

"CACTIN" AND "CACTINA;" AN EXAMINATION INTO THEIR PHYSIOLOGIC ACTION.*

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Not long since R. A. Hatcher¹ made a physiologic examination of a number of preparations of *Cactus grandiflorus* which certain enterprising pharmaceutical manufacturing companies were exploiting as possessing invaluable therapeutic properties. He evidently went thoroughly into the somewhat limited literature on the subject, and one only needs to refer to his article to find out the present status of our knowledge of the chemistry and the physiologic action of the yet unknown principles contained in *Cactus grandiflorus*.

As stated by Hatcher, various principles derived from the different members of the cactus family have been

The substances used in this investigation were the so-called "Cactin," prepared from *Cactus grandiflorus* by the Abbott Alkaloidal Company of Chicago, and "Cactina," manufactured by the Sultan Drug Company of St. Louis. Both preparations were purchased in the open market; cactin in the form of granules, each granule said to contain 1/67 grain cactin or approximately 1 mg.; cactina in the form of pellets, each said to contain 1/100 grain of "cactina."

CACTIN (ABBOTT).

In the literature sent out by the promoters of this preparation special attention is called to this granule, "it being an invaluable steadier of the circulation." In view of the fact that no one heretofore has been able to find anything in *Cactus grandiflorus* possessing any



Fig. 1.—Cactin experiment. Dog, wt. 8 kg., time 10 a. m. Read from left to right: Upper tracing, blood pressure; lower, respiration. Normal blood pressure, 100 mm. Hg. At point indicated in tracing, 25 cactin granules, dissolved in physiologic salt solution, were injected into the right saphenous vein (time 10:01). Blood pressure dropped to 96 mm. Hg, but soon rose again to normal, 100 mm. No change in rate.



Fig. 2.—Ten minutes later (10:10), 25 cactin granules were injected. Blood pressure, 98 mm. Hg. No change in rate.

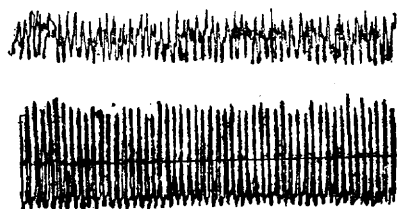


Fig. 3.—Ten minutes later (10:20), blood pressure 90 mm. Hg. No change in rate.

subjected to physiologic examination, but few and incomplete are the researches on the physiologic action of anything found in *Cactus grandiflorus*. This is probably due to the fact that no one has been able, thus far, to isolate any substance which could be said, with any degree of certainty, to be either an alkaloid or glucosid contained in this member of the cactin family and possessing physiologic action.

Hatcher has left it unnecessary for me to go into the history and literature of the subject, hence my only reason for investigating these preparations of cactus at this time is that they are still being advertised as very useful remedial agents; therefore, a restatement of the place assigned to them by physiologic experiment will not seem out of place.

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1. THE JOURNAL, Sept. 21, 1907, p. 1021.



Fig. 4.—Ten minutes later (10:30), blood pressure 98 mm. Hg; 25 cactin granules injected.



Fig. 5.—Ten minutes later (10:40), blood pressure 98 mm. Hg; no change in rate.



Fig. 6.—One hour and twenty minutes later (12:00 m.) and after the administration of 7,200 cactin granules, blood pressure 98 mm. Hg; no change in rate.

physiologic action whatsoever, the company's claims as to the most extraordinary influence of this preparation on the heart and circulatory organs in general, in any and all deranged conditions of the circulation, are most interesting, indeed, and, if true, most valuable.

That cactin (Abbott) is non-poisonous is attested to by the fact that guinea-pigs will withstand 30 to 50 cactin granules administered per os or subcutaneously without the least effect. Also rabbits, in like manner, will withstand 50 to 100 granules. This simply means that a man could take any quantity. I took 100 of these cactin granules, 25 at a dose, every four hours, without experiencing the least effect. Being satisfied that cactin possessed none of the properties of an acute poison, I made a few experiments on dogs to see what influence it might exert on the circulation, using the methods generally followed in physiologic experiments.

