

excellent results. The ointment should be rubbed in until it has practically disappeared, with a gentle kneading motion of the hand, or, better, the two hands—practically the movement used in massage. The hand of an assistant, if such be employed, need not be protected by gloves, seeing that a talc paste, such as the modified Lassar may practically be made protective. The rubbings are preferably made at night, after which the patient retires to bed in clothing which is suffered to be soiled by contact with the salve. Diaphoresis induced by the drinking of hot fluids afterward (milk, spirits, etc.), recommended by some authors, is unnecessary in order to secure the best results of the treatment. In hospitals it is customary to make the patients rub each other, usually on the back and simultaneously, the ward nurse having then to anoint but a single patient in the line. It is usual to order from one to four or five scores of rubbings, to be given on successive or alternate nights or at intervals of several days. Often it is desirable to give a course of twenty inunctions, after which the rubbing may be suspended while other treatment is pursued, the inunctions being renewed until the entire number advised is completed. When required, for special reasons, a useful method of inunction is to order the skin well rubbed with the salve, the part anointed being then covered by the customary clothing, which is worn afterward for a series of days. In this way stockings impregnated with the ointment may be kept in contact with the feet, while flannel undergarments may be employed with the same end in view. There are, however, few patients who relish the dirtiness and messiness of this practice, which is, in general, to be reserved for special cases, such as those where

neither the patient nor professional masseurs can do the work.

When giving inunctions, the rule enunciated with respect to mercury by the mouth should not be forgotten. The ferruginous tonics are to be administered systematically while the patient is under the influence of the metal. He should also be given a generous diet and should have out-door air and exercise.

The regions selected for inunction of the body are of some importance, as it is desirable that the ointment be rubbed into those parts where the skin is provided with glands through whose excretory orifices the metal may gain access to the economy. It is also desirable, in view of the readiness with which mercurial inunctions induce an artificial dermatitis in the region of application, that a new area of inunction be selected on successive days. This area secured, however, the refinements of authors respecting the selection of special regions of the body for inunction have little foundation in the way of attaining practical results. Inunctions of the thick sole of the foot are often as efficient as those on the sensitive and thinner integument of the groin or over the subclavian regions.

We are in the habit of ordering inunctions first for regions of the upper segment of the body in succession, and later for those of the lower half successively, for reasons connected chiefly with the garment worn after the completion of the process. In this way, on one night the thighs and groins, on another the legs and soles, are anointed, and after this the drawers or pajamas worn are washed; on other nights the surface of the belly and the breast, the arms and the axillæ, the back, or the neck and the head may be smeared. It is to be



borne in mind, further, that when the inunction is not employed with a view to acting directly upon lesions present upon the integument, the value of the inunction as regards the general system is as great when applied in one region as another; and it is a matter of importance to encourage patients, especially those in private practice, to continue with their inunctions for the longest period advised. For the most part, they will consent to rubbings of the lower portions of the body for a longer time than to inunctions of the upper regions. The penis, scrotum, anus, face, ears, and the vulva and breasts of women are in general to be spared.

There are few patients, whether informed or not, who remain ignorant of the nature of the treatment when inunctions are employed. As a consequence, they are at times exceedingly anxious about "catching cold," using acids in their dietary, etc., for fear of toxic results. While due prudence must guide the practitioner in advising patients on these points, it is rare, with a properly advised course of inunctions and with the subject of the disease kept under the observation of an intelligent physician (as should always be done throughout the treatment of syphilis), that accidents happen, even after imprudent behavior on the part of the patient.

When inunction is practised with a view to direct medication of the skin (for example, in case of palmar or plantar syphilodermata), care should be observed to make the applications so far as practicable over all persistent lesions present. It is the skilful obliteration of all foci where infective cells, micro-organisms, or toxins may be present that preserves against the lighting up of morbid processes in these centres of undiminished activity.

