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PART I.

ORIGINAL COMMUNICATIONS.

ART. VI.—*The Treatment of Syphilis by Intra-muscular Injections of Mercury.*^a By GEORGE S. WALTON, M.D.
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FOR many years oral medication to the point of salivation was the one recognised method of treating syphilis. Then came fumigation and inunction, the former of which had a great vogue for a time. Inunction, though regarded as an excellent method of introducing mercury into the system rapidly in severe cases, has never become very popular in this country because of the difficulty of performing it, and also on account of its messiness.

The treatment by intra-muscular injections was introduced into this country from Germany some twenty years ago. For a time it was employed by many, but, owing to faulty technique, impurity of the preparations employed, the method fell into disuse.

Within the last few years a slight revival of the method has taken place in this country, but so far it has failed to secure the recognition which it deserves.

^a A Thesis read for the Degree of Doctor of Medicine in the University of Dublin, December 18, 1909.

At the Liverpool Skin Hospital the treatment by intramuscular injections has been extensively carried out during the past five years—the results having been so satisfactory that the oral administration of mercury has been almost entirely abandoned.

The forms of mercury used are:—

1. Metallic mercury in the form of grey oil, which contains 40 per cent. of mercury by weight.

2. Calomel, suspended in sterilised olive oil. This is reserved for very severe cases.

Grey oil is the form almost exclusively used. The formula is:—

Purified mercury	-	-	40 grammes.
Sterilised anhydrous lanoline	-	12	,,
Sterilised white vaseline	-	13	,,
Sterilised vaseline oil	-	35	,,

Of this oil a full dose is 5 minims, which is equivalent to 2.5 grains or approximately 16 c.gms. of mercury.

The method of administration is as follows:—

After disinfection of the skin a platino-iridium needle 3.5 cm. long, or, for very stout patients, 7 cm. in length, is plunged deeply into the gluteal muscles about the mid-point of an imaginary line drawn between the anterior superior iliac spine and the top of the intergluteal furrow. This region is, as a rule, free from important vessels and nerves, and the injection is not likely to cause discomfort in sitting, cycling, or riding. After the needle has been introduced into the buttock, an empty hypodermic syringe is fitted to it and exhausted. In this way one finds out immediately whether the needle has penetrated a blood-vessel. This is a rare occurrence, but if blood should be drawn into the hypodermic syringe the needle should be withdrawn, thoroughly cleansed, and introduced at another point. If no blood is drawn, Barthelemy's syringe is taken, and, being charged with the required amount of grey oil, is fitted to the needle and the injection is made by slow, steady pressure. The grey oil should be slightly warmed and well shaken up

before charging the syringe. Syringe and needle are then withdrawn with a rapid movement in one piece, and the site of the injection is massaged for a minute or two to facilitate the distribution of the grey oil between the muscular strata. The site of injection is then covered with wool and collodion. The injections should be made in the right and left buttocks alternately.

The injection of grey oil is as a rule painless, any discomfort that may arise from it being a little stiffness in the buttock for two or three days afterwards.

Dosage.—In order to determine the most advantageous dose of mercury when treating syphilis by injections of grey oil, Barthelemy and other authorities in Paris made a series of observations. The therapeutic value of the dose was gauged by estimating its effect on the condition of the blood, urinary excretion, and the patient's weight. Their conclusions may be summed up as follows:—

The quantity of mercury injected should bear a definite relation to the patient's weight, thus, for a man weighing eight to nine stone, they found that 8 to 9 centigrammes of metallic mercury (7 c.gm. = 1 grain nearly) injected once a week for six weeks gave the best results; after the fifth injection there was a tendency for the red blood corpuscles to diminish, and if more than six injections were given the hæmoglobin decreased also. Following this course of six injections an interval of non-treatment for two months was necessary. In the case of a big man weighing thirteen stone the dose may be increased to 14 or 16 c.gm.

