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Contributors

Fox, Howard, 1873-1947. Trimble, William B. Royal College of Surgeons of England

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EIGHT MONTHS' EXPERIENCE WITH SALVARSAN AT THE NEW YORK SKIN AND CANCER HOSPITAL

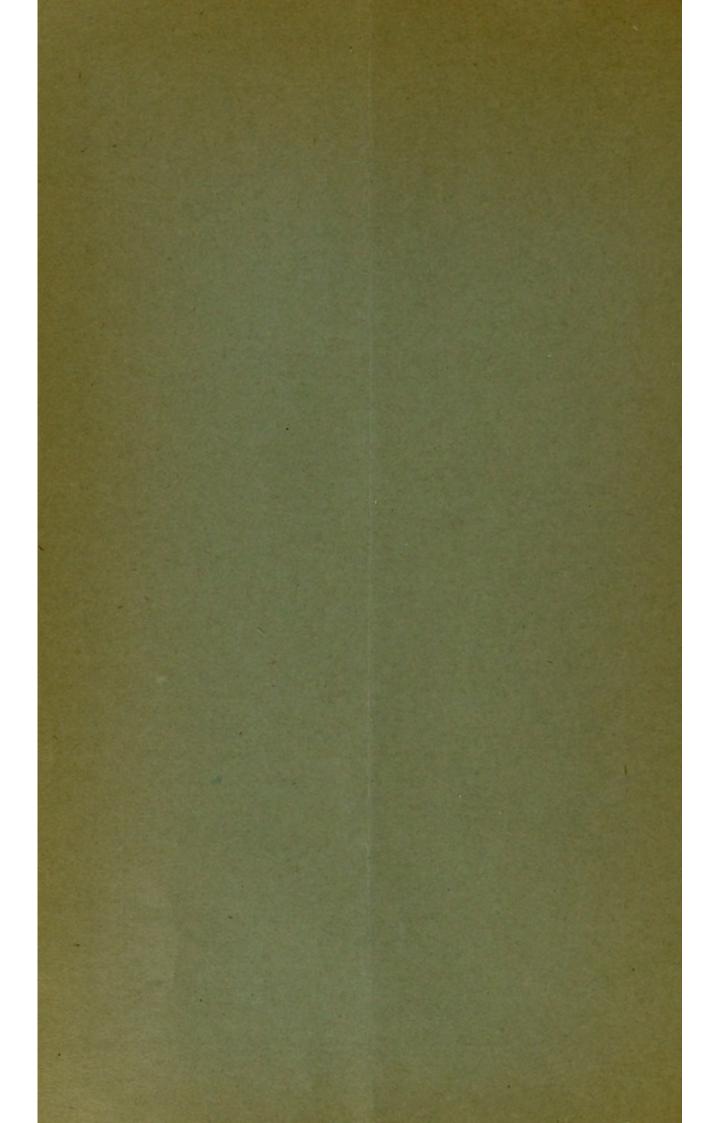
HOWARD FOX. M.D.

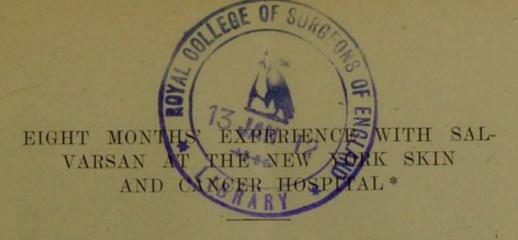
AND
WILLIAM B. TRIMBLE, M.D.
NEW YORK

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FIVE HUNDRED AND THIRTY-FIVE DEARBORN AVENUE
CHICAGO





HOWARD FOX, M.D.

AND

WILLIAM B. TRIMBLE, M.D. NEW YORK

A few months ago we expressed some opinions on the value of salvarsan, based in part on our own experience and in part on that of others. Our present communication is a detailed account of work that has been done during the past eight months, and the conclusions drawn

are based entirely on our own experience.

The greater part of our observations have been made at the New York Skin and Cancer Hospital in the service of Dr. George Henry Fox. At the time of writing, 128 injections have been given to 100 selected patients. The first ten patients were treated by the subcutaneous method (Wechselmann), after which intramuscular injections of an alkaline solution (Lesser method) were tried in twenty cases. Later, the intravenous method was employed in sixty-nine cases and intramuscular injections of an oily suspension in twenty-nine cases. The treatment was repeated in twenty-one of our patients, three of them receiving three, and two receiving four separate injections.

We have been fortunate in being able to follow a large proportion of the cases both clinically and serologically. Shortly before completing our report, we had personally observed or received letters from eighty-five of our patients. Of the remaining fifteen cases, ten had been

under observation for at least a month.

Three patients with primary lesions were treated before the appearance of any general manifestations. They were unfortunately not seen at an early enough period to attempt to abort a general infection, as at the

^{*} Read in the Section on Pharmacology and Therapeutics of the American Medical Association, at the Sixty-Second Annual Session, held at Los Angeles, June, 1911.

time of treatment the Wassermann reaction had already

become positive.

Our early opinions regarding some of the cutaneous lesions of syphilis have not materially changed as a result of further experience. The macular syphilids have not disappeared with any surprising rapidity, and the papular syphilids have generally proved pretty resistant



Fig. 1.—Tuberculo-squamous syphilid of twelve years' duration.

to treatment. Gummatous lesions have generally yielded to salvarsan in a most satisfactory manner, while mucous patches and condylomata have regularly disappeared in a most surprisingly short time.

In four cases (68, 74, 58 and 77) of late syphilis of the palms and soles, lesions which are notoriously resistant to mercury, the results of single injections of salvarsan have been extremely gratifying. One of these patients (68) had suffered from an extensive syphilid of the sole for twelve years, in spite of a good deal of treatment with mercury by several competent syphilologists. One month after a single intramuscular injection,

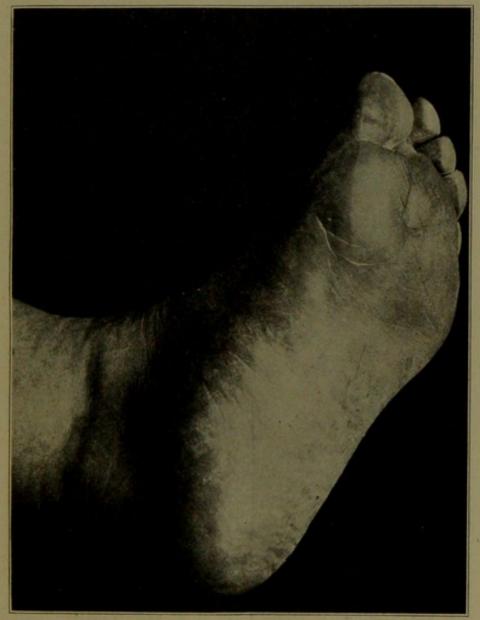


Fig. 2.—Same as Fig. 1, one month after one intramuscular injection.

the eruption had completely disappeared. In the other cases, the lesions had existed for three years, two years and two months respectively and disappeared in an equally satisfactory manner. Indeed, in one case a verrucous syphilid of the palms entirely cleared up in one week after an intravenous injection.