When a dermatitis is induced by the frictions incidental to the inunction process or as a consequence of the mercurial application, the results are rarely serious. Discontinuance of further rubbings over the region which thus expresses its resentment will usually suffice, in the course of a few days, to relieve the symptoms. In any case where treatment really seems needed, the application of a simple dusting-powder or of Lassar paste usually suffices to allay the itching and the local irritation.

The modified Lassar paste is made by adding 2 to 4 drachms each of talc and zinc oxide to  $\frac{1}{2}$  ounce of white vaseline, with from 5 to 20 grains of salicylic acid, the whole rubbed together until a smooth and impalpable paste results. It is more or less adherent to the skin, and, apart from the value of its medicinal constituents, has the advantage of protecting the surface to which it is applied.

*Fumigation.*—The treatment of syphilis by the aid of the mercurial vapor-bath is both efficient and speedy. In any emergency it is capable of producing more rapid effects in a given time than any of the methods thus far described. In the large cities it is customary to send patients to bath establishments, where, by the aid of somewhat elaborate apparatus, aided by steam-supply and by special devices for exposure of the head without necessitating inhalation of the vapor, the patient is fumigated by the aid of trained assistants. However, with the Lee or the Maury apparatus, and an extemporized chamber, constructed either of bed-blankets or of ticking, which can be fashioned by any seamstress so as to encompass the patient's body as high as the neck, the same results can be attained with trifling trouble and expense.



Indeed, without any special apparatus, an ordinary tin-smith can construct a pan for holding the metallic salt to be vaporized over a spirit-lamp, which, with a kettle of boiling hot water by its side, furnishes all required accessories.

Calomel or cinnabar is usually selected for vaporization, and often the two in combination—about one-fourth more of the latter than of the former when the two are commingled. From 1 to 3 scruples of the single salt or of the two may be employed at a sitting, the quantity being estimated not merely from the condition of the patient but from the size of the chamber to which steam is admitted, since much more may be used in the large receptacles of the bath-houses than in the extemporized blanket or ticking tent which may be employed by a country physician at the bedside of his patient. The exposure should last for about half an hour—less if the patient becomes faint during the steaming. As a rule, the subject of the disease should be fasting at the bath-hour, which is preferably that preceding his or her accustomed hour of sleep. As it is by no means rare for the subject to become faint, it is well to have a stimulant at hand, and, even in sending patients to the bath-houses, to advise the carrying with them of a small flask of sherry or brandy. A bath every third or even every second day is sufficient save in cases of emergency—as when there has been ignorance of the nature of the disorder before the first consultation, and the patient has a highly disfiguring facial exanthem forbidding his or her customary association with family or friends. In such event, and for brief periods of time, a bath may be taken daily; but in these cases, as well as in the others, it is needful to remember that the patient is often debilitated

by the steaming, even when vastly improving in the matter of the removal of the lesions which place his case in the emergency class. These emergency cases, furthermore, are often those of patients suffering from febrile reactionary symptoms (syphilitic fever), and the need of ferruginous tonics, of quinine in ample doses, and even of a generous glass of wine with the dinner, should not be forgotten. Local mercurial fumigation by means of the apparatus sold in the shops is of value in many cases for direct application of the vapor both to the skin and the mucous cavities. We have, however, practically limited our use of this method to the nasal passages, where its value is without question. In country practice, where apparatus of the desired sort is not immediately at hand, a hot flat-iron and a paper cone answer admirably for directing mercurial fumes into the nasal passages. The dose of calomel or of cinnabar selected for local fumigation must be reduced considerably from that used in the general bath. For the nose from 2 to 5 grains of calomel may be vaporized; for the face a somewhat larger dose may be used.

*Hypodermatic Injection.*—This method of introducing mercury into the system is properly described after the others, since, as a matter of practical experience, it is not only employed far less often than others, but promises to be reserved at no distant date for use only in special cases. By it the metal, pure or in combination, is injected directly beneath the integument.

