MILITARY MEDICAL MANUALS

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SURGEON-GEN. SIR ALFRED KEOGH
G.C.B., M.D., F.R.C.P.

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Surgeon to the Saint-Louis Hospital

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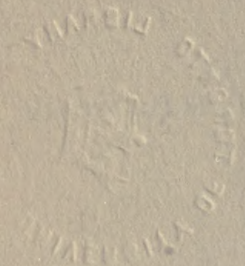

GENERAL INTRODUCTION

THE infinite variety of injuries which any war presents to the surgeon gives to military surgery a special interest and importance. The special interest and importance, in a surgical sense, of the great European War lies not so much in the fact that examples of every form of gross lesion of organs and limbs have been seen, for if we read the older writers we find little in the moderns that is new in this respect, but is to be found in the enormous mass of clinical material which has been presented to us and in the production of evidence sufficient to eliminate sources of error in determining important conclusions. For the first time also in any campaign the labours of the surgeon and the physician have had the aid of the bacteriologist, the pathologist, the physiologist, and indeed of every form of scientific assistance, in the solution of their respective problems. The clinician entered upon the great war armed with all the resources which the advances of fifty years had made available. If the surgical problems of modern war can be said not to differ sensibly from the campaigns of the past, the form in which they have been presented is certainly as different as are the methods of their solution. The achievements in the field of discovery of the chemist, the physicist and the biologist have given the military surgeon an advantage in diagnosis and treatment which was denied to his predecessors, and we are able to measure the effects of these advantages when we come to appraise the results which have been attained.

But although we may admit the general truth of these statements, it would be wrong to assume that modern scientific knowledge was, on the outbreak of the war, immediately useful to those to whom the wounded were

to be confided. Fixed principles existed in all the sciences auxiliary to the work of the surgeon, but our scientific resources were not immediately available at the outset of the great campaign; scientific work bearing on wound problems had not been arranged in a manner adapted to the requirements—indeed, the requirements were not fully foreseen; the workers in the various fields were isolated, or isolated themselves, pursuing new researches rather than concentrating their powerful forces upon the one great quest.

However brilliant the triumphs of surgery may be and that they have been of surpassing splendour no one will be found to deny—experiences of the war have already produced a mass of facts sufficient to suggest the complete remodelling of our methods of education and research.

The series of manuals, which it is my pleasant duty to introduce to English readers, consists of translations of the principal volumes of the "Horizon" Collection, which has been appropriately named after the uniform of the French soldier.

The authors, who are all well-known specialists in the subjects which they represent, have given a concise but eminently readable account of the recent acquisitions to the medicine and surgery of war which had hitherto been disseminated in periodical literature.

No higher praise can be given to the Editors than to say that the clearness of exposition characteristic of the French original has not been lost in the rendering into English.

MEDICAL SERIES

The medical volumes which have been translated for this series may be divided into two main groups, the first dealing with certain epidemic diseases, including syphilis, which are most liable to attack soldiers, and the second with various aspects of the neurology of war. The last word on *Typhoid Fever*, hitherto "the greatest scourge of armies in time of war," as it has been truly called, will be found in the monograph by MM. Vincent and Muratet, which contains a full account of recent progress in bac-

teriology and epidemiology as well as the clinical features of typhoid and paratyphoid fevers. The writers combat a belief in the comparatively harmless nature of paratyphoid and state that in the present war hæmorrhage and perforation have been as frequent in paratyphoid, as in typhoid fever. In their chapter on diagnosis they show that the serum test is of no value in the case of those who have undergone anti-typhoid or anti-paratyphoid vaccination, and that precise information can be gained by blood cultures only. The relative advantages of a restricted and liberal diet are discussed in the chapter on treatment, which also contains a description of serum-therapy and vaccine-therapy and the general management of the patient.

Considerable space is devoted to the important question of the carrier of infection. A special chapter is devoted to the prophylaxis of typhoid fever in the army. The work concludes with a chapter on preventive inoculation, in which its value is conclusively proved by the statistics of all countries in which it has been employed.