Frequency with which the dose should be repeated.—This depends on many considerations, chief of which are the patient's general condition, the severity and stage of the disease, and the reaction to treatment.

As a rule it will be found best to give full doses to robust patients with acute symptoms once weekly for six or eight weeks, or until the disease begins to recede, provided always that the patient is not losing weight. Then the dose is reduced by one-half to 8 c.gm. of mercury, and

continued weekly, or a full dose is administered each fortnight until all the remaining symptoms have disappeared. In patients of poor physique half doses are administered from the beginning. After a full course, which usually extends over three months, no more mercury is administered, unless there be a return of symptoms, for three months, when a second course of half doses, administered according to circumstances, weekly or fortnightly, should be given. Three courses should be administered in a year.

During treatment patients should be urged to pay special attention to the teeth and gums. Carious teeth should be removed before mercury is first injected, and frequent use of a tooth-brush and of an astringent mouth-wash should be observed. The mouth-wash used in the British army for syphilitics undergoing injection treatment is very useful.

The formula is:—

1. $\mathcal{R}$ Plumbi acetatis, $\mathfrak{z}\text{i}$;
Aquaë destillatæ, $\mathfrak{z}\text{v}$.
2. $\mathcal{R}$ Aluminis sulphatis, $\mathfrak{z}\text{i}$;
Aquaë destillatæ. $\mathfrak{z}\text{v}$.

Mix Nos. 1 and 2 and filter. The filtrate should be used after dilution with nineteen parts of water.

Smoking and alcohol should be forbidden, and the patient should be urged to lead a healthy life. Attention to the bowels and frequent baths are advisable. The patient's weight should be carefully recorded each week, and any serious falling off should be regarded as a sign to stop or lessen the dosage of mercury until the weight becomes constant.

The urine should be examined frequently, always before the injections are commenced, and frequently during the course of treatment, to ascertain whether or not albuminuria is present, and also whether the mercury is being eliminated satisfactorily. Mercury is eliminated by the kidneys very slowly. It first appears in the urine in appreciable quantities a few days after the adminis-

tration of the second dose of grey oil, and it has been found as late as three months after the last of a series of eleven injections has been made. It is probably on account of its gradual but constant absorption, and slow elimination, that mercury introduced intra-muscularly is so much more potent in syphilis than when given by the mouth.

The rate of absorption has also been investigated at the Liverpool Skin Hospital by means of radiographs. It is found that, as a rule, four to six weeks elapse before all trace of an injection of 16 c.gms. of mercury disappears from the buttock.

The advantages of the intra-muscular treatment are:—

1. The mercury is well tolerated, and does not readily set up gastro-intestinal symptoms.

2. The treatment is carried out by the doctor, and is not left to the memory of the patient, who, as often as not, will forget to take pills or medicines regularly.

3. By seeing the patient regularly one is able to ascertain what resistance he is offering to the disease, and how far treatment is helping him. Oral medication, either in hospital or private practice, has this great disadvantage, that patients are likely to drift into irregularity of attendance, and so treatment becomes inconstant.

4. Improvement begins more quickly, often being apparent after one injection; progress is more rapid, and relapses are less frequent than with any other method.

The disadvantages alleged against the method are largely imaginary. In the long series of injections employed at the Liverpool Skin Hospital no case of abscess, cellulitis, or embolism has occurred; no large blood-vessels or nerve-trunks have been penetrated. No case of mercurial poisoning or severe salivation has occurred.

It has been stated by opponents of the method that patients take only one injection and never come again. Statistics were made recently of the attendance at hospital of syphilitic patients before and after intra-muscular injections were employed. It was found that

patients treated by injections attended much more regularly than those treated by oral medication.