EXPERIMENT 1.—Dog, weight 8 kg. Anesthetic, ether. Prepared in the usual manner to take a blood-pressure tracing and a record of the respiratory movements. Two hundred cactin granules were ground to a fine powder in a mortar and dissolved in 80 c.c. of physiologic salt solution. This was administered intravenously in doses of 10 c.c., or about 25 granules at a dose.

At the beginning of the experiment (10 a. m.) the blood pressure was 100 mm. Hg. Two hours later (12 m.) and after the administration of 200 cactin granules the blood pressure was 98 mm. Hg. The blood pressure and the rate of both heart and respiration remained practically constant throughout the experiment (Figs. 1-6).

This shows the record of one of several experiments performed under like conditions, all of which showed

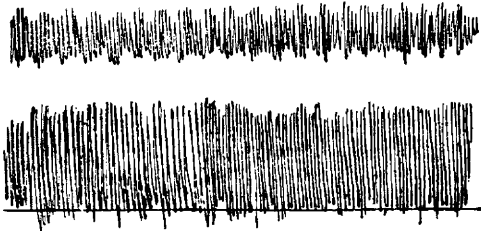


Fig. 7.—Cactina experiment. Jan. 13, 1908. Dog, weight 12 kg.; time 10:30 a. m. Read from left to right: Upper tracing, blood pressure; lower, respiration. Normal blood pressure, 134 mm. Hg.

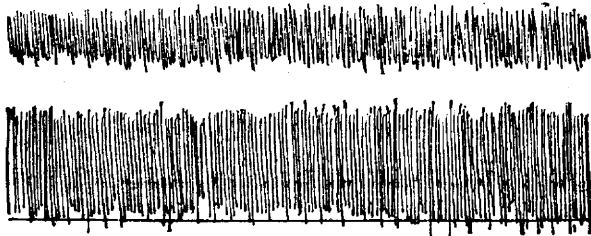


Fig. 8.—Ten minutes later (10:40). ten cactin pellets were injected at point indicated on tracing. Blood pressure one minute after injection, 128 mm. Hg.

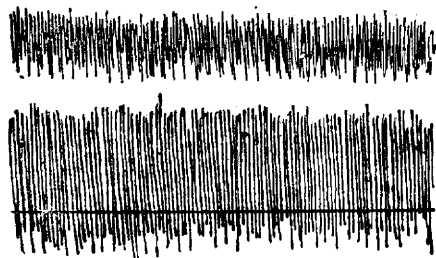


Fig. 9.—Twenty minutes later, 11:00 a. m., blood pressure 120 mm. Hg. Second dose of ten cactin pellets were administered at 10:00.

cactin to be inert, just as inert as milk sugar administered in like quantity. One of the dogs used for experiment was suffering from the effects of a large goiter, and had a very irregular heart and low blood pressure. In fact, it was difficult to keep the animal under the anesthetic (ether) with any degree of safety. In this case cactin was without the least effect, in doses of 5 granules every ten minutes for one hour. In this case the corresponding dose for man (dog 8 kg., man 70 kg.) would be about 40 to 45 granules.

It would seem from the results here recorded, and from certain clinical reports sent out by the manufacturers of cactin, that physiologic experiments and so-called clinical observation must part company.

CACTINA (SULTAN).