MM. Vincent and Muratet have also contributed to the series a work on *Dysentery, Cholera and Typhus* which will be of special interest to those whose duties take them to the Eastern Mediterranean or Mesopotamia. The carrier problem in relation to dysentery and cholera is fully discussed, and special stress is laid on the epidemiological importance of mild or abortive cases of these two diseases.

In their monograph on *The Abnormal Forms of Tetanus*, MM. Courtois-Suffit and Giroux treat of those varieties of the disease in which the spasm is confined to a limited group of muscles, *e.g.* those of the head, or one or more limbs, or of the abdomino-thoracic muscles. The constitutional symptoms are less severe than in the generalised form of the disease, and the prognosis is more favourable.

The volume by Dr. G. Thibierge on *Syphilis and the Army* is intended as a *vade mecum* for medical officers in the army.

Turning now to the works of neurological interest, we have two volumes dealing with lesions of the peripheral

nerves by Mme. Athanassio-Benisty, who has been for several years assistant to Professor Pierre Marie at La Salpêtrière. The first volume contains an account of the anatomy and physiology of the peripheral nerves, together with the symptomatology of their lesions. The second volume is devoted to the prognosis and treatment of nerve lesions.

The monograph of MM. Babinski and Froment on *Hysteria or Pithiatism and Nervous Disorders of a Reflex Character* next claims attention. In the first part the old conception of hysteria, especially as it was built up by Charcot, is set forth, and is followed by a description of the modern conception of hysteria due to Babinski, who has suggested the substitution of the term "Pithiatism," *i.e.* a state curable by persuasion, for the old name hysteria. The second part deals with nervous disorders of a reflex character, consisting of contractures or paralysis following traumatism, which are frequently found in the neurology of war, and a variety of minor symptoms, such as muscular atrophy, exaggeration of the tendon reflexes, vasomotor, thermal and secretory changes, etc. An important section discusses the future of such men, especially as regards their disposal by medical boards.

An instructive companion volume to the above is to be found in the monograph of MM. Roussy and Lhermitte, which embodies a description of the psychoneuroses met with in war, starting with elementary motor disorders and concluding with the most complex represented by purè psychoses.

SURGICAL SERIES

When the present war began, surgeons, under the influence of the immortal work of Lister, had for more than a quarter of a century concerned themselves almost exclusively with elaborations of technique designed to shorten the time occupied in or to improve the results obtained by the many complex operations that the genius of Lister had rendered possible. The good behaviour of the wound was taken for granted whenever it was

made, as it nearly always was, through unbroken skin, and hence the study of the treatment of wounds had become largely restricted to the study of the aseptic variety. Septic wounds were rarely seen, and antiseptic surgery had been almost forgotten. Very few of those who were called upon to treat the wounded in the early autumn of 1914 were familiar with the treatment of grossly septic compound fractures and wounded joints, and none had any wide experience. To these men the conditions of the wounds came as a sinister and disheartening revelation. They were suddenly confronted with a state of affairs, as far as the physical conditions in the wounds were concerned, for which it was necessary to go back a hundred years or more to find a parallel.

Hence the early period of the war was one of earnest search after the correct principles that should be applied to the removal of the unusual difficulties with which surgeons and physicians were faced. It was necessary to discover where and why the treatment that sufficed for affections among the civil population failed when it was applied to military casualties, and then to originate adequate measures for the relief of the latter. For many reasons this was a slow and laborious process, in spite of the multitude of workers and the wealth of scientific resources at their disposal. The ruthlessness of war must necessarily hamper the work of the medical scientist in almost every direction except in that of providing him with an abundance of material upon which to work. It limits the opportunity for deliberate critical observation and comparison that is so essential to the formation of an accurate estimation of values ; it often compels work to be done under such high pressure and such unfavourable conditions that it becomes of little value for educative purposes. In all the armies, and on all the fronts, the pressure caused by the unprecedented number of casualties has necessitated rapid evacuation from the front along lines of communication, often of enormous length, and this means the transfer of cases through many hands, with its consequent division of responsibility, loss of continuity of treatment, and absence of prolonged observation by any one individual.