Four of the patients suffering from early syphilis presented an iritis which disappeared at the end of three weeks. In one case the iritis became more severe after treatment and on the fourth day had involved the other eye. A most excellent result was obtained in a case (57) of syphilitic neuroretinitis in a patient who had been infected a year and a half previously. Before injection

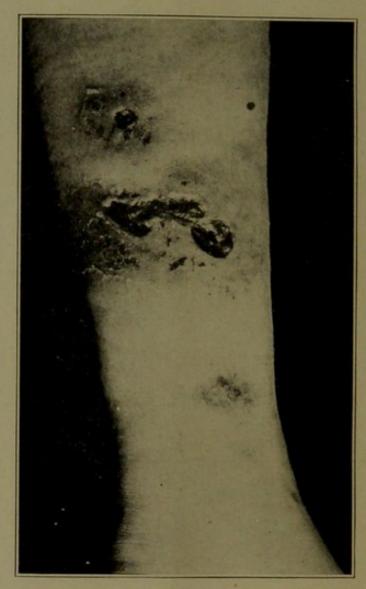


Fig. 3.—Gummatous ulceration of six months' duration.

her vision (examined by Dr. H. H. Tyson) was 20/100 in the right and 20/70 in the left eye. At the end of sixteen days there was a decided clearing of the fundus and she could read 20/30 minus with both eyes. One week later the fundus was practically normal in appearance and the vision was 20/20 minus in the right and 20/30 minus in the left eye.

Headaches occurring in both the early and late stages of syphilis were generally very favorably affected by salvarsan. Pains accompanying early manifestations, those associated with gummatous lesions and especially with periostitis, also yielded very satisfactorily.

One patient suffering from incipient tabes was treated without any benefit. In one case of hereditary syphilis



Fig. 4.—The lesions shown in Figure 3, view ten days after one intramuscular injection.

the result was excellent, in another moderately good. In a case of leukoplakia of the mouth no improvement was obtained. In a case of extensive leukoplakia of the tongue, there was a temporary lessening in the thickness of the patches, without any diminution in their extent.

The all-important question of the permanence of the action of salvarsan can hardly be fairly discussed until

a period of several years at least has elapsed. It must be said, however, that the number of relapses in our cases has been somewhat less than would have been expected as a result of our earlier experience. One of our patients relapsed repeatedly after four different injections, comprising all of the four methods of administration that we have used. Three patients relapsed after one injection and four cases after two injections had been given. Three patients relapsed or remained stationary after the first, but responded favorably to a second injection. The patients in whom failures, or at least unfavorable results were obtained, included the case of tabes and a case (16) in which the diagnosis was in some doubt (gummatous vs. varicose ulcers). In addition, a case of gummatous ulceration of the leg showed no response to treatment at the end of three weeks, while the results in three others (38, 43 and 87) must be considered unsatisfactory. In all there were fifteen cases in which either relapse or unsatisfactory results were observed.

Many of the patients in whom excellent results were obtained by salvarsan had been previously treated by mercury without success. It is probable, however, that most of these cases at least would have vielded in a satisfactory manner to mercury if its administration had been sufficiently vigorous and thorough. An example of the very rare cases in which mercury cannot be tolerated in any form was shown by a case (83) of extensive gummatous ulceration of the palate. For eighteen months an experienced syphilologist had attempted to treat this patient by injections, inunctions and internal administration of mercury. Small doses had proved of no avail and large doses had been followed by necrosis of portions of the gums. We spoke of this case in our first communication1 as one in which a "disappointing relapse" had occurred; we are now glad to be able to report that the ulcerations healed entirely after a second injection and that no further relapse had occurred at the end of seven months.

The Wassermann test was made in every case before treatment and subsequently as often as circumstances permitted. More than 400 examinations were made in the course of eight months. The original Wassermann

^{1.} Fox and Trimble: The Journal A. M. A., March 4, 1911, p. 650.

TABLE 1.—PATIENTS TREATED WITH ONE SUBCUTANEOUS INJECTION

Case No.	Sex	Age	* Stage	Lesions	Duration of Lesions	Previous Treatment	Date and Dosage	Local Effect of Injection	Clinical Result. Remarks	Wasser- mann Reaction
F	r.	48	2	Flat papular syphilid.	Five weeks.	None.	gm. 0.5	induration persists at the end of 8 mos.; no necrosis.	severe headache; given Hg, after which lesions disappeared in a month; menses irregular but possibly due to menopause.	in 11 wks Positive a the end o 8 months.
F	F.	32	3	Tuberculo- ulcerative syphilid of face.	Two years.	Hg at irregular intervals by mouth and injections for two years; disease not controlled by mercury.	gm. 0.5	induration persists end 8 mos.; tender and red for first 5 mos.; no necrosis.	Nasal discharge stopped end of 1 week; lesions healed in 10 days; menses irregular since treatment; no relapse at end of 8 months.	Faintly positive a the end o 8 months
3 I	F.	27	3	Gumma of clavicle; tubercular syphilid of lip.	Gumina 4 months; lip lesion 12 years.	Hg at irregular intervals for many yrs.; improved but never cured.	10/22/10, gm. 0.45	Practically no pain; necrosis 10 weeks later; not entirely healed at end of 8 months.		the end o
4 1	М.	32	2	Papulo- squamous syphilid; ex- tensive mucous patches.	Three months.	Hg by mouth for one month.	10/28/10, gm. 0.5	Pain and induration marked; necrosis six weeks later; curetted 6 months later and still dis- charging at end of 7 1/4 months.	Mucous patches disappeared in 10 days, eruptions in 2½ months; no relapse at end of 7½ months; gained 18 pounds; general appearance greatly improved.	in 6 wks.
5 1	M.	37	2	Pustular syphilid.	Four months.	Hg by mouth for four mos, with- out effect on eruption.	10/29/10, gm. 0.5	Pain severe; indura- tion slight.	Moderate improvement at end of 1 week, when patient left clinic; from Dr. Jerome Kingsbury we learn that lesions disappeared at end of 1 month; relapse 6 months later, consisting of a general papulo-squamous syphilid.	after
6 1	М.	21	2	Maculo- papular	Five weeks.	None.	10/29/10 gm. 0.45	Pain severe for 12 hours; induration moderate.	Slight improvement at end of 3 weeks,	
7 1	M.	34	3	syphilid. Tuberculo- ulcerative syphilid of arm, shoulder, abdomen; ulceration of palate.	Four months.	Hg by mouth two weeks.	11/3/10, gm. 0.5	Pain severe on sec- ond day; indura- tion moderate.	Ulceration healed in 3 weeks; no relapse at end of 7 months.	Strongly positive a the end o 3 weeks.

