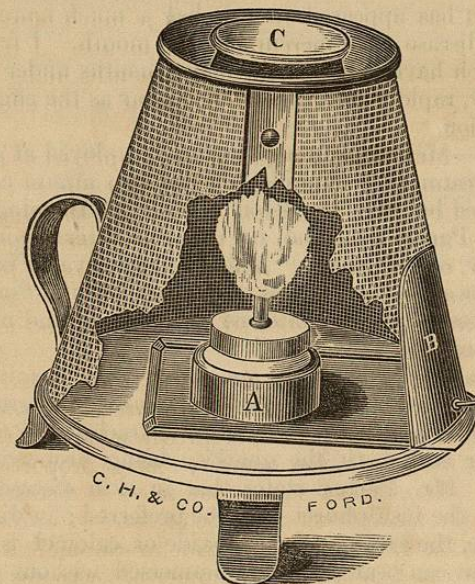


of the body may remain and be further absorbed. In order to prevent too sudden a change of temperature, it is well for the patient to remain enveloped in the blanket on going to bed, or, before immersion, he may put on a long flannel night-gown, which can be drawn up

FIG. 138.



Lee's lamp for fumigation. This lamp is now made of wire gauze, and resembles the safety lamp of the miners, thereby guarding against sudden explosions of the alcoholic vapors.

around the neck until he is ready to retire. I have never, however, seen any ill-effects from "taking cold," nor found it necessary to restrict patients with regard to exposure to the weather any more than when giving mercury by the mouth. When put to bed it is well to give the patient a tumblerful of the compound decoction of guaiacum or sarsaparilla, as hot as he can drink it.

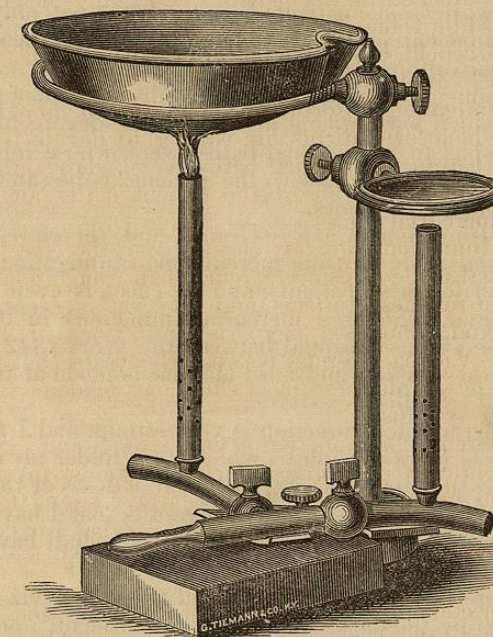
The late Dr. Thomas F. Maury, of Memphis, invented an apparatus for the same purpose, which may be attached to any ordinary gas fixture; and which avoids the danger of using a lamp containing alcohol (Fig. 139).

In the absence of these contrivances an excellent plan is to dissolve any soluble compound of mercury, as corrosive sublimate, in water, and subject the same to ebullition by any ordinary process; or a simple apparatus may be extemporized by heating a brick and sprinkling the calomel upon its surface, at the same time placing a pail of boiling water by its side beneath the chair.¹

¹ Prof. David W. Yandell, M.D., has published an excellent lecture on the Mercurial Vapor-Bath, which is worth reading. Am. Pract., Louisville, Sept., 1877.

The frequency of the baths should be determined by the strength of the patient and the degree of mercurial action desired. In cases of secondary syphilis, when the strength of the patient is fair, every night is not too frequent; in debilitated subjects, and in cases of tertiary syphilis, when only a slight effect from mercury is desired, from

FIG. 139.



Professor Maury's apparatus for moist mercurial fumigations. It consists of two Bunsen's burners, one of which is surmounted by a pan to contain the water, and the other by a small shallow dish for the preparation of mercury. The apparatus is attached by means of a flexible tube to any ordinary gas-fixture.

one to three times a week is sufficient. During the period of their administration the patient should wear flannel next the skin, and observe the hygienic rules heretofore laid down; and mercury in minute doses, iodide of potassium, or tonics may be given internally. The syphilitic symptoms often exhibit an improvement after the first or second bath, and generally disappear in the course of from one to three weeks, but the treatment should be continued for at least some weeks longer.