Severe salivation is said to occur more frequently in patients treated intra-muscularly than by other methods. The severest cases of salivation I have seen were in patients treated with hydrargyrum cum cretâ. Some time ago I saw a young man who had been taking 6 grains of hydrargyrum cum cretâ daily till he was salivated, and yet without any amelioration of a copious papulopustular eruption which covered his whole body. An examination of his urine showed, though he was suffering from gingivitis, he was eliminating mercury in a fair quantity by his kidneys. In spite of the condition of his gums, he got intra-muscular injections, and his ptyalism disappeared, and his eruption rapidly cleared up under injections of grey oil.

Some fatal cases have been reported after injections of grey oil, but in most of these cases no details as to the doses administered were given, and in others there is no indication as to who administered the injections. These two points are of importance, for if no record of the dose is kept, and as in some hospitals untrained porters and dispensers are allowed to administer the injections, the wonder is that fatal cases do not occur more frequently.

In a fatal case recorded by Bouchaud, a woman, aged twenty-six years, had had twenty injections of grey oil extending over four months, the patient being pregnant at the time. All went well at the confinement, and a full-term child was delivered. A short time after, another injection of grey oil was given. A few days later acute stomatitis occurred. The dose of grey oil was unknown. Her teeth were in a very bad condition; they were never attended to in any way during her confinement. Several carious teeth were removed, with some improvement, but the stomatitis returned, and the patient died. At the necropsy nephritis of some standing was found.

In this case there was an unjustifiable use of grey oil—viz., twenty injections in four months in a pregnant

woman. It is well known that mercurial stomatitis is very likely to occur in pregnancy and the puerperium when the woman is in a toxic condition already. The doses injected were not known—a fact which crops up frequently in the records of fatal cases.

REPORTS FROM CONTINENTAL CLINICS OF THE EFFICACY OF
GREY OIL.

Dubot, of Paris, who for some years has employed intra-muscular injections of grey oil, has published his results in a recent paper. During the three years 1906-7-8 he has dealt with 780 cases of syphilis in hospital and private practice (some 7,800 intra-muscular injections), and has never met with any serious complications. The doses varied from 7 to 14 centigrammes. In neither class of practice was there any case of stomatitis. In one case a small superficial abscess occurred. In three cases mercurial grippé, "grippé mercurielle," occurred—*i.e.*, general malaise, slight febrile manifestations, pains about the limbs and joints, loss of appetite, &c.—symptoms resembling influenza. But these passed off in a few days.

Jullien has brought forward 200 cases which he has had under observation. He lays stress on starting intra-muscular injections of grey oil in large doses immediately the primary chancre is diagnosticated. As to doubt about the diagnosis of primary chancre, he has overcome this by a systematic examination of the *Treponema pallidum* by demonstrating its presence in smears and frequently in the excised chancre, this being ascertained in a routine way before starting the treatment. As a result of starting injections so early he claims that tertiary manifestations will be prevented.

Neisser, of Breslau, has also employed large doses of grey oil, following on Dubot's initiative—this is, 14 centigrammes. He records 200 cases treated by this means, and states that no untoward complication was observed. Even in the case of women such large doses

could be frequently employed. He considers, as a rule, it is better to use smaller doses—viz., 5 to 7 centigrammes—in women.

Another recent paper by Carle confirms the results of Dubot, Jullien and others. He records over 300 cases with very satisfactory results.

CASES SHOWING THAT INTRA-MUSCULAR INJECTIONS WILL
SUCCEED WHEN ORAL MEDICATION HAS FAILED.

Mrs. C., aged forty, had tertiary ulcers on her left leg for seven years. She attended hospital, off and on, for nearly two years, and improved considerably, though a large, deep ulcer on the back of the left leg, just above the ankle, and two punched-out kidney-shaped ulcers on the dorsum of the foot, proved most intractable. She was treated orally with mercury, potassium iodide, and Donovan's solution, but it was not until mercurial injections were commenced that the obstinate ulcer began to heal. After the second injection of 16 c.gms. of grey oil, the ulcers looked cleaner and healthier, and after twelve injections they had completely disappeared.