^{* 1,} primary; 2, secondary; 3, tertiary.

TABLE 2.—PATIENTS TREATED WITH ONE INTRAMUSCULAR INJECTION (ALKALINE SOLUTION)

-										
Case No.	Sex	Age	* Stage	Lesions	Duration of Lesions	Previous Treatment	Date and Dosage	Local Effect of Injection	Clinical Result. Remarks	Wasser- mann Reaction
8	M.	24	2	Superficial ulceration of mouth; laryngitis.	Ten months.	None.	11/10/10, gm. 0.45	Severe pain and swelling; lameness 3 wks.; soreness in sitting for 3 mos.	Ulcers in mouth disappeared in 3 days, hoarseness improved on second day and voice normal on fifth day; no relapse at end of 7 months; gained 23 pounds.	in 8 wks.; faintly positive at the end of
9	F.	46	3	Serpiginous syphilid of face.	One year.	None.	11/15/10, gm. 0.5	Severe pain and induration; lameness 3 weeks; in bed 2 weeks.	Eruption entirely well at end of 1 month; no relapse at end of 7 months.	7 months.
10	F.	36	3	Gumma of pharynx; gummatous infiltration of accessory sinuses;	Three years.	Hg by mouth 18 months.	12/3/10, gm. 0.45	Pain and induration moderate; slight necrosis at end of a week, with con- tinual slight dis- charge for 6 mos.	Lesions practically healed at end of 1 month; deafness not changed; no relapse at end of 6 months; gained 19 pounds.	the end of 5 months.
11	Μ.	43	3	deafness. Tuberculo- ulcerative syphilid	Seven months.	None,	12/5/10, gm. 0.45	Severe pain and in- duration for one week.	Ulceration healed at end of 31/2 weeks; no relapse at end of 6 months.	Positive at the end of 6 months.
12	Μ.	23	2	of thigh. Macular syphilid.	Ten days.	None.	1/10/11, gm. 0.6	Severe pain; tremendous swelling of buttocks; lameness	Eruption disappeared in a week; no re- lapse at end of 4 months; does not suffer from flatulence as much as for-	positive at
13	F.	23	3	Gummatous ulceration of leg.	Six months.	None.	1/12/11, gm. 0.6	for 4 weeks. Pain severe; induration inoderate.	Ulceration healed at end of 10 days; no relapse at end of 5 months; menstruation irregular since injection; has	4 months. Faintly positive at the end of
14	F.	34	2	Maculo- papular syphilid.	Three weeks.	None.	1/12/11, gm. 0.6	Pain and induration slight.	gained 5 pounds. Eruption disappeared at end of 1 month; ten weeks later iritis, treated with Hg at another hospital.	in 4 wks.
15	F.	20	2	Latent.		Hg by mouth 8 months.	1/12/11, gm. 0.6	Severe pain for three days; induration and lameness three weeks.	No manifestations at end of 5 months; has gained 15 pounds.	in 5 wks.; Weakly positive at end of 5
16	F.	52	3	Gummatous ulceration of leg.	Four years.	None.	1/24/11, gm. 0.6	Severe pain 3 days; induration 3 wks.	Ulcers improved slightly at first, became cleaner but not much smaller; men- struation irregular since treatment	at end of
17	F.	34	2	Condylomata of vulva; psoriasis.	Condylo- mata 2 months; psoriasis	None.	1/31/11, gm. 0.6	Severe pain 3 days; induration moder- ate.	(possibly menopause). Condylomata disappeared at end of 1 week; psoriasis lesions nearly well at end of 3½ months (see text); dysmen- orrhea since treatment.	in 12 wks
18	М.	24	2	Papulo squamous syphilid.	3 months. Six weeks.	Salvarsan 1 mo. before, subcuta- neously.	2/18/11, gm. 0.6	Pain two days; in- duration moderate.	Eruption disappeared in 3 weeks; no re- lapse at end of 7 weeks.	
19				Chancre (spirochetes present).	Eleven days.	None.	3/1/11, gm. 0.6	Pain two days.	Chancre covered with epidermis in 6 days; induration of chancre disappeared in 1 month; no manifestations	of 5 wks. Negative in 4 wks. and at end
20	F.	24	2	Latent.		Hg by mouth and inunctions one year.	3/8/11, gm. 0.6	Severe pain and in- duration; in bed 2 weeks.	at end of 3 months.	of 10 wks. Negative

^{* 1,} primary; 2, secondary; 3, tertiary.

method was followed, using as antigen a reliable alco-

holic extract of syphilitic liver.

The results of the Wassermann reaction may be conveniently considered in two groups, those of patients who received one and those of patients who received two or more injections. Of the patients who were treated by a single injection, seventy-one showed a positive Wassermann reaction before treatment. Of these cases, twentyeight became negative at an average period of about six weeks. In these the reaction later became positive in two, weakly positive in three cases and faintly positive in one case. The twenty-two cases which remained negative (30 per cent.) were followed, on an average, two and a half months; some of them for six and eight months. Of the remaining forty-three cases, ten showed a temporary and twenty a final weakening in the reaction. In eleven cases the reaction remained the same. In two cases it became stronger.

Of the cases in which two or more injections were given, twenty were positive before treatment. Of these four became negative in periods varying from five to nine weeks. One of these later again became positive. Of the remaining fifteen cases five showed a temporary and eight a final weakening in the reaction, while eight remained the same. The total number of cases which remained negative after either single or multiple injec-

tions was twenty-five (27 per cent.).