The most frequent complaint made by patients against this mode of treatment is a feeling of debility, and sometimes headache: effects which I believe to be due to too great an amount of steam. The difficulty may be obviated by diminishing the amount of water, and shortening the duration of the bath. If necessary, so little water may be used that the whole of it will be evaporated in the course of ten minutes, after which the force of the flame is expended upon the mer-

cury. The gums frequently become tender, but decided salivation is very rare. In some instances the physiological effect of the mercury is manifested by severe diarrhœa, such as often takes place after the prolonged internal use of the mineral.

We are inclined to think that the absorption through the skin is very slight, and that the effect is proportioned to the amount of the mercurial vapor inhaled by the patient. Certainly the effect is not constant; and while some patients bear the baths not only with impunity but with benefit, others are obliged to abandon them from the occurrence of salivation, headache, weakness, etc.

Mercurial fumigation unfortunately requires an amount of time and attention which few patients are willing to devote to it, or recourse must be had to professional bath-givers, whose inherent tendency would seem to be to absorb the patient at the same time that he absorbs the mercurial fumes.

Inunction.—Inunction is a less cleanly, and, therefore, more disagreeable external mode of using mercury than fumigation; but it is more convenient for most patients, and its effect is even more satisfactory. Sigmund, who used mercurial inunctions in 9379 cases, occurring at the Vienna Hospital between the years 1842 and 1855, regards this as the simplest and most efficacious mode of treating the various forms of syphilis.¹

My own preference for inunction is very strong, and I resort to it in most of the old cases of syphilis which come under my care, while administering at the same time internally large doses of the iodide of potassium. Some of the most gratifying results that I have met with in practice have been obtained in this way, as I shall have occasion to notice hereafter.

The chief objection against this mode of treatment, viz., the staining of the linen by the dark-colored "blue ointment," and the consequent risk of exposure, has been obviated by the introduction of the oleates of mercury. The latter, which are liquid up to the ten per cent. oleate at least, may be used pure. I prefer, however, the twenty per cent. preparation combined with an equal weight of simple cerate.

R. Hydrarg. Oleinici,
Cerati Simpl., aa, ʒi 30|00
M.

This forms a consistent mass, of a light fawn color, which is free from the above-mentioned objection. The oleates, however, are more apt to irritate the skin than the ung. hyd. They should, therefore, be used with greater caution, and they require less friction in their application.

In making the applications, it is better to avoid the more delicate portions of the skin, and also those portions which are exposed to

¹ Medical Times and Gazette, May 5, 1857; from the Wien Wochenschrift, 1856, No. 36. Sigmund has published a pamphlet on this subject, entitled Die Einreibungseur bei syphiliformen, Wien, 1878.

friction or motion, or are usually covered with hair. For the sake of cleanliness, the application may be suspended, and a bath of hot water with soap be taken once a week. For the sake of convenience, I usually furnish patients with a copy of the following directions:

Before commencing the treatment, take a hot bath and cleanse the skin thoroughly with soap.

The evening, before retiring, is the most favorable time for the application, when a piece of the ointment, about the size of the terminal joint of the forefinger, is to be rubbed, with the palm of the hand, into some portion of the surface of the body or extremities for about fifteen minutes.

At each application, a fresh surface should be selected, so as to avoid irritation from excessive friction of any one portion.

Any of the ointment which remains after the rubbing should be left upon the skin and not be washed off; and the patient should wear the same flannel or merino underclothes constantly night and day. The following order may be followed in the applications:

- 1st evening, to the buttocks.
- 2d " to the thighs, but not near the groins or scrotum.
- 3d " to the sides of the chest, but not in the armpits.
- 4th " to the internal surfaces of the arm and forearm.
- 5th " to the back or belly. The former application is best made by an assistant, whose hand is protected by a glove.
- 6th " omit the application.
- 7th day, take a bath in the morning, change underclothes, and the evening resume the applications as above.

