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General Secretary for India and the East,
CALCUTTA.

Original Communications.

EXPERIMENTS WITH THE REV. MR. LORBEER'S ANTIDOTE (TIRIYAQ) TO COBRA-VENOM.

BY VINCENT RICHARDS, F R. C. S., &c.,

AND

W. J. SIMPSON, M.D.

Present at the investigation, also

SURGEON J. STEVENSON, M. S.,

AND

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Health Officer of the Town of Rangoon, July 22nd 1889.

SOLUTION OF COBRA-VENOM.

MIXED 64 grms. of dried cobra-venom, with 12 cubic centimetres of water, forming a solution, of which 1.33 c.c. (containing .071 grms. of cobra-venom) were used as an injection in each of the following seven experiments.

TIRIYAQ MIXTURE.

MIXED 2½ drachms of Tiriyaq, with, 7½ ounces of syrup, forming a mixture of which 2 drachms (containing 5 minims of the antidote) were used as a dose by the mouth.

EXPERIMENT I.

IN this experiment a dose of Tiriyaq was given by the mouth every five minutes until five doses had been administered; ten minims of pure Tiriyaq were also hypodermically injected.

At 2-58 P.M. hypodermically injected cobra-venom into one of the hind-legs of a dog, weighing 28lbs.

- „ 3-4 „ administered a dose of the antidote.
- „ 3-9 „ second dose.
- „ 3-14 „ third dose.
- „ 3-19 „ fourth dose.
- „ 3-24 „ fifth dose.
- „ 3-42 „ there was vomiting and frothing at the mouth.
- „ 3-48 „ hypodermically injected ten minims of pure Tiriyaq into the hind-leg. Salivation; commencing general paralysis; paralysis of the tongue, which was hanging out of mouth; convulsions; pupils sensitive and normal in size; respiration at first hurried and then slower.
- „ 4-10 „ respiration jerky; pupils insensible and widely dilated; occasional convulsions.
- „ 4-15 „ dead—in one hour and seventeen minutes.

EXPERIMENT II.

IN this instance the Tiriyaq was administered every ten minutes until five doses had been given; and five minims of pure Tiriyaq were hypodermically injected.

At 3-5 P.M. hypodermically injected the cobra-venom into the left hind leg of a powerful dog, weighing 32½ lbs.

- „ 3-15 „ the first dose of medicine administered.
- „ 3-25 „ second dose.
- „ 3-35 „ third dose.
- „ 3-45 „ fourth dose.
- „ 3-55 „ fifth dose.
- „ 4-20 „ salivation.
- „ 4-23 „ strong convulsions; pupils sensitive; priapism.
- „ 5- „ the animal is lying on its side; pupils still sensitive.
- „ 5-15 „ respiration slower.
- „ 5-28 „ respiration ceased.
- „ 5-30 „ dead—in two hours and twenty-five minutes.

EXPERIMENT III.

IN this case the Tiriyaq was given every fifteen minutes until five doses had been given; and ten minims of the pure antidote were hypodermically injected.

At 3-12 P.M. hypodermically injected cobra-venom into one of the hind-legs of a powerful dog, weighing 39 lbs.

- „ 3-27 „ first dose of antidote given.
- „ 3-43 „ second dose.
- „ 3-58 „ third dose.
- „ 4-13 „ fourth dose.
- „ 4-15 „ the animal is much affected; salivation and commencing paralysis. Ten minims of pure antidote were hypodermically injected.
- „ 4-18 „ the tongue was paralysed and hanging out of the mouth; pupils sensitive; respiration most hurried; defecation.
- „ 4-47 „ strong convulsions.
- „ 5-4 „ respiration ceased.
- „ 5-7 „ dead—in one hour and fifty-five minutes.

EXPERIMENT IV.

THIS was a control experiment conducted for the purpose of showing the effects of the venom used, without the antidote.

At 3-30 P.M. hypodermically injected cobra-venom into one of the hind-legs of a bitch, weighing 13 lbs.

- „ 4-27 „ slight convulsions, slight salivation; pupils sensitive; commencing general paralysis.
- „ 4-35 „ tongue paralysed and hanging out of the mouth.
- „ 4-44 „ convulsions; respiration slowing.
- „ 4-53 „ pupils insensitve and dilated; respiration ceased.
- „ 4-54 „ dead—in one hour and twenty-four minutes.

EXPERIMENT V.

IN this experiment ten minims of the pure Tiriyaq were injected with cobra-venom, one dose was given by the mouth at the same time, and five minims of the antidote were subsequently injected.

- At 3-45 P.M. hypodermically injected into one of the hind-legs of a bitch, weighing 12½ lbs. ten minims of pure Tiriyaq mixed with the cobra-venom, and at the same time administered by the mouth a dose of the Tiriyaq mixture.
- „ 4-27 „ the animal is uneasy and evidently becoming affected by the cobra-venom.
- „ 4-55 „ hypodermically injected five minims of pure antidote.
- „ 5- „ salivation and vomiting. convulsions.
- „ 5-15 „ dead—in one hour and thirty minutes.