In all except five of the cases ophthalmoscopic examination of the fundus was made, although we have for some time considered that such an examination was an unnecessary precaution. Routine examinations of the urine were made before and after injection and showed

a transitory albuminuria in a few cases.

At the beginning of our experiments every patient was required to remain in bed for three days after treatment. More recently the patients receiving intramuscular injections of oily suspension have been allowed to go home after treatment and advised to keep as quiet as possible for several days. Patients receiving intravenous injections have been required to remain in bed only for twelve, or in some cases four or five hours.

There have fortunately been no serious ill effects from salvarsan up to the time of writing. Deafness appeared in one case three months after treatment, but was found on aural examination to be due to acute catarrhal otitis media. The patient presented a chronic rhinitis and pharyngitis and had also suffered from a discharge from the opposite ear before the administration of salvarsan. Another patient (68) who had complained of smarting of the eyes and blurring of vision, showed no abnormal changes in the fundus on ophthalmoscopic examination.

Among the general effects of salvarsan should be mentioned a marked improvement in general health that was noted in quite a number of cases. Seventeen of our patients showed a decided gain in weight, one of them gaining 23 pounds in the course of seven months. In three cases, however, there was a loss of from 15 to 18 pounds, which had not been regained in two of the cases at the end of three months.

After subcutaneous and intramuscular (Lesser) injections the temperature rose as a rule on the second day and lasted from one to three days. In five cases there was no reaction whatever, while in the others the height of the temperature ranged from 99 to 102.6. After intravenous injections the temperature rose as a rule within a few hours, its height varying from 99 to 103. No temperatures were taken after most of the oily injections, the patients being allowed to go home immediately after the treatment.

Among the general symptoms noted after intravenous injections were chills or chilly sensations in twenty-seven cases, vomiting in twenty-five, headaches in four-teen cases. One patient complained of dizziness, another of diarrhea for a day, and two suffered from sleeplessness for several days. In twenty-eight cases there were no symptoms whatever. Two patients who had shown a marked reaction after the first injection showed no

symptoms after the second had been given.

The local effects of intramuscular injections of alkaline suspensions included pain, induration and lameness, which were very severe in nine cases, moderate in five and slight in five cases. The discomfort in some of the cases was severe enough to warrant the use of morphin. After intramuscular injections of oily suspensions the local effects were severe in ten, moderate in eleven and slight in eight cases. In the worst cases the patients were obliged to remain in bed for a week or more, and even at the end of several months they complained of some stiffness about the buttocks and thighs. Necrosis occurred in two cases (3 and 4) after subcutaneous injec-

tions, in one case (10) after the intramuscular injection of an alkaline solution, and in two cases (70 and 88) after intramuscular injections of oily suspensions. At the time of writing nine of the ten patients that had been treated by the subcutaneous method still presented the characteristic indurations between the scapulæ; the tenth case had been early lost to observation.

Among the interesting by-effects that were observed may be mentioned a case (85) in which a herpes zoster appeared on the trunk ten days after the injection. A general toxic crythema occurred in two cases (41 and 68) on the seventh and ninth days respectively after treatment, lasting three days and accompanied by febrile symptoms. In one case the temperature rose on the

first day to 104.

Treatment with salvarsan had no disturbing effect on pregnancy in one of our cases (21) which was followed from the sixth month to full term, and in another case

which could only be followed for a month.

Disturbances in menstruation were noted in twelve cases after treatment. In two of the cases the irregularities were possibly due to the menopause. In another case the cessation of the flow was probably due to pregnancy. In one case the menstrual periods became more regular, while in the others they became more irregular after injection, being delayed in one case for seven and a half months.

One patient with nodular leprosy was experimentally treated with an intramuscular injection. In our first report we stated that this patient had been prostrated by the treatment and that no benefit had resulted from the injection. A change occurred, however, a month later when numerous ulcerating lesions of the face healed entirely. Two weeks later there was a partial relapse. No change in the solid nodular lesions was noted. A small dose of salvarsan was later given intravenously without producing any improvement or indeed any reaction whatsoever.

Two patients (17 and 90) who were treated for syphilis also presented complicating lesions of psoriasis. In one case the eruption was practically well at the end of three and a half months. In the other case, in which (according to the patient's statement) the eruption had existed for forty years, there was a complete disappearance of the psoriatic patches at the end of six weeks and at the end of three months no relapse had occurred.

In giving intravenous injections we have employed the gravity method in all of our cases except the first, in which the more complicated Schreiber apparatus was tried. We have had practically no difficulty and no bad results. For most of the injections we have used our own model of the gravity apparatus described elsewhere.2 In this communication we recommended the Schreiber form of needle having a 17 or 18 bore and a bevel that was not too long. Our experience with some of the short beveled and dull needles has led us to modify our views. We are now convinced that the most suitable needle is of the Schreiber type, having an 18 bore (Stubbs) and a bevel of about 3 or 4 mm., that is, not too sharp and not too dull. For diluting the salvarsan we use only sterile distilled water and dispense entirely with the salt solution. This may be the cause of the appearance of small nodules in the vein in eight out of sixty-nine injections. In two cases they were present at the last time of observation, the fourth and tenth weeks respectively after treatment. In the others they had disappeared in from one to four weeks. The simplicity of using water instead of salt solution is an advantage that in our opinion more than compensates for the appearance of some of these harmless nodules.

CONCLUSIONS

- 1. Salvarsan is a powerful symptomatic remedy for the treatment of syphilis.
- 2. It acts with greatest rapidity on lesions of the mucous membranes.
- 3. It is of decided value in obstinate palmar and plantar syphilids.
- 4. The permanence of its action cannot be determined until a number of years have elapsed.
- 5. Salvarsan should be used in conjunction with mercury and cannot entirely replace this valuable remedy, except in a few selected cases.
- 6. The effect of salvarsan on the Wassermann reaction is less favorable than on the clinical manifestations of syphilis.
- 7. Its effect on the Wassermann reaction is in general analogous to that of mercury.

^{2.} Fox and Trimble: Med. Rec., March 18, 1911, lxxix, p. 469.