The advantages of this method are rapidity of effect, the sparing of the digestive tract (a feature which it shares with both fumigation and inunction), its simplicity and cleanliness as contrasted with the two methods named, and its surrender of the dosage into the hands



of the practitioner, and of him only—a feature of importance. Other advantages claimed, but not yet demonstrated to the satisfaction of experts, are the speed with which it effects a radical cure, the failure of relapses in the cases thus treated, and the exclusion of the gummatous phases of the disease. The objections to the method are great: it has often proved dangerous, and in a few instances fatal; it is liable to produce furuncles, nodes, abscesses, sloughing, and other lesions at the site of injection; it is likely to beget an overweening confidence on the part of both physician and patient that the disease is in course of radical treatment, while precious time is lost that might have been employed in protecting the victim of the malady from its ravages at a future epoch.

If, nevertheless, a hypodermatic mercurial treatment be selected, too much care cannot be taken in the preparation of the skin and the instruments before the operation. Only sterilized solutions should be employed, and the skin over the region of introduction should first be cleansed thoroughly with warm water and soap, then dried, then washed with alcohol and dried, and then moistened with a 1:1000 solution of the sublimate. The needle employed should be of steel, gold, or silver, somewhat longer than that of the ordinary instrument, and in an aseptic state—as also, needless to add, should be the hands of the operator. The region most often selected for injection is the post-trochanteric, with the patient reclining on his belly and the muscles completely relaxed. The needle, with syringe attached and charged, taken from a 5 per cent. carbolyzed bath in a tray, should be pushed slowly down to the region where the salt is to be deposited, the physician avoiding always, first,

entrance to a vein (known by the ease with which the syringe begins to discharge its contents, as contrasted with the obstruction encountered in muscle), next, regions of unusual pressure or friction, and, lastly, the inferior portion of the derma or very near the panniculus adiposus, where severe sloughing may follow.

The damage resulting from hypodermatic injections of mercury may be the formation of nodes, abscesses, erythematous patches, and sloughing at the site of the deposit; alarming cardiac and pulmonary symptoms after injection within a vein; sudden death; exhaustion coming on slowly after the operation; considerable pain, at times agonizing, at the site of the puncture; and salivation, with other systemic signs of the toxic action of the medicament. In well-managed cases, however, it is to be admitted that, with a properly constituted solution and with due precautions, hundreds of injections have been given with no untoward consequences.

A great amount of literature exists on the subject of hypodermatic injections of mercury for relief of syphilis, and the list given of selected articles employed for the purpose is intended to serve chiefly as an index.

*Soluble Salts of Mercury.*—Corrosive sublimate is employed for hypodermatic injections in the strength of from  $\frac{1}{12}$  to  $\frac{1}{10}$  grain, dissolved in a few minims of water suspended in olive oil, or emulsified, as with vaseline or mucilage. The injections may be made as often as once every second or third day. The following are practicable formulæ:

℞. Hydrarg. chlor. corros.,           gr. j;  
       Glycerin.,  
       Aq. dest.,                             āā. fʒj.—M.  
 Sig. Inject 10 minims.



Ry. Hydrarg. chlor. corros., gr.  $\frac{1}{4}$ ;  
 Sod. chlor., gr.  $\frac{3}{4}$ ;  
 Aq. dest., fʒj.—M.

Sig. Inject 60 minims.

Ry. Hydrarg. chlor. corros., gr. x;  
 Acid. tartar., ʒss;  
 Aq. dest., fʒj.—M.

Sig. Inject 10 to 12 minims.

Other preparations of this group are the following:

*Asparagin-mercury*.— $2\frac{1}{2}$  drachms of asparagin are dissolved in warm water, and a saturated solution is made with the mercuric oxide; this solution is filtered and diluted to a 2 per cent. mercuric solution, and  $\frac{1}{8}$  grain of mercury is injected. The *succinimide of mercury* is injected in 5 per cent. aqueous solution, so that from  $\frac{1}{60}$  to  $\frac{1}{20}$  grain is employed at a dose. The *oxycyanide of mercury* is injected in doses of 15 grains, containing a trifle more than 1 per cent. of the metal. Bamberger's *mercuric albuminate*; Martineau's *mercuric peptonate*; *Staub's mixture* of mercury, chloride of ammonium, chloride of sodium, and albumin; and *Gaillard's combination* of mercuric biniodide and sodium phosphate, are all too unstable to be worthy of reliance. *Nourry's formula* for the iodo-tannate is as follows:

Ry. Hydrargyri, gr.  $\frac{1}{10}$ ;  
 Iodini, gr.  $\frac{1}{4}$ ;  
 Acid. tannic., gr.  $\frac{3}{10}$ ;  
 Glycerin., gtt. xv.—M.

