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PSICAINE: AN ARTIFICIAL COCAINE.*

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PSICAINE is said to be the acid tartrate of a pseudo-cocaine, a dextro-rotatory artificial isomer of natural cocaine.¹ (Formula, $C_{17}H_{21}O_4N.C_4H_6O_6$; molecular weight, 453; alkaloid content, 67 per cent.). It is a white crystalline powder, very soluble in hot water, soluble in cold water up to 20 per cent.; the solution is acid in reaction, 1 per cent. solution giving a rather pinkish orange tint with dimethylamino-azo-benzene—pH about 3.3; the solution is also dextro-rotatory. (This is mentioned, as other properties of the substance I have examined differ somewhat from those described in Continental reports.¹) The powder is sparingly soluble in alcohol.

Anaesthesia.—Applied to the nasal mucous membrane a 5 per cent. solution gives very good anaesthesia. As compared with 5 per cent. solution of cocaine hydrochloride, the time taken for full anaesthesia is rather longer; the depth of anaesthesia ultimately obtained is the same. The duration of anaesthesia without adrenaline is over fifteen minutes, after packing. If 7 per cent. solution is used, the time required for anaesthesia is practically the same as with 5 per cent. cocaine hydrochloride solution. (The alkaloid content of 7 per cent. psicaine solution is 4.7 per cent., that of 5 per cent. cocaine hydrochloride solution being 4.5 per cent.) I have made over fifty observations with uniformly good results, performing such operations as puncture of the antrum, cauterization, etc. I have not found that the anaesthetic value is twice that of cocaine as claimed.

Toxicity.—No cases of toxicity in the human subject have been brought to notice. Experiments have shown that doses up to 70 mg. do not produce excitement or fainting when injected into men.¹ This dose (containing less than gr. 3/4 of alkaloid) is too small for deductions of value; many men might escape symptoms after the same quantity of cocaine.

Shrinkage.—Psicaine is said to be a vaso-dilator, but I have found uniform good shrinkage after spraying the nose with mv of 5 per cent. solution. This strength also checks bleeding. If it is desired to use adrenaline the solutions mix well.

Irritation.—I have found no case of primary or late irritation with solutions of the strengths described.

Habit Formation.—In common with all cocaine substitutes, psicaine is said not to lead to addiction. Deductions from animal experiments support this view—the dose required to produce excitement would probably be so near the lethal dose as to prevent the drug ever making a popular appeal.

Stability.—A 5 per cent. solution of psicaine grows "moulds" just as does cocaine solution; the addition of 1/4 per cent. salicylic acid prevents this. Time has not allowed an investigation of keeping powers; the solution is unaltered after two months. Psicaine can be boiled for

five minutes, or steamed for an hour, with only slight loss of power; fifteen minutes in the autoclave at 134° C. seriously diminishes the anaesthetic power and the experimental toxicity.

Dangerous Drugs Acts.—It appears that psicaine comes under the Dangerous Drugs Acts. (The Home Office is investigating this point, and will give a decision when the work is complete.)

Experimental Work.—Subcutaneous injection into guinea-pigs* was chosen as a method of comparison. The minimal lethal dose in 5 per cent. solution was found to be 53 mg. per kilogram. The toxicity is therefore 19 kilograms per gram of psicaine (the toxicity of 5 per cent. cocaine hydrochloride is 25 kilograms per gram). The toxicity figure is affected by the large proportion of acid in the molecule—just under a third. In kilograms per gram of alkaloid, the toxicity is 28, the same as that of cocaine in 5 per cent. cocaine hydrochloride solution. In 1 per cent. solution, the toxicity of psicaine is 18 kilograms per gram. The new isomer therefore appears to have no advantage over the natural alkaloid as regards toxicity measured by the minimal lethal dose. The minimal convulsant dose seems to be almost the same as the minimal lethal dose: it was practically impossible to produce convulsions without killing the animal. Assuming that the same holds good in man, and further that there is some relationship between the dose required to produce excitement, nausea, fainting, etc., and that required to produce convulsions, it is seen why I consider the drug unlikely to become one of addiction: the dose necessary for excitement would be dangerously high—that is, psicaine probably has a high "danger ratio." This is important, since, if so, we shall not be warned when our clinical dosage is getting dangerously large. No one should use psicaine who has not acquired with the much safer (from this aspect) cocaine hydrochloride practice in safe dosage. When death occurs, it is from respiratory failure, the heart continuing to beat after the respirations cease. Under ether anaesthesia, deep enough to abolish reflexes, convulsions do not occur, but the same dose kills the animal, respiration gradually failing; it is not, in fact, the convulsions that cause death.

Summary.

1. Psicaine is the acid tartrate of an artificial isomer of cocaine. It is soluble in water, giving a definitely acid solution. The solution is not harmed by brief boiling. It requires the addition of salicylic acid to prevent the growth of moulds.
2. Used in the nose, 7 per cent. psicaine solution gives anaesthesia identical with that produced by 5 per cent. cocaine hydrochloride solution. The anaesthetic value of the new alkaloid is the same as that of natural cocaine.
3. The same "shrinkage" as is seen with cocaine is found in using psicaine.
4. The experimental toxicity of psicaine in 5 per cent. solution is three-quarters that of cocaine hydrochloride; the toxicity of the new alkaloid is therefore identical with that of cocaine.
5. It is probable that excitement, fainting, etc., will not be so readily produced by psicaine as by cocaine; it may therefore be useful in susceptible persons.
6. For the same reason psicaine should not be used except by those well accustomed to use cocaine; the dose of psicaine should not exceed that found safe with cocaine.
7. Psicaine is a "dangerous drug."
8. The price of psicaine has not yet been published.

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