TINAME WHEN ABOUT		

	-	-			1	ABLE 3-PA	TIENTS TREATED WITH O	NE INTRAVENOUS IN	TECTION		
		100		Duration of Lesions	Previous Treatment	Date a Donag	nd Local Effects of Injects	Greetal Effects Injection	of Citated	Result. Remarks	Watermeen Resides
	21 0			touths.	None.	2/2/3 gm, o	ł	Chill; venitrd op abdominal pain hours.	Condylomata dis relapse at end frience with p fall term, app for neather.	eppeared in 1 week; of Fig months; no intergrater; buty hern treatly healthy, exce	Palatly positive at the cad of a by mouths, get
	22 M	21 2	Mucous patches.	Eight months.	43 Injections	2/3/1 gm, o	1	Chill, manner: w		healed 12 hours att being alopped at any i palse and distribut 1 bellon, insting 5 days of 0 % by months.	
	23 54.		1000		30 Innections	2/7/1 gm. 0	l.	Slight chill, mass: Yespited two headsche for heads:	a. Clean The a	it end of 3 weeks.	Negative is 3 and at end of 4 weeks.
	24 F.		Tuberculo- ulorrative apphilid of neck, Latent.	Our steath.	20 Infections.	2/5/11 \$10. 0			Levious healed in on menutrualist at end of 4 men	5 days; favorable offer ((now leaf); no relap- othe; gained 17 pound	of Weakly positive at end of 4 months
	26,34	11	Gumma.	Three years.	None.	2/25/2 gm. 0. 2/25/2		Nesson; resulted Uses		then; galand 5 pound	214 menths
	27 M	45 3	Tubercule- aquament arguind of peebend	Tra weeks.	Hg by mouth to fermitteently for T prairs; 65 a	2/28/1 F gm. 0.1		Headache for a fi			3 % months.
	29.8	26 3	of Sectors and scrip. Generation of leg.	Fore months.	By by mouth months				good in A to affected; an b guined 8 pounds	o disappear on series in 2 works; reduce to 3 months and bearing to disper in 3 months and bear and be	Megatier in 7 works and at end of 4 months. Positive at end of 5
	20 M	22 3	Tubercule uborrative syphilis.	Four wonths.	Hg intermittent ly 2 weeks.			it. Dissiscen, chill, no			
	20 8.	61 3	Genmalous alceration	Two yes:	Ness.	2/9/11 gm 0.5	Dig a rest	nea; comitted two		O days; no relapse w	Hotelba.
Š	33 F. I	1 3	of kner. Tubercolo-	Ey healed.	Hg by mouth					0 days; no relapse at	the end of 3 mes.
	52 F 2		ajorative ayphind.	Prace	treatment.	gm 0.5		Chill; vonded two	there healed at struction delays there precious; a months.	nd of 2 weeks; men d few days for first o relapse at end of 2	Negative in 8 weeks and at end of 2 months.
			popular syphical	Two weeks.	None.	3/11/11 gm 0.5	Slight pain in arm for 1 hours.	2	Eruption entirely of the relaper at up. 15 pounds; give	temperated in 5 was ; in a 2 to more at own re-	Negative at end of a weeks.
1	35 F. 2		Postular applicat. Small flat papular applied.	Four Bonths. Three weeks.	Hg by mouth ; weeks, Note:	2/14/11 gm. 0.5 2/16/11 gm. 0.5		Slight names an heatlache Chill haring thirt minutes	d Lesions healed in !	works; felt "stiff all he delicating injection. In 2 days; napules nore handly wishle at yeld of 2 month only 6 from cruption; no	Weakly positive at
1	35 M C	1 3	Gummatous alcoration of log	His years;	None.	3/21/11 pm 0.5			prends	- minist; guard a	
ı	36 F. 36	2	Milliory	natherly healed. Three	None.				red of 1 month, bran-sired brains; 2% months; gain	er; entirely healed at with reception of 1 no relapse at end of od 5 possids.	Weakly positive at end of 215 mor.
1	37 9. 23		papolah nyphilid Gummahous	WOISE.		3/23/11, 2m 0.5		Slight headache as following night.	Stiffers of know d day; eruption wa at end of 2 west the class.	hisppeared on second a slowly disappearing in, when patient left	
П			of noti palate.	One year.	Hg by mouth 4 years.	3/53/11. gm. 0.5	One praished nodule disappeared in 2 is wreke; as obliveration of vila.	Chill and slight	Leuisna healed in brease much can normal at end	4 weeks; smallewing for on third day and of 1 week; negues due to proposecy.	Faintly positive at end of 2% mes.
ı	28 M. 21	3	Tuberculo- sicerative syphilid.	One year.	None.	2/26/11. gm. 0.5	Two nodules, which disappeared in one month.	Chilic nauses, von- iting, severe head sche,	Tubercies of face if there out of fee a	due to proposacy. Inthoned in 2 works; doors of log brailed in seed healed 2 to mon; not heal.	Wrahly positive at
ı	39 M. 43	3 0	inspecting gunda of liver.	Eighteen months.	Hg by mouth for 18 mos., given 15 yes, ago and again 18 mos. ago.	3/26/11, gm. 0.5	Praisted models present at red of 10 weeks.			not heat. eve disappeared day flered of chronic con- mprovement in appe- raith.	Profiler at the end of 10 works
	40 M 28	2	Latest.		Hg by mouth 6 months.	3/27/11. gm. 0.5		Child, nauses ; vom.			Negative at the end of 6 works.
	41 F. 20	2	Macular syptime	Two months.	None.	3/30/11, gm. 0.5	Right versions of arm; and module disappeared in two works	distribus.	Eruption, disappears strillers, and to	d In a mounth; tould mprenture 1985 on (RI); be relapse at	Negative at the end of 9 weeks.
	42 F. 21	2	Marular syphold.	Two weeks.	Ness.	3/20/11, gm. 0.5				injection "poins all impersor": eruption meks; no relapse at	Wrakly positive at the end of 9 was.