EXPERIMENT VI.

IN this instance five doses of the antidote were administered; one every five or six minutes.

- At 4-26 P.M. hypodermically injected cobra-venom into one of the hind-legs of a powerful dog, weighing 30 lbs.
- „ 4-31 „ gave the first dose of medicine.
- „ 4-37 „ second dose.
- „ 4-43 „ third dose.
- „ 4-48 „ fourth dose.
- „ 4-53 „ fifth and last dose.
- „ 5-30 „ the animal is becoming much affected, respiration greatly hurried at first, then slowing.
- „ 6-39 „ convulsions; pupils sensitive; tongue paralysed; salivation.
- „ 7- „ strong convulsions; pupils dilated and insensitve.
- „ 7-20 „ dead—in two hours and fifty-four minutes.

EXPERIMENT VII.

ON this occasion four doses of the antidote were administered by the mouth, and forty minims of pure antidote were hypodermically injected in four injections, one every five minutes.

- At 4-41 P.M. hypodermically injected cobra-poison into one of the hind-legs of a bitch, weighing 13 lbs; and immediately afterwards administered by the mouth five doses of the antidote at once.
- „ 4-57 „ injected ten minims of the Tiriyaq.
- „ 5- „ repeated injection.
- „ 5-5 „ again repeated injection.
- „ 5-10 „ another injection of ten minims.
- „ 5-48 „ the animal is lying on its side; respiration rapid; pupils sensitive; salivation;
- „ 6- „ respiration jerky; tongue paralysed.
- „ 6-13 „ very strong convulsions; pupils insensitive and dilated.
- „ 6-34 „ dead—in one hour and fifty-three minutes.

In addition to the above experiments the following was performed with cobra-venom that was somewhat damaged, by being kept (previous to coming into our hands) in an unclean bottle which had evidently contained linseed oil. The results show that though the rapidity of its action (owing to mechanical interference with its absorption) had been lessened, its virulence had remained unaffected.

EXPERIMENT VIII.

In this experiment eight doses of Tiriyaq mixture were administered at once, ten minutes after the animal had been hypodermically injected with a solution containing damaged co-

bra-venom, 128 grms. and water 2 c.c. The solution was very cloudy.

- At 4-35 P.M. hypodermically injected the above-mentioned solution of cobra-venom into one of the hind-legs of a dog, weighing 24½ lbs.
- „ 4-45 „ administered forty minims of the antidote with syrup.
- „ 5-55 „ paralysis commencing.
- „ 6-30 „ hurried respiration; salivation.
- „ 7-9 „ strong convulsions; paralysis of the tongue, which hangs out of the mouth; salivation; pupils sensitive.
- „ 7-12 „ respiration ceased.
- „ 7-15 „ dead—in two hours and forty minutes.

SUMMARY OF RESULTS OF THE EIGHT PRECEDING EXPERIMENTS.

No. of Experiments.	Weight of Animal.	Quantity of Venom injected.	Number of doses of antidote.		Period from injection to death.		REMARKS.
			Grammes.	By the Mouth.	Hypodermically injected.	Hours.	
I	28 lbs.	.071	5	2	1	17	Powerful dog.
II	32½ lbs.	.071	5	1	2	25	
III	39 lbs.	.071	4	1	1	55	
IV	13 lbs.	.071	None	None	1	24	
V	12½ lbs.	.071	1	3	1	30	Control experiment; rather weak dog.
VI	30 lbs.	.071	5	None	2	54	
VII	13 lbs.	.071	5	8	1	43	
VIII	24½ lbs.	.128	8	None	2	40	Venom damaged.

REMARKS BY VINCENT RICHARDS.

THE method adopted on this occasion to test the value of the Reverend Mr. Lorbeer's "antidote" to cobra-venom, is that which has received scientific sanction, as being the best calculated to afford reliable results. In regard to the quantity used for an injection, I may observe that a full-grown, vigorous cobra is capable of injecting at one bite, as much as from 508 to 640 grms., or from nearly eight to ten times the quantity injected in the first seven experiments, and, of course, in a much more concentrated form; so that the antidote was administered under the most favourable circumstances to its success, had it possessed the powers attributed to it. It is desirable to refer briefly to the statement made by Mr. Lorbeer in the public papers as to the quantity of the antidote necessary to be administered to ensure a successful issue. It is, as follows:— "Now, from all the experiments which I have made, and which are numerous, I know, for certain, that three doses of five drops each will cure karait bite, and four doses will cure cobra bite, after the poison has circulated; and if given soon after the accident one dose will destroy the poison at once, leaving no trace of it behind." To avoid any misunderstanding as to the intended applicability of the dose to the case of dogs, I may mention that, whether the victim is a fowl, a dog, a child, or a man, the dose prescribed by the Reverend gentleman