This preparation is on the market in the form of pellets and is claimed to be the proximate principle of *Cactus grandiflorus*.¹

This preparation of cactin was found to differ somewhat from the cactin of the Abbott Alkaloidal Company in that it was found to be poisonous in large doses, administered intravenously. A single dose of five, ten or even twenty cactina pellets, administered intravenously, to a 10-12 kg dog exerts little or no influence on the heart or circulation; the larger dose may cause a slight fall in blood pressure (Fig. 12). The following experiment will show the action of cactin on the blood pressure of a dog, administered in doses of ten pellets:

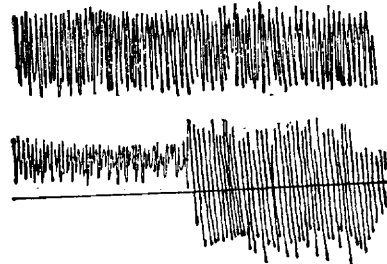


Fig. 10.—One hour later (12:00 m.), doses of 10 cactin pellets had been administered at 11:05, 11:15, 11:30 and 11:40, making a total of 60 cactin pellets. Variation in respiration tracing due to a shift of the ether bottle. Blood pressure, 120 mm. Hg.

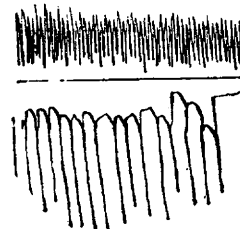


Fig. 11.—Forty minutes later (12:40), ten cactin pellets were injected at 12:10 and at 12:20, making a total of 80 pellets. Blood pressure, 40 mm. Hg. Respiration slowed. Dog died at 12:50.

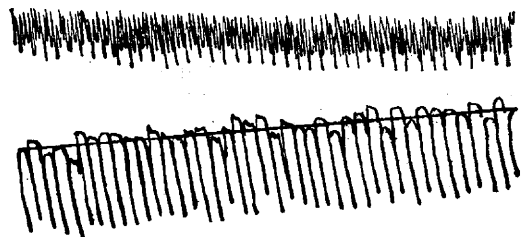


Fig. 12.—Blood pressure and respiratory tracing taken from 10 kg. dog. Two doses of 20 cactin pellets each had been administered intravenously 20 minutes apart. Tracing was taken 20 minutes after last dose. Normal blood pressure, 140 mm. Hg. Blood pressure indicated in tracing 120 mm. Hg. Respiration slowed.

EXPERIMENT 2.—Dog. Weight, 12 kg. Anesthetic, ether. Experiment conducted under same conditions as Experiment 1. One hundred cactin pellets were dissolved in 100 c.c. of physiologic salt solution. This was administered intravenously in doses of 10 c.c., or 10 pellets. Corresponding dose for man (dog, 12 kg., m. cm. 70 kg.) would be about 60 pellets at a dose (Figs. 6-12).

All this experiment showed was a gradual decline in blood pressure, and if 70 or more pellets were administered in the space of two and a half hours, the animal generally died, the blood pressure gradually going to

1. Myers: N. Y. Med. Jour., liii, 681.

zero and the respiration growing progressively slower and weaker. In fact, instead of showing any stimulating effect on the heart, it showed the opposite—both the circulation and respiration were progressively weakened. In this regard it differs from strychnin, and has no resemblance to the action of digitalis, strophanthus or any other of the known heart stimulants. Just what is in this preparation that causes a depression of the circulation I do not know. Figure 12 shows the effect exerted by 40 cactina pellets, twenty minutes after the last dose, or forty minutes after the first (20 pellets at a dose). This animal was used for another experiment and was living two hours after the administration of the cactina.

Here again it might be said in regard to cactina, as has been said of cactin, physiologic experiment is wholly out of harmony with the clinical results published by the Sultan Drug Company. In the light of my experiments all that can be said for either one or the other of these preparations (cactin [Abbott] cactina [Sultan Drug Co.]) is: Physiologically neither one corresponds in the slightest degree to the claims made by their respective exploiters, the former being absolutely inert in doses at least a thousand times greater than recommended, the latter in large doses (two or three hundred times the dose recommended) shows a depression of the circulation and respiration.

The negative results recorded in this paper simply confirmed all previous pharmacologic work on *Cactus grandiflorus*; that is, no one has ever found it to possess any physiologic action whatsoever.