In addition to all this, it must be remembered that in this war the early conditions at the front were so uncertain that it was impossible to establish there the completely equipped scientific institutions for the treatment of the wounded that are now available under more assured circumstances, and that progress was thereby much hampered until definitive treatment could be undertaken at the early stage that is now possible.

But order has been steadily evolved out of chaos, and many things are now being done at the front that would have been deemed impossible not many months ago. As general principles of treatment are established it is found practicable to give effect to them to their full logical extent, and though there are still many obscure points to be elucidated and many methods in use that still call for improvements, it is now safe to say that the position of the art of military medicine and surgery stands upon a sound foundation, and that its future may be regarded with confidence and sanguine expectation.

The views of great authorities who derive their knowledge from extensive first-hand practical experience gained in the field cannot fail to serve as a most valuable asset to the less experienced, and must do much to enable them to derive the utmost value from the experience which will, in time, be theirs. The series covers the whole field of war surgery and medicine, and its predominating note is the exhaustive, practical and up-to-date manner in which it is handled. It is marked throughout not only by a wealth of detail, but by clearness of view and logical sequence of thought. Its study will convince the reader that, great as have been the advances in all departments in the services during this war, the progress made in the medical branch may fairly challenge comparison with that in any other, and that not the least among the services rendered by our great ally, France, to the common cause is this brilliant contribution to our professional knowledge.

A glance at the list of surgical works in the series will show how completely the ground has been covered. Appropriately enough, the series opens with the volume on *The Treatment of Infected Wounds*, by A. Carrel and

G. Dehelly. This is a direct product of the war which, in the opinion of many, bids fair to become epoch-making in the treatment of septic wounds. It is peculiar to the war and derived directly from it, and the work upon which it is based is as fine an example of correlated work on the part of the chemist, the bacteriologist and the clinician as could well be wished for. This volume will show many for the first time what a precise and scientific method the "Carrel treatment" really is.

The two volumes by Professor Leriche on *Fractures* contain the practical application of the views of the great Lyons school of surgeons with regard to the treatment of injuries of bones and joints. Supported as they are by an appeal to an abundant clinical experience, they cannot fail to interest English surgeons, and to prove of the greatest value. It is only necessary to say that *Wounds of the Abdomen* are dealt with by Dr. Abadie, *Wounds of the Vessels* by Professor Sencert, *Wounds of the Skull and Brain* by MM. Chatelin and De Martel, and *Localisation and Extraction of Projectiles* by Professor Ombrédanne and R. Ledoux-Lebard, to prove that the subjects have been allotted to very able and experienced exponents.

ALFRED KEOGH.

EDITOR'S PREFACE

An increase in the prevalence of venereal diseases appears to be an almost inevitable consequence of war. In the present war, it is difficult to determine whether the actual percentage of venereal disease is higher in the Army than it was before the war, owing to the fact that the number of men under observation is vastly augmented, so that the increase may be more apparent than real. However, in spite of this possible source of fallacy, most observers are agreed that there is a real increase in the incidence of these diseases in the populations of the countries engaged. The chief factors concerned in the spread of venereal disease are well described by Dr. Thibierge in the present volume.

As regards the treatment of syphilis, Dr. Thibierge rightly insists on the importance of continuing treatment in a milder form after the initial intensive course, which he aptly terms the "treatment of attack." Since the modern treatment of syphilis by salvarsan was introduced, this fact is not sufficiently well understood, many patients being under the impression that they are cured after one course of arsenical and mercurial injections.

With regard to the choice of methods and preparations, it will be noted that Dr. Thibierge favours intravenous injections both of mercury and arsenic, employing the cyanide of mercury and novarsenobenzol. Although all are agreed that the first course of treatment should be energetic, and that it gives the best

results when instituted at the earliest possible date, opinions differ considerably as to the relative merits of the different modes of administration, both of mercury and arsenic. In the British Army the routine treatment has hitherto consisted in intravenous injections of one of the "substitutes" for salvarsan, combined with intramuscular injections of mercury in the form of grey oil. The different preparations of arsenobenzol, all more or less similar to the original salvarsan and neosalvarsan, each has its own advocates.