Keep the mouth and teeth clean by the use of a brush and an astringent lotion, and the bowels open. If any symptoms of salivation occur, such as increased flow of saliva, tenderness or swelling of the gums, fetor of the breath, etc., the applications should be suspended, and the body cleansed with soap and water.

If the oleate of mercury, instead of the mercurial ointment, be employed, less friction is required, and little more is necessary than to smear the remedy over the surface.

When only a mild effect from mercury is desired, the extent of the application may be limited. Thus, the ointment may be rubbed into the soles of the feet every night, or some of it may be spread upon pieces of chamois leather, which are to be stitched to the drawers, at points corresponding to the hams and the calves of the legs.

A modification of the inunction method has been proposed by Schuster, of Aix-la-Chapelle,¹ which he considers equally as effica-

¹ Die Mercurseife, savon Napolitain. Vierteljahr, für Derm. und Syphilis., Heft 1, 1882.

cious and more elegant than it. This method is by frictions of the skin with a mercurial soap made in Paris, and called *savon Napolitain*. A good lather is made with water, and allowed to dry on the skin leaving a thin film of mercury. This can be applied over a more or less extensive surface, but its too frequent application may cause dermatitis. The lather is less objectionable in odor and in feeling than the mercurial ointment. In one case thus treated, mercury was found in the urine, which fact, together with improvement of the patient, proves the efficacy of the application. Oberländer¹ indorses the method, but prefers a soap originated by himself, which is composed of one part of mercury combined with three of green soap, and perfumed with oil of lavender. Oberländer claims that the lather made from this soap is of lighter color than that of the French preparation, and that it is actually absorbed into the skin, even without much friction. While, as yet, I have no experience with this agent, I can see that it may, in many instances, be advantageously employed.

Mercurial Suppositories.—Suppositories, composed of about a drachm (4.00) of mercurial ointment and a sufficient quantity of butter of cocoa, one of which is introduced into the rectum every night, have been tried in the treatment of syphilis, with unfavorable results. They can seldom be borne for any length of time, on account of the tenesmus, colic, rectal catarrh, and frequent desire to go to stool which they soon occasion. The syphilitic lesions appear to be little benefited by them, and they often salivate.

Hypodermic Injection.—The hypodermic injection of preparations of mercury has, of late years, attracted attention, and deserves to be regarded as a valuable addition to our means of treatment in certain cases. Its general adoption, however, as a means of treatment is not, I think, to be recommended, since the injections are followed by considerable pain, lasting often for several hours, and there is always a possibility of causing troublesome abscesses at the points of insertion. We find it of value in those cases in which a very speedy action of mercury is desired, and are in the habit of using it especially in cases of early malignant syphilis, in which, within a few months after infection, the patient exhibits deep ulcerations of the fauces or ecthymatous ulcers scattered more or less generally over the integument. In such instances, I know of no better treatment than the internal administration of the potassium iodide in large doses, combined with hypodermic injections of corrosive sublimate.

The preparation of mercury recommended by Scarenzio, of Pavia, and first used for this purpose, was calomel, of which about three grains (0.20) were rubbed up with about a quarter of a drachm (1.00) of glycerine for each injection, which was repeated at intervals of a week. These injections were found, however, very frequently to produce troublesome abscesses, and smaller quantities of calomel, from

¹ Die Mercurseife, ein neues und praktisches Ersatzmittel für die mercursalbe. Vierteljahr. für Derm. und Syphilis, Heft. 4, 1882.

a grain and a half (0.09) to a grain (0.06), were employed at shorter intervals, as every third or fourth day. The danger of abscesses was diminished with the small doses, but was not entirely removed, so that injections of calomel have been pretty much abandoned.