J. B., age thirty-eight, dock labourer; date of primary infection unknown; had severe syphilitic glossitis for two years, attended with such pain that eating was almost impossible. He could not take hot drinks of any kind, nor smoke. He had been treated by oral medication for eighteen months before coming to hospital. A week after his first injection of 16 c.gms. of grey oil he was able to drink hot tea; after six full injections, spread over a period of eight weeks, the tongue was covered with healthy epithelium, and he was able to eat and drink with comfort.

It is frequently said that oral medication is good enough for mild cases of syphilis, and that intra-muscular injections should be reserved for severe cases. But the difficulty is to tell a mild case of syphilis. The most innocent-looking primary sore, or the scantiest secondary eruption may be followed by the most formidable specific affections of the central nervous system. Since it is always a serious disease, it should invariably be treated with vigour, and in the intra-muscular method there is an effective weapon for its control.

TREATMENT BY INTRA-MUSCULAR INJECTIONS OF CALOMEL.

Injections of calomel form one of the—if not the—most effective methods of treating syphilis. Unfortunately, it possesses several marked disadvantages. One of these is that the injections are almost always followed by very severe pain. Another objection to its use is that on account of its high molecular weight it does not lend itself to the preparation of a satisfactory emulsion.

Calomel was first employed intra-muscularly in 1864. Jullien, who had experimented with a variety of mercurial preparations, came to the conclusion that in serious manifestations of syphilis calomel is a sheet anchor. He instances, for example, two cases of early optic neuritis which cleared up under its use. Other observers have shown its value in syphilitic affections of the nerves.

METHOD OF INJECTING CALOMEL.

Method of Injecting Calomel.—Ten centigrammes of calomel and 1 c.c. of liquid paraffin are placed in a special hollow glass cone. A number of these cones are prepared and sterilised. A glass syringe with a wide-bore needle is used. The syringe is sterilised by boiling, and then placed in 1 in 20 carbolic lotion. Before use it is washed through with alcohol. The skin of the part to be injected is sterilised with ether or alcohol. The nozzle of the syringe is inserted into the liquid; by working the piston up and down several times the calomel is intimately mixed with the paraffin and is easily injected through the needle. The quantity of calomel which is actually injected is considered to be about 7 c.gm. The injection is made deeply, the needle being inserted to its full extent vertically to the surface.

As a routine method of treatment, its disadvantages far outweigh its advantages, and place it much below grey oil.

In obstinate cases, or those in which the central nervous system is attacked, and it is imperative to bring the

disease under control at the earliest possible moment, it may be worth while to try injections of calomel in spite of its drawbacks.

ART. VII.—*Duodenal Ulcer.*^a By MALCOLM KING
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As I have been a victim to this malady for some years I have devoted much time to, and taken more than ordinary interest in, the study of the disease. I purpose giving a brief history, of my own case, and then dealing generally with the entire subject.

About eight years ago I remember having a very acute pain in the epigastrium, which always occurred with unfailing regularity at the same hour in the morning, during the course of a lecture, which I attended before breakfast. This I attributed to indigestion. Whatever the cause may have been, quite suddenly, at the end of a week from the first onset, the pain left me. There was no return of the pain for some years.

A rather prolonged attack of jaundice was the next symptom of the progress of the duodenal catarrh. Then followed occasional vague digestive disturbances, which could generally be explained by some error in diet. Hunger, too, seemed to attack me severely; and, further, though this hunger was fully gratified, yet, instead of gaining flesh, I lost it.

In August, 1908, my first acquaintance with genuine hunger-pain began. This generally came on about 3 30 or 4 in the afternoon (and occasionally at night), and could be relieved only by taking afternoon tea or a large dose of sodium bicarbonate.

During the next few months I had complete immunity from pain for periods lasting for three weeks.

In November, a doctor, whom I knew but slightly, suddenly developed the symptoms of perforated duodenal

^aBeing a Thesis read for the Degree of Doctor of Medicine in the University of Dublin, on Tuesday, February 8, 1910.