. Smith wrote to the editor of the British Medical Journal on the 22nd of February, 1868, that, on the recommendation of a native, he tried the effect of tobacco upon a cobra, and that the reptile died rapidly. It succumbed to a pinch of snuff. He added that cobras "are rarely, if ever, seen in tobacco fields." But, in the same journal, on the preceding 11th January, a statement had been made that a nostrum, consisting almost entirely of tobacco, failed altogether as an *antidote*. It would seem, therefore, that what can kill a venomous snake will not do away with the effects of its poison.

A sad accident has recently occurred at Melbourne in Australia, where a Mr. Drummond,—a Magistrate, and a man of singular strength of mind,—in a scoffing spirit, allowed a *tiger snake* to fix its "poison fangs" into one of his bared arms, from the effects of which he died. A snake-fancier, one Shires,—a sailor by profession—had been in the habit of exhibiting these reptiles coiled up in his bosom, and of causing them, first to bite himself and then a fowl, the fowl always succumbing rapidly, whilst he himself continued unaffected, beyond (occasionally) a temporary feeling of vertigo. But, whilst nothing was administered to the fowl, Shires swallowed, and applied



externally, an antidote, (?) composed of Iodine, Spirit of Wine and Ammonia. This same so-called antidote was partially applied to Mr. Drummond, who succumbed some hours after the infliction of the bite, notwithstanding. It is difficult to explain how Shires always escaped. Could it be that he had become a "seasoned vessel?" Had he become tolerant of the poison, as some men become tolerant of stimulants or of opium? This was the view taken by Dr. Halford before the jury. He was doubtless *bitten* each time by the "*poison fangs*;" and, although he seems to have acquired perfect confidence in the means which he used for his own indemnity, he was evidently sceptical and nervous about the result with Mr. Drummond. He allowed the poor infatuated unbeliever (Mr. Drummond had pooh-poohed the whole affair, at one time discrediting the virulence of the poison, and yet apparently having confidence in the remedy as a safeguard,) to be bitten, for the sake of money, whilst he trembled for the consequences. Mr. Drummond's friends could hardly believe in his egregious folly, and his melancholy fate will be a warning to those who would thus trifle with the decrees of an All-wise Creator. It is one thing to make experiments with snakes with a view to discovering a remedy for the poison with which Providence has endowed them, as a weapon of defence, in compensation, as it were, for their otherwise defenceless condition. The sons of science are quite as much justified in prosecuting these enquiries as in seeking for remedies for cholera. But, to act, as Mr. Drummond acted, is simply to *tempt* Providence; and it cannot be a matter for surprise if his audacity should be followed by the fate which it deserved. Though we must mourn with the weeping widow, and with all to whom the deceased had endeared himself, by his numberless acts of friendship and love. A more melancholy instance of the results of "bravado" was probably never placed on record.



## POSTSCRIPT.

In the *Indian Medical Gazette* of the 1st June last, I raised the question whether, although the poison of serpents might be swallowed into the stomach with impunity,—the milk of an animal that had been bitten would be equally innocuous? I adduced the evidence of two intelligent trustworthy Natives of Calcutta, which appeared to shew that such milk could not be swallowed with impunity. An instance in support of the truth of this view has recently occurred in the family of a European gentleman residing at a station in Eastern Bengal. The facts, which have been kindly placed at my disposal by my friend Dr. Fayrer, are as follows.—

Early in the present month, (July), at 7 A. M., a fine “up-country” goat, belonging to the family, was milked by the gentleman’s wife. It had been observed that the udder and teats of the goat were unusually distended, and that the servant who attempted to draw the milk did not do it well. The lady, therefore, drew it herself. The milk from one teat flowed thicker than that drawn from the other. This was attributed to the fact of the kid having, probably, been kept away too long from the mother. The general health of the goat appeared to be very good.

The whole of this milk was set aside for the family breakfast, being intended especially to be mixed with the tea. Boiled cow’s milk was also set aside, for the coffee. At 8-30 A. M. the family breakfasted. The party consisted of the gentleman, his wife, and two children, another gentleman,—a friend aged 23,—being added to it. At the commencement of breakfast, the lady gave the eldest of the two children,—a boy three years old,—a cup full of the goat’s milk. At 9-15 A. M., or three



quarters of an hour afterwards, the child vomited, and brought up, apparently, the whole of his breakfast. Presently, he lay down, and now the vomiting was very violent, and continuous. In the intervals between the attacks, the poor little fellow lay very quiet, and, in another hour, his appearance had changed greatly,—dark rings having formed around the eyes, which were rolled up under the upper-lids, the complexion becoming very yellow, and the expression anxious. The vomiting was persistent throughout the morning, and, at 2 P. M., diarrhœa supervened, the evacuations being very thin and of a black colour. Both the vomiting and diarrhœa continued till 4 P. M., when they subsided. The former returned at night, and continued for 36 hours. The child was more or less ill for upwards of 96 hours altogether, when the symptoms subsided entirely, and he was ravenous for food!