	43 7. 22	11	Macular syphitis.	One work	Nese	1/30/11, gm. 0.5	Arm services days; no medules.		THE O'C 275 HOUSE	Breks; no relapse at Breks; no relapse at this on know; head- constipation releved	Positive at the end
	44 55 21	2	Extensive mucous patches.	No mention	Hg three weeks.	4/11/11, gw. 0.5		Chill, arranea	Sche part 6 days; since in jection Mucous patches diag- no relepse in 2 mm		of 4 works.
1	45 M. 24	ā	Ulceration of Nps.	One year.	Hg by mouth te- regularly for 3	4/11/11. gm. 0.5		Slight names.	Ulreration healed in		Faintly positive at the end of 5 wks.
	66 M 10		Latest.		Hg by mouth in- termittently for 3 years.	4/15/11, gw. 0.5		Serves chill, names vomited 4 times syrete kendische	No new man		of 8 weeks. Weakly positive he- face treatment and at the end of 2
	47 M. 58	2 14	or suphild and lettle.	Eruption 8 mont, iritis 1 month.	24 Indections.	4/25/31, gm. 0.5		Chill, names; rom-	Eruption not quite works; tritts well 5	disappeared in 8	positive at the end of 5 weeks.
	48 F. 21 49 F. 11	2 3	Papelar syphilid.	Four months. Two	3 Saperhone.	5./2/11 gm. 0.5		Bradache for a few hours	Druption very view present at end of 6		Negative in 4 was
	50 M 23		pupular syphimi. Inciplent takes.	months.	Hg tablets 1 mo. Hg by mouth in- regularly 10	5/2/11, gm. 0.3 5/2/11,			Truplica dicappea		weakly positive at the end of 6 whs.
	\$1 M. o		Alepecia.	Six mea. sixce infection.	None.	200.03		Chilly forling; stight names.	No effect on	Kymphone.	Prefilter at the end
-	50 M. ss	100	obstealar cyphics ; chopiskis.	Tra years, at times disappear-	None	5/4/11, pm. 0.5		Score beadache an	Francisco discountries	A SHARE T WHEN	of 0 works,
	53 F 30		anno fias	Eroption Sworts, 1900s	None.	5.4711, gm. 0.5		Score bradache on following aight	Evoption disappeard temporary improve t. p. setter and this Double britis well in 2	works : nearfically	Negative in 3 and at end of 6 was.
	54 M 55	3 7	papalar rephilid is (double) whereala-	Serva	Hg by mouth 3	5/9/11,			to charge in applic		Strongly positive at end of a weeks.
	50 F. 19 1	911110	erphits of foot.	Two mos.	Hg by mouth 6.	2W. 0.45	-		Exception rationly disc 6 works; poin in or of 2 works; no re- monaths.		Negative at the end of 5 weeks
	56 M. 62	2 1	Sceration to tempor;	Infection.	Hg by mouth 18 months	5/11/11, gm 0.5	Vela statemental by Indon.		No manifestations at t		Weakly positive at the end of 4 wks.
	57 F. ST 1	1 2	rperenta f laryes. olet pap- e; specifie			Pm. 0.4	Vein childrented by indura- tion one inch long, size of a gross quill.	Nausen; remited beice.	When seen I meant be entirely disappeared.		Negative at the end of 4 weeks.
	58 M 27	100	POPPERALLE.		Hg by mouth 1	5/13/11, gm. 0.4	One pon-slood module fast- ing four days; wen par- tially abblerated.	Chill, neuers : com- ited four (lines) severe headache	Model papules heated at corner of meach refinitis practically weeks (see 1811)	n 6 ders : papule in 2 days : nouve- ucit at end of 3	Weakly positive at the end of 4 was
		100	erraceus restite, th points ad soles.	Two years.	Hg by mouth and injections for 18 most 515 years ago; Hg for 2 most by mouth a n d in berton, since leadings ag- pended; very slight result.	5/13/11, gm, 9.5		Hight chil. Sauce; vonited for times; slight bendocke.	Both points ratingly as work; both noise out end of 1 month.	t at the end of 1	Faintly positive at the end of 4 was.
	89 F. 26	Con	rentiform papeing pphine.	Four and one-half months.	None.	5/11/11. gm, 0.5	One notice also of large platicad lasting 2 works	Chill, hannes; vom- sted once; slight bendache.	Evaption began to to- day, disappearing at month.	the rat of 1	nestive before treat- ment; strongly pos- stry at ond of 3
	60 M 17 1		M decous patches.	Two months.	Neae,	5/18/11. gm 0.5		Vanited over	Morous patches disapp		nite at cod of 3 works. colline at the end of 5 works.
-	62 M. 64 3		Latrat.		2 mon age sal- various glvrs subscultaneously, an observated by of 10 years' du- ration had then heated.	5/19/11, gm. 0.5					troughy positive at the end of 4 was
	62 M 47 2	1	Iritia.	One week. Iritis	None.	5/20/31. gm. 0.5 5/20/31.	·		brittle practically well of		
	84 F. 10 1	100	repair related; atostroia. nauvo of p; local sepathy.	week.	None.	5/29/11. gm. 0.5 5/23/11. gm. 0.5		Chill, penint; rop-	Slight improvement in fourth day, when iril other eye; being great end of 2 weeks.	one are up to the lite developed in the lite developed in the lite of the lite	bully position at the end of 3 wks.
	65 M. 47 3	100	horotar horotar	Two	None,	\$1/23/11, go. 0.5		Chill, neuret; vom- roed foor there; nevers bradache.	Chances covered with spi- day; greatly lemond 1 2 works; gleads some other mealfestgmost be Craption become	s size at end of that smaller; as the appeared.	shelly positive at the red of 2 wks.
	*1. 10	thre	k and Ep	Pints.					dry and was second and of 16 days.	imperorphilitie al	
	-, 541		- Controllery	a, neonly		† Heredi	SHIP STREET, SHIP	THE WAY	10000		