is unalterably the same—"5 drops." Now, if we examine the results attained in the foregoing experiments, we shall find that, whether the antidote was injected with the venom (Expt. V), or was administered by the mouth at the time of the injection (Expt. VII); a few minutes after (Expts. I, II, VI and VIII), or at a somewhat later period (Expt. III), or in whatever quantity or manner it was used, the result was always the same—death. If the symptoms noted in experiment no IV, in which no "antidote" was used, be compared with those described in the other cases in which the medicine was given, it will be evident that the same train of symptoms, special paralysis of the tongue—progressive general paralysis, salivation, convulsions and asphyxia, ending in death—followed the injection of the venom in both conditions, showing most conclusively that the so-called antidote exercised not the slightest influence upon the lethal effects of the venom. Tiriyaq is, in fact, absolutely worthless as a remedy in cobra-poisoning.

REMARKS BY W. J. SIMPSON.

As so much attention has recently been drawn to the powers which Tiriyaq was believed to possess in curing cobra-bite, it was very desirable that some careful experiments should be made in order to test the value of the new medicine. To India such a discovery would be of vast moment, and should an antidote be found against cobra and krait venom, the discoverer ought to be crowned as one of the greatest benefactors that the 19th century has produced. I am afraid this enviable position has not fallen to the lot of Mr. Lorbeer. The foregoing experiments demonstrate that Tiriyaq has no effect either on the venom itself or in retarding its destructive power on animal life.

The following experiment was performed subsequently to the others, by Vincent Richards, F. R. C. S., &c.

EXPERIMENT.

In this experiment twenty-four doses of the Tiriyaq were administered at once.

- At 11-16 A.M. hypodermically injected into the thigh of a dog, weighing about 29 lbs., a solution of cobra-venom containing 071 grammes of cobra-venom in 2 c. c. of water.
- " 11-17 " administered 24 doses=two drachms, of Tiriyaq, in syrup.
- " 12-15 P.M. is decidedly affected by the cobra-venom; retching, and is very restless.
- " 12-33 " retching occasionally; salivation; lying down on its side.
- " 12-40 " tongue hanging out of the mouth, paralysed; breathing hurriedly.
- " 12-45 " convulsed; pupils sensitive.
- " 1-5 " strongly convulsed; pupils insensitive; micturated and defecated.
- " 1-15 " dead—in one hour and fifty-nine minutes.

Notwithstanding the excessive dose administered, the lethal effects of the cobra-venom were not in the slightest degree affected.

NOTES ON PHENACETIN IN THE TREATMENT OF CONTINUOUS AND MALARIOUS FEVERS AND ON SULPHONAL AS AN HYPNOTIC.

BY SURGEON ALEX. S. FAULKNER, I. M. S.,
Bombay Army.

Phenacetin.—The discovery and introduction of this drug is of recent date, and its use in practice has not yet, as it deserves, become general.

Physical Properties—Are as follows: a white crystalline powder, free from odour and taste, it melts at a temperature of 135°c, is not soluble in cold water but is dissolved to a certain extent in hot water, but most readily in alcohol.

Discovery.—It was originally prepared in 1886 by Dr. O. Hinsberg, and in the subsequent year satisfactory results were obtained by Professor Bemberger, whose experiments were published by Dr. Kobler—* In France, M. Lepine made public his experiments about the same time as Dr. Dujardin-Beaumetz, whose paper "On the Phenacetins," was read at the Meeting of the British Medical Association held at Glasgow in August, 1888.

In the same year Drs. Misrachi and Refat published an important paper on the subject† which was read before the Society of Medicine of Salonica.

Therapeutic Properties.—It is in a marked degree an antipyretic and its anti-thermic action on the system is of longer duration than is the case after the administration of other antipyretics. In most cases under my observation, it had a diaphoretic action and caused copious sweating, but in no case have I noticed any toxic phenomena attributable to the drug itself. It also has a sedative effect when given in cases of neuralgia, either cranial or facial, sciatica, &c., uncomplicated with a high temperature, and it is stated to have a beneficial effect in the cases when given in doses commencing with 8 grains, but in prescribing this drug for such cases, it is necessary to bear in mind the results of the researches of Drs. Misrachi and Refat who found that Phenacetin was soluble in Lactic Acid at a temperature of 33°c and this fact, apparently would account for its rapid absorption when administered, since Lactic Acid is usually present in the stomach, so possibly in those cases in which Phenacetin fails to give relief, the failure may be due to the absence of that acid in the stomach, and the indication then naturally would be the addition of a little Lactic Acid.

The French observer, M. Lepine, states that Phenacetin affects the blood less than antipyrin or antifebrin, and that doses of even 60

* Wiener Med. Wochenschr. 1887—26 and 27.

† Contrib à l'étude de la Phénacétine—Bull Gen de Therap, tome LXIV, p. 481—1888.