Recently, intramuscular or subcutaneous injections have been said to give as good results as intravenous injections, and, if this is the case, this method is to be preferred, as it is simpler in technique and less liable to cause severe after-effects. With regard to mercury, the most powerful mode of administration is still probably that by inunction, although this is almost impossible to carry out when dealing with large numbers of men. Hence, intramuscular injections of grey oil, which are only given once a week, are more practicable if less efficacious. The intravenous injection of mercury has not now many supporters.

Lastly, as to the ultimate results of the modern treatment of syphilis.

It is too early yet to determine the fate of the syphilitic treated by the new arsenical preparations. All we can judge are the immediate results. Energetic initial treatment is no doubt the best means of rendering men fit for service again in the shortest possible time; but the proportion of these who will suffer later on from tertiary or quaternary manifestations, such as aortic disease and aneurism, tabes and general paralysis, remains to be seen.

C. F. MARSHALL.

August 1917.

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INTRODUCTION

It seemed to the Editors of the Collection, and also to me, that a place should be found for syphilis, considered in its relations to the Army and the present war.

The frequency of this infection in the Army, among men in munition works, and among the civil population with whom soldiers and munition workers associate, makes it at the present time a veritable epidemic disease, and one of the most widespread of epidemic diseases.

Contrary to the majority of diseases contracted in the Army, syphilis is one of long duration, its effects being felt by the patient for many years, and by his descendants for many more. It has a disastrous influence upon the birth-rate, infant mortality, and the qualities of the race, and is one of the chief factors in depopulation.

It is always a social disease, and should be more considered by public authorities than has been the case. At the present time, when, more than ever before, France must do all in her power to check the scourge of depopulation, and when, not only must she repair the terrible losses in men resulting from the war, but also effect an intensive repopulation, so as to have healthy, vigorous contingents of soldiers ready to meet any fresh aggression and retain her place amongst the premier nations, no efforts must be spared to guarantee the number and quality of her children.

More than ever, therefore, it is a social duty for all public authorities, as well as medical men, to combat by all possible means this powerful destroyer of children, this cause of degeneration of the race.

In order to do this, two methods must be combined: the one, exclusively the province of medical men, concerns the treatment, and I may add, the energetic treatment, of syphilis, especially at its onset; the other, of medical, hygienic, and administrative nature, designed to prevent the propagation of the disease.

Certainly, it is necessary to cure syphilitics, but it is better still to prevent the development of the disease. Prevention is better than cure, says the wisdom of nations.

In this struggle against the propagation of syphilis a large share falls on the medical man; he can do much by himself, the military surgeon especially, in preventing men from contracting syphilis, by his personal influence, both moral and medical. It is, above all, the duty of the public authorities, both civil and military, to prevent it. But, in order that this administrative and police struggle should be undertaken under rational and useful conditions, the authorities need the concurrence and enlightenment of the medical man. He alone can throw light upon the dangers of syphilis and its modes of transmission, explain to the heads of the great public services the general measures to be taken, and show the lesser authorities, municipalities and local police, and the heads of the different military units, how general measures may be applied in different localities and small communities, and adapted to the necessities of time and place.

I hope to contribute to this work, to take my part in this social duty, by exposing the modes of propagation of syphilis, and its danger, so as to furnish the medical men, who have to advise the authorities, with precise information and clear arguments in order to enlighten them.

On the other hand, the treatment of syphilis has undergone considerable changes within the last six years. The new methods are not yet well known to all medical men; certain details may have escaped them, or they may have forgotten them. It is opportune, therefore, to review the different ways of treating syphilis, specify their indications, and describe their technique, which is sometimes delicate and always important, if accidents are to be avoided.

But, before treating a patient, it is necessary to know what is the matter with him. Since my clinic at the Saint-Louis Hospital has been put under military control, I have had the opportunity of proving, not only amongst the patients in hospital, but also in those sent to me for examination by the Medical Service, how frequently doctors are in doubt about venereal diseases and make errors in diagnosis.