Subsequently, Lewin,¹ of Berlin, resorted largely to injections of corrosive sublimate, of the strength of four grains (0.25) to the ounce (30.00) of distilled water, and of this fifteen minims (1.00) were employed at each injection. The pain following the injection was found to be alleviated by adding one-tenth to one-eighth of a grain (0.006–0.008) of acetate of morphia. Lewin made his injections daily, or sometimes even twice a day, so that one-fourth of a grain (0.015) of the sublimate was inserted within twenty-four hours, and he stated that about fifteen injections would usually suffice for a cure, although forty to fifty were sometimes required. So great frequency appears to us both undesirable and dangerous at the outset, as I have found salivation produced by one or two injections, and I prefer, until the patient's susceptibility has been tested, to wait some two or three days after each insertion before repeating it, meantime watching the effect. Lewin found the different parts of the body equally available, so far as the power of absorption is concerned; but it is important to select a portion presenting the least sensibility in the integument, and the least tendency to the occurrence of inflammation and the formation of abscesses, and the infrascapular regions, the loins, and the upper portions of the nates possess these requisites in the highest degree. The arms had better be avoided. There is reason, however, to believe that mercury causes the lesions of syphilis to disappear, quite as much by its direct local action upon the lesion itself as by any alteration in the constitution of the blood which it effects. Consequently I prefer, if possible, to make the injection in the neighborhood of the lesions we hope to cure. The same rules as to the avoidance of veins, injecting only into the derma, wounding the hair bulbs, etc., obtain as with all hypodermic injections. The same syringe should never be used on syphilitic and non-syphilitic subjects. After injecting corrosive sublimate the point of the syringe should be carefully washed and dried, and sharpened, if necessary. This will not, however, entirely prevent its being corroded by the sublimate, and points used for this purpose must be frequently renewed. The pain following the injection is often severe, lasting for several hours. If sufficient care be used, the recurrence of abscesses will not be frequent. Salivation should be carefully guarded against.

My experience with hypodermic injections in the treatment of syphilis has been chiefly confined to solutions of corrosive sublimate, with which I have had every reason to be satisfied. A formula which I have used in very many cases is the following:

R. Hydrarg. Chloridi Corr., gr. xl	2 60
Glycerinæ, ℥j	5 00
Aquæ Destill., ℥vj	24 00
M.	

¹ Behandlung der Syphilis mit subcutaner Sublimat-injection. Berlin, 1869.

Twelve drops (0.80) of this solution contain about one-eighth of a grain (0.008) of the sublimate, and are used for each injection.

M. Stern¹ has recently proposed a solution of the double chloride of mercury and sodium, which, he states, will not produce abscesses, and causes only very slight stomatitis, if any. His formula is as follows:

R. Hydrarg. Chloridi Corr., gr. iv 0.25
Sodii Chloridi Puri, ℥ij 2.50
Aque Destill., ℥xiiij 55.00
M.

Half a drachm (2.00) of this mixture is daily injected, thus giving a dose of one-sixth of a grain (0.01) of the sublimate.

But there is scarcely any end to the other solutions of mercury which have been recommended, chiefly on the ground that they were less likely than corrosive sublimate to produce abscesses or occasion stomatitis. Having had no experience with most of them, and being well satisfied with the mercuric chloride, I shall do little more than enumerate some of them.

The substitute for corrosive sublimate which has attracted most attention has been the albuminate of mercury, first proposed by Staub,² of Strasburg, in 1871, and afterwards adopted and popularized by Professor H. von Bamberger, of Vienna, who states that its action is most rapid; that all syphilitic symptoms disappear after ten to twenty injections; that suppuration and infiltration of the skin are avoided; and that salivation never occurs. For the mode of preparing this solution, which is somewhat complicated, we must refer to the original.³ We had several bottles put up, one summer, by the eminent chemist, Dr. Squibb, of Brooklyn, but the fluid became so soon decomposed that we were unable to give it a fair trial, and were discouraged from testing it further.⁴

Dr. Squibb says that the solution is pretty accurately as follows:

Egg albumen,	20 per cent. =	Dry albumen,	25 per cent.
Mercuric chloride,	1 " =	1.0 "	
Sodium chloride,	4 " =	4.0 "	
Distilled water,	75 " =	92.5 "	
	100	100	

The amount to be used at each injection is a cubic centimeter, or about fifteen minims, which contain one-seventh of a grain (0.01) of the mercuric salt. It does not seem to be a true definite chemical compound, but merely a solution of the very irritant chloride of mercury in a saline albuminous fluid, the chloride being unchanged, but guarded by the blandness of the solvent vehicle.