TABLE 4-PATIENTS TREATED WITH ONE INTRAMESCULAR INJECTION (OHA SUSPENSION)

Cue No. Sex Age	Lesissa	Duration of Lexions	Previous Treatment	Date and Donage	Loral Effect of Injection	Clinical Result. Bennarks	Wasser- mana Resettion
66 F. 16	Gommatous valveration of neck	Four years.	Hg lateracity 1 month.	gm. 0.4	moderate.	Middents improvement at end of t Booth; later given 3 more lajections by swetter physician and lesions healed filter accord induction.	3 works.
6T F. 54 2	Militiery	Three meaths.	None.	2/14/11, gm. 0.5	Severe pala sad	Efection slow to disappear; not entirely gone at end of 2 months; patient given By with more favorable result.	Negative at the ea- of 4 way
68 8. 65 3	Tub-regio- specification ryphilid of sale.	Twelve years.	Hg by mouth he termittently for D years.	2/9/11, gm, 0.5	Pala two weeks; In- duration moderate	Effection disappeared entirely at end of	Negative in 4 was
65 F. 22 2	Macular system.	Nor works.	Numb.	3/14/11. gm. 0.5	Not much pale; lamenous for 2 wks	Pain in joints disappeared in 1 work; grouption well in 10 days.	
10 F. 28 1	Lanet		Hg for 1 year by mouth and in- unctions.	2/19/11. gm. 0.5	Puts and industries for a week in split of remaining in bed; everyon at end of five weeks.		
TI M 26 2	Latent		Small amount Hg by mosth and injections.	3/20/11, gm. 0.5	Fuln considerable for a week; moderate induration; no		Negative at the ea- of 10 was
72 M 31 3	Ulcristion of month; leukopiakia.		Hg by mouth in- regularly size years.		duration; very lame for 2 works; leg stiff at end of		Positive a the end o 6 weeks.
T2 M. 33 3	Receiving wecome patches.	Three years.	Hg by mouth 2 months.	4/1/11, gm. 0.5	one month. Senior puls, indera- tion and improcess lasting 3 works.	One traceus patch disappeared in I day, Smother in 3 days.	in it and and at the ca-
P. 23 8	syphilid.	Three years.	Nune.	4/11/11. gm. 0.5	Pain and induration avvere; innoness for two weeks.	Direction disappeared completely in 3 works; headaches stopped entirely; galered 15 pounds in 1 month.	of 9 wks Positive a the end a 4 weeks.
S F. 42 2	Latent.		He for many yes, by mouth and few inunctions.	4/18/11, gm, 0.5	Pale, inducation and innerson 2 weeks; confined to bed one	Grined 10 pounds since injection.	Faistly positive a the end o
e r. 36 3	Tub-scular syphilis of check.	One year.	None.	4/21/21, gm. 0.5	Server pals and in- decation; in bed 2 weeks.	Excition began to improve on theed day and belong flattened at end of 2 weeks; noty slight stain left at end of 6 weeks.	positive at
7 9. 27 3	syphilid of both palmer; pigmentary syphilid	One month.	None.	5/15/11, gm. 0.5	Severe pain; lame- ness for five days.	Emption of polms entirely well at end of a month; no effect on pigmentary	7 wreks.
S P. 20 3	Tubercular ryphilid	Seven prara.	Nane.	5/16/11, 20.05	tion and insumess	Displies began to improve on second day; at end of 2 weeks lesions entirely.	Positive at
0 F. 25 2	of face, Large that pagedar exphilid.	Eight weeks.	Nune.	5/24/1). po. 0.5	Pala for one week;	Battened; issuemate for 3 weeks. Eroption began to disappear on second day, satisfactory improvement at end; of 5 weeks.	3 weeks

^{*} L primary; 2, secondary; 3, tertlary; 1 Heroditary.