Very often these uncertainties and errors are due to the difficulty of diagnosis, often delicate, of syphilitic chancre, and the impossibility of the military doctor with a regiment to have recourse to the means of control furnished by the laboratory: this can only be avoided by a medical man skilled in the practice of syphilology and supplied with adequate scientific apparatus.

But also—why should it not be said?—it often happens that doctors have not received sufficient instruction with regard to venereal diseases, or have forgotten what they learned.

It has, therefore, seemed necessary to me to repeat with some detail the characteristics and diagnostic elements of syphilitic manifestations—with special reference to the syphilitic lesions most frequently observed in the Army—syphilitic chancre and secondary lesions.

Further, within recent years new methods of examination and more precise facts as to the characteristics of some of these lesions have been introduced into practice

and require to be described, while, at the same time, old diagnostic points are recalled to the memory.

As a matter of fact, this small volume, intended above all to combat the syphilitic scourge, contains, I hope, all that is necessary for the medical man to enable him to perform the medical part of his anti-syphilitic work. It will also supply him with the elements of extra-medical advice, which he may have to give to the civil and military authorities, with a view to the prophylaxis of this disease.

My ambition is that it may be at least a practical guide, a vade-mecum of syphilology for the use of military doctors.

SYPHILIS AND THE ARMY

CHAPTER I

THE FREQUENCY OF SYPHILIS IN THE ARMY

ALL great movements of population—wars, pilgrimages, exhibitions—induce a recrudescence of contagious diseases in general. Venereal diseases in particular always become more frequent in time of war.

During the wars of the Revolution * venereal morbidity was estimated at a fourth of that of the entire army.

The present war, owing to the immensity of the armies engaged, its long duration, and the large numbers of men mobilised in munition works, seems likely to leave all previous wars far behind, as regards the frequency of venereal diseases.

Up to the present the statistics of the belligerent forces are unknown †; and, in any case, they could

* See Spick, "Scabies and Venereal Diseases in the Armies of the Revolution and of the Empire" (*Annales de dermatologie*, October, 1908, p. 593).

† Balzer ("Prophylaxis and Treatment of Venereal Diseases in Time of War," *Presse médicale*, October 14, 1915, p. 40) reports that, according to German statistics going to the end of February 1915, the German troops at this period, in Belgian territory alone, had already had 30,000 cases of venereal disease, whereas in the war of 1870–71 the total number of venereal cases had been 32,528, viz. 70·6 per 1,000 of the sick in hospital.

give but a feeble conception of this frequency, for they are most incomplete, for several reasons :

In the first place, medical inspection of men with the colours is not carried out with sufficient rigour to obtain accurate figures, for divers reasons.

And, on the other hand, it is not only amongst the fighting units that venereal diseases are to be found ; they occur also amongst convalescent soldiers, as well as amongst munition workers, who, from the health point of view, must be regarded as soldiers.

Consequently, syphilis is frequently seen in the base hospitals, without precise statistics being procurable : many of these centres do not report the venereal cases treated, others ignore them. Patients suffering from gonorrhœa or syphilis gladly take advantage of their leave to obtain treatment unknown to the doctor in charge, and often go to quacks.

As regards munition works, despite the most laudable efforts, medical supervision is most inadequate. As the result of various unfortunate influences, in the majority of cases, even a brief medical visit is not made, and, there is no doubt, a large number of venereal patients conceal their malady, and are either badly treated or not at all, to their own disadvantage and to the still greater detriment of society in general.

As far as I have been able to judge, from personal experience and from conversations with numerous military surgeons, as well as those attached to the dermato-venereological military staff, the frequency of gonorrhœa has been markedly increased since the war, especially in certain regions. Mauriac has shown that simple chancre has a tendency to increase at a time of any great shifting of population, but its occurrence does not appear to be above the average.

As regards syphilis, with which I am alone concerned here, in the opinion of every one, it has increased notably since the beginning of the war, and there appears to be almost constant augmentation.