The lady and the friend drank both coffee and tea, each therefore partaking of the goat's milk. At 9-45 A. M., whilst she was attending upon her sick child, the former experienced a sensation of nausea, and, in a few minutes afterwards, vomited, felt very ill, and lay down. The vomiting appears to have continued, more or less, throughout the morning, and was followed, as in the case of the child, by diarrhœa of the same nature. The vomiting was very severe; so much so, that at length she brought up a considerable quantity of pure blood. There was no change in the countenance, as in that of the little boy: and, at 4 P. M., (just when the child's symptoms subsided,) the diarrhœa ceased; but the vomiting continued through the night. The lady recovered in 96 hours.

The friend went out on horseback immediately after breakfast, but returned at 10-15 A. M., saying that he felt very ill, and immediately afterwards vomited. The same train of symp-



tems appeared in this case likewise,—continuous vomiting, and the supervention of diarrhœa at 2 P. M.,—continuing till 4 P. M. The friend recovered in 48 hours.

The gentleman himself drank only coffee, and therefore no goat's milk at breakfast ; and he continued well.

The other child had no goat's milk, and he was unaffected. When the friend returned from his ride complaining of illness,—thus making a third who had complained and suffered in the same way, a suspicion naturally arose that there had been something wrong with the milk drawn from the goat. Prior to this, cholera had been suspected. The goat was, therefore, examined ; and the mark of a bite, like that from the poison fangs of a snake, was found on one of the teats close to its extremity. The udder was much inflamed. At this time, (about 10-30 A. M.) the animal seemed to be very ill, and rapidly became worse. At noon a frothy foam exuded from her mouth ; and at 2 P. M. she died.

The goat had evidently been bitten by a poisonous serpent, and its milk poisoned all who partook of it. The entire history points to this fact. I am not aware that anything of the kind is on record ; though, now, confirmed as the statement of my native friends has been by other independent witnesses, I have no doubt that similar instances have occurred. So pathologically important, (as well as simply interesting), is the fact of milk, into which the essence—as it were—of a serpent's venom has been, by a vital process, secreted, being capable of poisoning when swallowed into a healthy stomach, whilst the venom itself may be swallowed, freely, with impunity, that I trust more observers will give to the profession the benefit of their experience,—and that professional men, (or others,)



will carry out the experiments which I suggested in the June number of the *Indian Medical Gazette*.

In the case, which is here recorded, there is apparently no source of fallacy whatever. The goat was evidently poisoned by a venomous serpent, as the mark of the fangs was seen, and the animal died in a way that results from such a cause. Then, those only who drank the goat's milk, suffered; and with all the symptoms, too, of snake poisoning. The poison of venomous serpents is allied to the acrid vegetables, (which produce vomiting and purging,) in their action. The more remote effect—viz., that on the centre of the nervous system, which is seen after a bite from the venomous serpents of hot climates, the cobra for example, was observed in the child, who was inclined to be lethargic besides. Again, the individual who took the most milk was the principal sufferer. In the face of this sequence of events, it seems idle to talk of the possibility of the milk becoming deteriorated from "standing" at this season of the year, or of the possibility of there being abrasions in each of the stomachs of those who swallowed it. The fact must, I think, be admitted; and it remains, therefore, to profit by the lesson which it teaches.

(1.) Milk is consumed in every house; and the animals from whom we derive it are often exposed to the bites of venomous serpents. When out at pasture, of course, it would be difficult to adopt any sufficiently efficacious measures for the purpose of keeping these reptiles at a distance, beyond grazing the kids or cows as much in open ground as possible. But, it may be well to use carbolic acid in our homesteads, in the immediate neighbourhood of the cattle stalls or sheds, sprinkling it about freely. Mr. Clark's and Dr. Fayrer's experiments have satisfactorily proved the deadly effect which this agent has upon



these reptiles. They shun either it or creosote, and will not go where these compounds exist.

(2.) We have now before us further evidence of the fact, that animal (human) milk may be a vehicle for the conveyance of the most virulent poison oftener than we are aware of. Should we not then be, more than ever, particular in selecting the *daces*\* whom we employ to nurse our children? Themselves impregnated, it may be, with the unseen and unsuspected taint of *leprosy*, the milk which is intended to nourish may carry with it the germs of that hideous malady,—to be developed in after years, a melancholy testimony to our want of foresight and care. As with *leprosy*, so with *constitutional syphilis* and other systemic diseases, let us be searching in our enquiries. The constitutional poison may lurk in the apparently healthy pustule on the arm of the infant who is being nursed by a tainted parent. I do not wish to be an alarmist, but on this point I do desire all whom I venture to caution to be Argus-eyed. “Forewarned, fore-armed,” is an ancient but wise precept.

\* Wet nurses.

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