Sex No	" MAGE	Lesiona	Duration of Lexions	Treatment	Date, Method and Dunge of Exjection	Local Effect of Injection	General Effect of Injection	Citalcal Result. Remarks	1
o M I		Pentule crustaerous arphible of arms, leg and car.	Eight months.	Hg by mouth fo	r 10/15/10. Indicataneous gm 0.6 52/23/10. Infrance cular gm. 0.45 Infrance cular gm. 0.45 Infrance cular gm. 0.45 Infrance venous gm. 0.5 2/9/11, in france-cular gm. 0.5 (viii)	Pale 1 day and slight 1 duration from first laj- tion; practically no pai or indecation from ac- ded arm see for a wa- following information from portion (see fact); as pai or inderation from la- injection.	8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Gove of key headed at end of 1 mouth; also of most and arm markedly impreed at end of seems, then relapsed; feter second indeed a seems, then relapsed; feter second indeed independent for a work; utarismer for the mouth of the feter second indeed in the second indeed relapse when the second indeed relapsed in the second indeed relapsed in the second indeed relapsed in the second indeed in the second in the second indeed in the second i	en et an
F S	2	Macular applied.	Rin days.	Xon-	10/72/70 relocataments gm 0.45; 1/20/11, inframes cutte gm. 0.6 (athalite solution).	Pale and industries no crate after first injection industries persisted at ea- of 8 months; severe pal and industries after se- end injection.	d	Fragilist disappeared in a weeks; severe ring at read of the weeks; constituing of more patches of mouth and realist opposite syphital; evaption disappeared is a site week all proposite appeared in the realist event disappeared in the realist event disappeared in the realist event disappeared in the form of a popular appear.	100 H
F. 20	10	Papular syphine.	Three weeks.	None	10-28-10, subcutaments gm 0-4; 2-25-11; listratement gm, 0-3; 2-4-11; intra- temerator gm, 0-5 (ell).	Pain and induration sign after Sent Induction; in bad effects from interve- ous Superlies; consider able pain and Inducation after third September.		Cruption nearly well at end of 2 months, who had gained 10 perceds: I meach had severe headastic and percedition of both time pain in this stopped on second day and has other on third day after interveness injection.	Sec. of
M. de	3	Ulcoration of hard and soft palate.	Nix months.	Hg by mosts, in whitten and in perions for on- you; He very lady beas.	11/10/10 inframuscular gm. 0.5 (alkaline solution) 12/15/20, inframuscular gm. 0.6 (alkaline solu- lion).			theresten of pulsate searly bouled at end of morek; relapsed I work later; begins to me pulsate the days after second injection as matter, and of 2 months; granted important, in grant of 2 months; grant present read of 7 months; grant 20 pound (see heat).	4
ME 60	1	Legen tuber- ruless.	Nix Frans.		1/5/11, infransocular gm 0.4 (alkaline solution) 5.30/11, infrarcassus gm 0.2	Severe pain for 8 days and moderate industries after first injection.	Service prestration for a work albertian fast injection.	(see test). Marked improvement in above ted delowed at each of d works; partial relation at each of 6 works as effect as sold soldier belone; no change ted at the delowed	4 .
P. 32	3	Gummatous ulceration of nose.	Nine Story than	Hg by month 4	1/12/11, inframuscular gm. 0.6 (skadhe solution); 2/30/11, inframuscular gm. 0.5 (ob).	Fain for 1 day; as laders link after East injection considerable pain, and moderate induration after second injection.		Cherution healed in 5 works; slight risport work later; I work after around injection discharge stopped and inters healed; in further relapor at oads of 5 meants; gained 17 pounds herpes souther on truth day after second injection tion.	
M. 36	4	Perioditis of tibis.	Three Frenk	tig by invactions internstructly a years.	1/19/11, infrancecular ga- 65 (ed.); 3/29/11, infra- meneral ga- 66 (alka- line solution).			origin assert on traffic day after second taper this had benderment of their stepped entirely on around day. The of pain for 5 weeks, they evidenced, symptoms again, relieved after se- condense, but referred again to rejend average, the step of the second again to rejend average, the second of the second again to rejend than these thouse of mercury.	N in
F. 23	9	Large flat papelar appelled	Screa. seedle.	He by month 6 weeks, with lit-	1/19/11, intransucular pm 0.65 (601); 3/4/11, infra- reness gm. 0.45.	No pale or indepation after first injection.	Names . Tombted three there after intramuecular	ery now improvement after both injections;	T W
r. 36	20	Mucular syphists	One treck.					Oraption disappeared at end of 1 week; re- inputs macouse applied on fifth day, disap- pearing 1 week after second injection; no further relayer at end of 4 % meachs.	
M 20	2	Postulo crustaceous syphilid of nose.	Six works	Ness.	1/26/11, intramocular gm. 0.5 (ed): 2/11/11, infra- veneus gm. 0.5.	Ing show end of the mon- No pain or indusation from first injection.	Night headache after in s traveness injection.	pearing I week after around injection; no farther relapse at end of 415 meachs. Highs improvement at end of I week; Section healed I menth after account injection; gained 7 pounds; no relapse at end of 415 meachs.	PART PART
53	10	Macular syphitid; protincia	Spphills 10 works, postionic	Nege.	3/4/11, latracenous gm. 0.5; 3.9/11, latracenous gm. lar gm. 0.5 (at.)	Pala server; confined to led for a work after ser-		ficular applifid disappeared in about a month;	12 1
M. 41	3	Latent	Nineteca yes since infortion; bemiplegis il menths before.	Hg by mouth ser- eral risks as first; Forestly to investings	2/5/33, interrence ga. 05/4/31/31, inframetra- ler ga. 0.5 (ed.) 2/31/31, infrarence ga. 0.5.	evere inducation and learn- ment for a work after in- telless under injection.		or a week following each injection overce head- nelses (from which he had selfered for several method personnel and then reappointed their week, however, much here every than helps were, however, much here every than helps	Series Se
24	3	Superficial siteration of temper.	Two months.	He by mouth 18 mouths.	3.724/1, intravenous gm ; 0.5; 4.87(1), intrassuc- lar gm 0.5 (ell); 5.70-71, intravenous gm 0.3	foreness and lancaces for 2 works offer inframe- cular injection.	Chill venited three times 0 serves hendache after first and no reaction after	bretation of tongue braied in 5 days; no re-	2 10
11	1	Chancre of Ep.	There weeks.	N-to.	0.5; 4/1/11, intravenous gm ; 0.5; 4/1/11, inframesce lar gm 0.5 (ed).	Practically no pain or in- duration after inframe- cular injection.	Stight chit, neares; you or lied fire times; slight bradges; story;	hearns covered with spidermin in 5 days; 1 work after second injection put on mercucial frictions.	position 7%
214	su	Tuberrule ulcerative syphical of our and face	Lesions of near, two pure, of fair, ten weeks.		NS; 5.4/11, intraspersors for gm. 0.5 (edl).	Militeration of vein, but no modules after interpreton to prove the 2 works, after inframence for the first terms of the contraction of the contra	No reaction after first in Si Jettien; sterpless for new eral algebra after second injection	transment in craption at end of 2 ; which shaper imports the conductor strong of 2 months at conductor strong of 2 months.	Positi be a
d 35	3	Latest.	Peer years since infection	the by sanath to requirely there years.	0.2; 4.21/11, infrarenous gm. 0.2; 4.21/11, infrarenous gm. 0.2.		No symptoms after either injection	No change at red of 2 mention.	
1 30	3 5	schen, tot	Fight years where Infection.	hermittently a	/21/11, infrarences gm. 0.1; 5.9/11, infrarences gm. 0.65		bill and severe after first the laterthm; thereat day for 2 works less severe chin and allgest breduche after	radiction disappeared on around day after first section; an irraper of end of 7 weeks.	Wrong and a second
128	3	Latest.	Fight years election.	Hg irrordially by month 20 fa- portions.	0.5 (ed); 5/20/11, lefra volume gm. 0.5	to pain, but slight induce tion after betramourning injection; well ability and had no modules after in- transpose injection.	browne rattl, namen's vota Vo- sted may after intraves, over hijection.	W belong (tubercles) developed as heads 1 ; such after first importion; headed 5 days after a croad indection; 30 days have perfected of socialists of developed.	Noga E the
4.5	3	Extensive erpipment exphilid of this, arms and nock.	There years.	Note.	7/22/11 intraveness gm s 0.5; 3/2/11, intraveness gm. 0.3; 3/15/11, intra- veness gm. 0.2; 3/15/11, intramacular gm. 0.5 1402;	hight sorrness; no bedera- tion after intrassocular injection.	National visualized twise Co- bendarie after first lates of remove lajordies, no re- sident after second and Tabled justicerroom lajor	sets began to fall at end of 1 week and at and of 8 weeks lesions entirely smooth; have present studies that he are an adjuster in the course of 10 weeks.	Militarios estates est
34	3 4	Commistors short-time of knot.	One year,	year and despe-	/22 / 13. intravvacou gm. (6.45; 5.4/11; infraveneus gm. 0.12		hill; frequent comiting; the bradacte after first to be tion; party feeling and tight headacte after ac-	over healed at end of 10 works; menufraction on profine since injection.	Fan editi-
22	3 6	Domain lous ubceration of kney.	Two years.	N-te.	01; 5/9/11, laterenous gm 0 01; 5/9/11, laterenous of lar gm 0.5 (sll).	me beam sized medide after a intravance injection, dis- fupearing at end of 10 dism; no obliteration of voice point severy, industry	Clight shirly fredleg and the formers after intertenous in indication.	core entirely besied at read of 1 month; pair a liner stopped at read of 1 week thad privil a matter stopped at read of 1 week thad privil produce at the stopped at read of 2 years); mentirealists at a Preparation of the stopped at read of 6 weeks.	Mirror Mirror Mirror Mirror

8. The intramuscular and intravenous methods of

administration are probably of equal efficiency.

9. The intravenous method is the one of choice where rapidity of action and the comfort of the patient are factors to be considered.

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616 Madison Avenue-39 East Twenty-Eighth Street.

