

# THE BRITISH JOURNAL OF DERMATOLOGY AND SYPHILIS

APRIL, 1921.

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## SOME EXPERIMENTS ON THE VOLATILISATION AND ABSORPTION OF MERCURY.

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THE efficiency of the inunction method of administering mercury is generally admitted, but opinion is not unanimous regarding the path of absorption of the drug.

It is held by some that the heat of the body volatilises the mercury and that the vapour is then absorbed by the lungs. The contrary opinion is that the metal is absorbed directly through the skin.

Whilst the author held a temporary commission in the Royal Navy he had the opportunity of making some investigations into the matter.

That mercury does volatilise and that it does produce toxic symptoms in persons who are exposed to its vapour is not disputed, but the temperature of the metal is then far above blood-heat, and the frequency and risk of poisoning is said to vary directly with the temperature.

It seemed advisable to approach the matter from two aspects: firstly, to ascertain if mercury does volatilise appreciably at blood-heat; and secondly, to inunct patients under certain conditions designed to exclude any reasonable possibility of respiratory absorption.

About 30 grm. of mercury, contained in a flat dish and very exactly weighed was placed in an incubator. The dish containing the metal was protected from dust in such a way as to offer the least possible interference with the circulation of air over it.



At the end of forty-eight hours the dish and its contents were weighed again ; there was a small decrease in the fourth decimal place which might have been due to evaporation of a minute trace of water.

The experiment was repeated three or four times and always gave the same result, except on one occasion, when there was a slight increase in the fourth decimal place.

It was obvious from these results that the loss, if any, was in the neighbourhood of one ten-thousandth of a gramme—a quantity much too small to be of any therapeutic importance.

Another test was made at a later date. In each of two clean, dry evaporating dishes was placed a tiny globule of mercury, in size not quite half as big as a pin's head.

The dishes were put in the incubator and the size of the globules inspected from time to time.

Because of their extreme smallness one would have expected them to disappear entirely within a day or two if the rate of volatilisation was appreciable.

At the end of five days at blood-heat the globules were still quite unchanged in size.

The inunction of patients was then commenced. Four cases were treated in the following manner :

The patient was stripped to the waist and put in a chair close to a window. In the patient's mouth was placed one end of a stout rubber tube about 2 ft. long ; the other end was led out over the window ledge and the sash closed sufficiently to just touch and grip the tube lightly.

The patient's nostrils were plugged with lint, and the inunction of the patient's back commenced by a sick-berth steward wearing rubber gloves.

The area was rubbed for twenty minutes, after which the patient dressed, and was immediately sent out into the grounds of the hospital, where a fresh breeze was blowing, for the remainder of the day.

Before turning in at night his back was washed and a clean undergarment put on.

Under these conditions all chance of vapour reaching the patient's lungs during the inunction was excluded, and it is improbable that any was inspired whilst he was moving about in the open air in a breeze.



The back was washed at night to exclude the possibility of inspiring "mercury-laden" air under the bed-clothes.

The only person likely to inspire the vapour was the steward who inuncted the four cases. It may be stated here that the steward suffered no ill effect.

The dose was 2 drms. daily, continued until signs of mercurialism appeared, when it was immediately stopped.

The four cases may now be described with the results of the treatment.

CASE 1.—McC—. Typical psoriasis, but some shotty glands in neck. No other sign of syphilis. Wassermann negative.

On ninth day patient had diarrhœa and gingivitis. Eruption and glands unaltered.

On stopping treatment the diarrhœa and gingivitis promptly cleared up.

CASE 2.—P—. Trench feet. Wassermann positive. Slight soreness of gums on seventh day. Treatment continued. Gums same, but no worse until the thirteenth day, when dose was increased to  $\text{ʒiij}$ . Two days later marked soreness of gums and teeth with some diarrhœa.

Cleared up on stopping treatment.

CASE 3.—T—. Tertiary ulceration of larynx. Wassermann positive. Rather anæmic. On tenth day aural surgeon reported that ulceration was completely healed.

In view of clinical results inunction was stopped next day. Patient's hoarseness had gone, he had gained weight, felt very well, and no longer looked anæmic.

CASE 4.—C—. Hemiplegia, probably specific. Wassermann positive. Able to get about; spastic; grip very weak. Facial muscles affected. Treatment started.

On fourth day grip was improving; on eighth day still improving; on fourteenth day grip much improved, gait much better, facial paralysis disappearing, gingivitis starting. Treatment therefore stopped.

Whilst receiving inunction the patients received no other form of treatment.

It will be seen that considering the dose given the onset of mercurialism was as rapid as one would expect after inunction in the usual way without precautions.



Incidentally it is perhaps permissible to recall an old method of inunction by smearing the soles of the feet with ointment. It was said to be effective, so if the respiratory theory is correct the sufferer was healed by a sort of mercurial miasma rising from the ground.

#### CONCLUSIONS.

(1) The rate of volatilisation of mercury at blood-heat is insignificant.

(2) In the inunction method of administering mercury the metal is absorbed through the skin.

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## ON CREEPING DISEASE.

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*(Continued from p. 102.)*

*Creeping Disease in Japan.*—On February 2nd, 1912, Prof. Dohi\* reported the first case of creeping disease in Japan at the annual meeting of the Tokyo Branch of the Japan Dermatological Society. He found a parasite in the lesion. The illustrations of the stained tissue, the larva installed in it and the wax model of the lesion were published in vol. ii, p. 1005, 4th Edition of his *Dermatological Studies*.

(1) Prof. Dohi's case, 1911: The patient was a man aged 40 years. Two years before he went to South China, and while staying at Yüeh Chou he contracted dysentery. On returning to Japan he went to Shiobara for recuperation. In May, 1911, he again showed symptoms of dysentery. He returned to Tokyo on October 12th and entered a certain hospital on the 15th. Just before leaving it he suddenly felt an itching sensation in the hip. The doctor said that it was an insect sting, and applied alcohol liniment with no effect. On the 20th Dr. Shiga examined him and still found in his intestinal discharge dysentery amœbæ. At that time he had already a linear eruption on the itching portion of his buttock. Dr. Shiga referred him to Prof. Dohi for the examination of the eruption. The latter diagnosed this case as creeping disease and invited the patient to his dermatological laboratory for treatment on November 1st. The next day he made a wax model of the lesion. At the time the patient's itchy feeling was not at the extremity of the line on the shoulder, but on an apparently unaffected spot about 1 cm. distant from a nodule as large as a bean on the inner margin of the shoulder-blade. After much deliberation he determined to excise

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\* *Japan. Zeits. f. Derm. u. Urol.*, xii, No. 3, p. 92.



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