¹ Progrés méd., Paris, déc. 21, 1878.

² Traitement de la syph. par les injections hypodermique de sublimé à l'état de solution chloro-albumineuse, Paris, 1872.

³ Zeit. d. öest. Ap Ver., 1876, 147, 177. Also, New Remedies, N. Y., 1876, pp. 167, 175.

⁴ Professor Bamberger, on the contrary, states that this solution may be kept in a (German) heated room all winter without undergoing change.

In a later communication we learn that the difficulty of preparing a stable and clear solution of the albuminate has led Bamberger to replace the albumen by peptone. Injections of the albuminate of mercury have been favorably reported upon by Neumann in a paper before the Imperial Academy of Medicine of Vienna, and by Grünfeld.¹

Daily injections of seven to fifteen drops (0.50-1.00) of four to five grains (0.22-0.30) of the bichloride of mercury to an ounce and four scruples (40.00) of distilled water were employed by Sigmund,² who states that within a period of ten years he has made injections upon six hundred and thirty-one persons, and has met with only five cases of abscess. He prefers, however, his favorite mode of treatment by inunction. The bichloride has also been used by Kroworzynski,³ and by Galezowski, in optic neuritis.

Gambarini, of Bologna, employed a solution of the biniodide of mercury, to which Ragazzoni⁴ added a little iodide of potassium, to insure the complete solution of the salt. His formula was this:

R. Hydrarg. Biniodidi, gr. ss 0.03
Potass. Iodidi, q. s.
Aque Destill., ℥ss 2.00
M.

Dr. Weisfolg uses injections of the nitrate of mercury, according to the following formula:

R. Hydrarg. Oxid. Nit. Crystall., gr. viij 0.50
Aque Destill., ℥xiv 56.00
M.

He states that they are less harmful than injections of the mercury perchloride, do not cause abscesses, and supply the system with a much larger quantity of soluble mercury without causing salivation, than can be done in any other way.⁵

It is claimed by Lewin that the results of the hypodermic injection of mercury are always satisfactory, except in cases of bone or brain syphilis, and that relapses are less frequent than after the internal administration of mercury or its external use by fumigation or inunction. Sigmund, on the other hand, believes that the field for its employment is limited, and that it is adapted only for the milder eruptions of the secondary stage. For obvious reasons, it is not to be employed on pregnant women nor on young children.

Professor Liebreich⁶ has added another new remedy to our syphilitic armamentarium, which he calls hydrargyrum formidatum. The agent, the composition of which was not given, belongs to the amide

¹ Wien. Med. Presse, No. 38, 1876.

² Wien. Klinik, Oct., 1876.

³ Vrtljschr. f. Dermat., Wien., Heft 2, 1876.

⁴ Gior. ital. d. mal. ven., Milano, anno viii., 1873, p. 65. Also, Lancet, London, Nov. 1, 1873.

⁵ Arch. f. path. Anat., etc. (Virchow), Berl., B. 66, S. 3111; and Practitioner, Lond., Mch., 1879, p. 216.

⁶ Medical Times and Gazette, Jan. 6, 1883.

group. On the theory that the amides pass out of the system undecomposed, and that when combined with a metal, decomposition took place, leaving the latter free, Professor Liebreich was led to think that the remedy would prove useful in the treatment of syphilis. It is readily soluble in water, of neutral reaction, does not coagulate albumen, and is peculiarly suitable for hypodermic injection, by which method Liebreich employed it. Thus used its action is rapid, but does not, it is said, produce salivation. Its originator used a one per cent. watery solution, of which he injected from one-half to a whole of a Pravoz syringeful, twice or thrice daily.