Other soluble preparations which have been recommended are the *carbolate of mercury* ( $\frac{1}{8}$  to  $\frac{1}{3}$  grain for

injection), the *formamide* in 1 per cent. solutions, the *alaninate*, and the *benzoate*, each of which has its partisans, and none of which has succeeded in achieving a large usage at the hands of experts.

*Insoluble Salts of Mercury*.—*Calomel*,  $\frac{1}{2}$  to 3 grains suspended in a chloride-of-sodium solution, in mucilage, in glycerin, or in oil, has been injected every five to ten days, as well as *metallic mercury*, from 5 to 20 grains in a similar vehicle.

*Oleum cinereum* (gray oil) is made by emulsifying lanolin and chloroform and adding metallic mercury in double the quantity of the unguent: 20, 30, and 50 per cent. ointments are compounded with this basis, by the addition of olive oil. From  $\frac{1}{2}$  to 1 grain of the 50 per cent. solution has been injected once or twice weekly, with progressively increasing intervals between the injections. *Yellow oxide of mercury* has been added to mucilage or olive oil and injected so that from 1 to 2 grains have been used at a single dose. The *black oxide of mercury* is employed in 10 per cent. oil, in glycerin, and in gum emulsions; and *cinnabar*, in the strength of 1 grain suspended in oil.

The conclusions which it is safest to accept, after reviewing the subject of hypodermatic injections in syphilis, have been well summarized by Dr. White of Philadelphia, who took pains to collate the opinions of a number of American experts on this question. The method has not as yet shown results which warrant its adoption as a means of routine treatment to the exclusion of, or in preference to, others; it has, on the contrary, some apparently insuperable disadvantages and even dangers, which render it improbable that it will ever be generally adopted.



*The Toxic Effects of Mercury* (Hydrargyris; Salivation; Mercurial Pains, etc.).—Like most medicinal agents of well-marked efficacy, mercury, when improperly administered or when administered to peculiarly susceptible subjects, may produce toxic effects. Some of these effects ensue rapidly (so-called "acute" symptoms), others more slowly (the "chronic"). One of the most common and unpleasant of these results is salivation, an accident displayed in many grades. In the slightest grade there is moderate fetor of the breath; slight inspissation of the saliva; some tenderness of the teeth, more particularly of the molars when brought together; a sponginess of the gums, which bleed readily when pressed upon; a metallic taste in the mouth; and a peculiar pasty aspect of the dorsum of the tongue. All these symptoms may be exaggerated in various grades to the point where the parotid and submaxillary glands become tender and tumid, the saliva flows in a full stream from the mouth, the teeth are loosened and fall, the mucous membrane of the mouth becomes swollen and often eroded in patches, the tongue is swollen, protruded, and ulcerated, and the bones of the jaw are necrosed. The breath in all cases has an unmistakable and nauseous odor, and the patient is also generally in a depressed condition of mind and disturbed in most of the bodily functions.