A BREACH OF TRUST; THE PHYSICIAN'S USE OF SECRET REMEDIES.*

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The trust and confidence in physicians shown by the public is phenomenal. A woman will bring her baby to a doctor, whom she may never have seen before, and permit him to prescribe for it, knowing that on his judgment, knowledge and care depends its very life. Men and women of the highest culture and intellectual power will place their lives, aye, their honor, dearer than life, in the custody of an anesthetist and an operator of whom they know little. Can a higher compliment be paid to a profession than this? It must be remembered that it is the knowledge that we are physicians which gives rise to this unusual faith in our integrity, our wisdom, our skill. None but the thoughtless doctor can fail to be thrilled when he realizes to what a pinnacle of virtue the repute of his calling has raised him. Perhaps it is the familiarity of this attitude of the public which makes us a little dull in appreciating the responsibility which its docile trust imposes. It at least must drive an honest man to a soul-stirring endeavor to play fair with his patients.

While it is true that some essayists and novelists have occasionally written disparagingly of medical men, it has, as a rule, been their foibles that have been smiled or railed at rather than their altruism for their patients. The words of thoughtful observers will seldom fail to confirm what I have said as to the prevalent opinion concerning physicians. It, therefore, behooves the present generation of doctors to maintain the honor of medicine by justifying this trust in its votaries.

Recent events in commercial and political life have exposed astonishing breaches of trust in high stations. Lapses from the kind of integrity supposed to be general have shaken faith in insurance circles, in the transportation business and in financial enterprises. The result has been economic distress and almost universal distrust.

The primal duty of one who offers himself as a healer of the sick and injured is to know what he is doing. He needs to use his mind to discover the cause of the illness and to apply his knowledge to furnishing the means of relief. Hence, he must see to it that neither ignorance of medical progress, nor a mind befuddled with drugs, nor the secret composition of his remedies makes him unfit to be trusted with human life. Such deficiencies on his part rob his clients of what they have a right to expect and lessen the honor in which the profession of medicine has long been held. A man who puts an unknown dose of an unknown poison into the circulation of his trusting patient is worse than a quack. He commits a breach of trust, as surely as the financier who fills his own pockets by selling worthless securities, or the guardian who cheats his ward out of his patrimony.

For a number of years the public respect for the medical profession has been in danger; because some credence has been given to rumors of secret division of fees, acceptance of bribes and other breaches of trust such as that under discussion. My observation has proved that such practices are indulged in by those from whom the public has a right to expect better things.

Sensational newspapers have disseminated the notion that physicians are willing to kill the sick deliberately, for whom they have no cure. A recent novel by a woman of great ability seems to indicate that she believes that a trained nurse, who is sane, will murder a desperately ill patient entrusted to her care. The insult to physicians and trained nurses conveyed in these publications is a result of some of our own misdoings. The damage done to public confidence in these essentials of modern civilization by such opinions is, perhaps, as widespread as the loss of financial stability due to recent knavery in business.

The cure for the nostrum evil is the inculcation by medical teachers of the maxims of Hippocrates and their own discontinuance of prescribing secret preparations, the use of the Pharmacopeia as a text-book in medical schools, the immediate emptying of samples of secret nostrums into the sewers, a better education in therapeutics, and an insistence that the prescriber of secret nostrums is a dangerous quack, who commits an actual breach of trust.

Paraplegia Following Roentgen Treatment of Cancer.—Martini's two patients had each a cancer in the chest wall and it retrogressed notably under the influence of Roentgen treatment. As the tumor subsided signs of paraplegia became apparent and the patients succumbed from thirty to forty-four days after the onset of the paraplegia. It came on suddenly, preceded by a severe radiodermatitis, and the circumstances seem to exclude a possible direct action of the rays on the spinal cord. Nothing was found at autopsy to indicate a metastatic affection of the spinal cord nor lesions of the vessels suggesting syphilitic infection, but merely a softening, a degeneration, of the nerve substance. Consequently he is inclined to ascribe the paraplegia to a myelitis of toxic origin. His article was published in the two last numbers of the surgical section of the *Policlinico* for 1907.

* Read Dec. 3, 1907, before the Philadelphia Branch of the American Pharmaceutical Society