EFFECTS OF MERCURY.—Before commencing treatment for general syphilis, a patient is often weighed down with languor and general malaise, which are the effect of his disease; under the use of mercury, his strength and spirits improve, and he becomes light, active, and buoyant; mercury thus far has indirectly acted as a tonic; after continuing treatment for some time, however, it is frequently the case, that although his symptoms have constantly improved, he is again subject to depression, but if questioned as to the cause or nature of his feelings, can give no satisfactory reply; his low spirits and uncomfortable sensations cannot be defined or explained, but are none the less real. This condition is unquestionably due to the prolonged influence of mercury, since it yields to a suspension of specific remedies, whether aided or not by a cathartic, and a change of air and scene for a few days, when this is practicable. These conclusions from clinical experience are borne out by analyses of the blood and by actual counting of the red corpuscles in a given quantity of the blood of healthy men and animals, while under the influence of small and large, or long-continued, doses of mercury. Liégeois¹ was the first to announce that small doses of the sublimate, under the above circumstances, would cause an increase of weight, while large doses diminished it. In 1874, Wilbouchewitch² drew the conclusion from careful experimentation, that small doses of mercury, when given to a syphilitic patient, at first increase the number of red corpuscles, and slightly diminish the number of the white globules.

But, for further light on this subject, we are indebted to a very valuable paper³ by Prof. E. L. Keyes, who, by means of the hématicimètre, made countings of the number of red corpuscles of the blood of syphilitics while taking small doses of mercury, and who arrived at the following conclusions:

¹ Des résultats cliniques et scientifiques obtenus avec les injections sous-cutanées de sublimé à petites doses dans l'étude de la syphilis, *Gaz. d. hôp.*, Paris, 88, p. 347; 89, p. 350, 1869.

² De l'influence des préparations mercurielles sur la richesse du sang en globules rouges et en globules blancs. *Arch. de physiol. norm. et path.*, Par., 1874, p. 508.

³ The effect of small doses of mercury in modifying the number of the red blood-corpuscles in syphilis; a study of blood-counting with the hématicimètre. *Am. J. M. Sc.*, Phila., Jan., 1876.

1. Mercury decreases the number of the red cells when given in excess, especially in hospitals (Wilbouchewitch).
2. Syphilis diminishes the number of red corpuscles below the healthy standard.
3. Mercury in small doses continued for a short or for a long period in syphilis, alone or with the iodide of potassium, increases the number of the red corpuscles in the blood and maintains a high standard of the same.
4. Mercury in small doses acts as a tonic upon healthy animals, increasing their weight (Liégeois). In larger doses it is debilitating or fatal.
5. Mercury in small doses is a tonic (for a time at least) to individuals in fair health, not syphilitic. In such individuals, it increases the number of the red corpuscles.

In whatever way mercury is introduced into the system, its presence in the normal secretions and excretions of the body may be demonstrated by our improved modern methods of analysis, as shown by Byasson,¹ Betelli,² and Ludwig.³ The bichloride taken by the mouth has been recognized in the urine two hours, and in the salivation four hours after its ingestion; still later it is found in the sweat, and in the milk of nursing women. A considerable portion is eliminated by the bile, and is found in the stools, and traces of it may be discovered in the various tissues for a considerable time after the cessation of treatment.

How mercury acts in the cure of syphilis, is a question still under discussion; whether directly upon the syphilitic diathesis, or simply as an antiplastic agent upon the neoplasm which characterizes the lesions of this disease, or, in other words, will mercury so attenuate and even exterminate the syphilitic influence as to protect the patient for the future—in fact, cure him, or does it simply cause the disappearance of existing lesions? In my opinion, it acts in both these ways. No one can question its influence upon the lesions themselves, which it accomplishes by controlling the hyperæmia of the various tissues invaded, and by causing the fatty degeneration and death of the specific cells which characterize syphilitic manifestations. But I go further than this, I believe it capable of removing the diathesis, and, in fact, of curing the disease. Without this belief, our continuance of mercury after the disappearance of the lesions would be illogical, and the advantages of such continuance are demonstrated by daily observation.

Many practitioners are very averse to the use of mercury with patients who show any tendency to pulmonary disease. We believe that this fear is groundless, provided this agent be used in the small

¹ Recherche du mercure dans les sécrétions; *J. de l'Anat. et de la Physiol.*, Par., 1872.

² Merc. vinvenuto nelle urine di quattro malati sif.; *Gior. ital. d. mal. ven.*, Milano, 1876, p. 149.

³ Sigmund, *Wien. Klinik*, Oct., 1876.