Among the results that develop more slowly may be named many of the evidences of gastro-intestinal dyspepsia (inappetence, eructations, heartburn), progressive adynamia and anæmia, pains in the joints, occasionally limited to one of the larger joints and associated with temporary immobility from pain, and symptoms simulating those of muscular rheumatism. While there is a

large list of ailments, not here set down, popularly accredited to the toxic effects of mercury, it may be said of most of such symptoms that they are due either to syphilis or to some other cause, and are wrongly imputed to the action of the metal. We have never been able to persuade ourselves that for any reasonable period after the ingestion of mercury had been suspended (months at the longest) any general effects of it are perceptible in a previously healthy subject; and the records of the physicians in charge of the laborers in mercury-mines attest the same fact. There the toxic effects are distinct and often grave, severe salivation being more or less rapidly followed in all grave cases by osseous necrosis. Nothing is found in these records corresponding with the "chronic rheumatic disorders," "eruptions upon the skin," and other ailments popularly charged to a continued use of mercury, and occurring years after its suspension.

Let it be noted further that in the few cases where, early in a syphilitic career, mild salivation has accidentally occurred (the writers have seen but few cases in many years), the issue is not altogether without its bright side. As a matter of fact, the few salivated patients have in the results obtained compared most favorably with others; and in one specially dangerous and extreme case, where salivation was intentionally produced, the issue was in the highest degree satisfactory, as a valuable life seemed thereby to have been saved.

When mercurial stomatitis supervenes, with symptoms of salivation, the metallic dose, if the case is not exceedingly urgent, should at once be suspended and the diet be limited to nutritious foods in a liquid or a semi-liquid state (broths, cream, soft-boiled eggs, etc.). The fluids used for drinking should be neither hot nor cold,



and all salted, spiced, and acetous articles of diet should be forbidden. The mouth should be washed frequently with bland lotions of flaxseed tea or borated or carbolated fluids, always diluted, such as:

R. Potass. chlorat.,            ʒj;  
 Mel. despum.,  
 Myrrh. tinct.,            āā. fʒss;  
 Aq. dest.,                    ad fʒviii.—M.

Sig. To be used as a mouth-wash and gargle, diluted with tepid water until grateful to the surface.

Often during the day the gums should be rubbed gently but thoroughly, within and without the circle of the teeth, with a tepid myrrh-and-cinchona wash (equal parts of the tincture of each suspended mechanically by shaking in water) applied by means of a soft piece of linen wrapped about the forefinger. We invariably order iron internally in these cases, and if any specific medication is employed before the toxic effects subside, we employ in small doses one of the salts of iodide. Recovery under good treatment is in any well-managed case rapid and complete.

*Iodine and its Compounds.*—With relation to the therapy of syphilis, iodine and its compounds stand next after mercury in popular estimation; and if just reserve be made, they certainly stand in this relation when properly employed in selected cases. There are two axioms that still very largely influence the minds of professional men on this question: one is that while mercury is most valuable in early periods of syphilis, the compounds of iodine are chiefly valuable in the late or gummatous periods; another is that while mercury cures

the disease, the compounds of the other metal relieve without curing. Both axioms are imperfect generalizations of a wide experience, which must, however, not be permitted to warp the judgment of the practitioner in any case where the one or the other drug is chiefly indicated.

The following are conditions in which it is common, and in general wise, to employ the iodine compounds:

First: In all attempts to resolve gummatous lesions promptly, the iodides are wellnigh unequalled in the armamentarium of the expert. Here (as in gummata of the brain, the testis, the liver, the spleen, or the kidney) life may be saved by their efficient employment, and in other cases (gummata of the periosteum, the meninges, etc.) a great amount of suffering may be spared. Second: The iodides are often in the highest degree valuable in any stage of syphilis when the patient either is intolerant of mercury or, if sufficiently tolerant, cannot be made, when ingesting it, to gain in weight, in appetite, and in the proper performance of his functions. Third: When it is desired to produce a profound impression on a syphilitic lesion, and the patient is being subjected to the action of mercury by any of the methods of its external employment (fumigation, inunction, etc.). Fourth: The iodides are in some cases, not as a routine treatment, valuable as furnishing an alternate medication of patients long subjected to the action of mercury.

It is exceedingly doubtful if, as was once thought, the iodide of potassium aids in the elimination of mercury previously introduced into the system. The speedy effects of the salt are well known, and its rapid appearance in the urine after ingestion (as shown by starch and other tests) is readily demonstrable. When the patient