As I have already stated, statistics give but a very incomplete idea of this, because they only comprise the cases observed in the military hospitals, and many escape notice; further, in order to appreciate this augmented frequency, it would be necessary to obtain statistics made before the war in the same communities. But pre-war communities have been modified, or rather, one might say, turned upside down by mobilisation; army corps in time of peace in no way resemble our regiments at the front, as regards composition, and there was nothing comparable to munition works in the industrial works of 1913.

The opinions of syphilologists are much more valuable than statistics. The unanimous opinion is that the *frequency of syphilis is much greater at the present time* than during the periods preceding the war: all my colleagues in Paris and the provinces, when consulted on this subject, agreed as to this.

I shall now merely give some statistics:

Gaucher,* out of 2,457 soldiers treated at his clinic from August 1914 to December 1915, for cutaneous or venereal affections, recorded 277 cases of recent syphilis, and, amongst 88 soldiers in the out-patient department, 24 cases of recent syphilis.

In the same clinic, from January 1st to July 31st, 1914, out of a total of 2,295 patients, he observed 276 chancres or recent syphilis—in round figures 300 cases of recent syphilis amongst 3,000 patients; and from August 14th, 1914, to December 31st, 1915, in the same clinic, 4,912 patients, both civil and military, amongst them being 793 cases of recent syphilis—say 800 out of 5,000 patients.

* Gaucher, "Venereal Diseases during the War in the Villemin Hospital and in its Annexes" (*Bulletin de l'Académie de Médecine*, March 28th, 1916, p. 352).

Gaucher and Bizard, "Statistics of Syphilis contracted by Soldiers since Mobilisation and treated in the Clinic of the Hospital St. Louis, August 1914—December 1915" (*Annales des maladies vénériennes*, March 1916, p. 129).

If these two statistics given are translated into centesimal proportions, out of the total of cutaneous and venereal patients, they represent 12% of venereal patients before the war and 16% since the war, therefore an increase of 4% or of $\frac{1}{3}$, which is certainly less than the reality and does not convey an exact idea.

In a clinic of cutaneous and venereal diseases in a colonial army corps, out of a possible effective force of 60,000 men, Rousseau * treated 27 cases of syphilitic chancre, from March 12th to July 1st, 1916, which corresponds to 89 cases of contamination in a year, and there is reason to believe that he did not see all the cases.

The statistical material of venereal diseases in the French Army has only been collected since the year 1916, and for variable periods for the three venereal diseases. The adjoining table, compiled from information given me by the kind permission of Mr. Justin Godard, Under-Secretary of State Health Service to the Minister of War, gives the number of contaminations reported month by month by the medical men of the various sanitary departments.

As regards syphilis, this table shows the oscillations which occur in the frequency of the disease, and of the results of the prophylactic measures prescribed ; but it does not by any means comprise all the syphilitic contaminations which occur in a military population, for several reasons. Despite the orders given, a considerable number of hospitals do not furnish detailed reports ; while, on the other hand, large numbers of syphilitic chancres are unrecognised, as the result of the insufficiency of the medical visits paid to the regiments and depots ; others are treated unknown to the regimental doctors. Further, these statistics only include patients who were admitted to hospital for a syphilitic chancre and, in order to prevent errors and

* Rousseau, "Treatment and Prophylaxis of Syphilis in an Army Corps" (*Presse médicale*, October 23rd, 1916).

double entry, no record has been made of those patients who, on admission, showed secondary affections, their chancre having been unperceived, or unrecognised for one cause or another. Therefore, under the heading of simple chancre, a large number of mixed chancres are hidden, the syphilitic phase of which has escaped the statistics.

Finally, these statistics only include the troops

VENEREAL CONTAMINATIONS RELIEVED IN THE ARMY TROOPS AND ON THE LAND.

—	Gonorrhœa.			Simple Chancre.			Syphilis.			Total of venereal contaminations.		
	In the Army.	In the Interior.	Total.	In the Army.	In the Interior.	Total.	In the Army.	In the Interior.	Total.	In the Army.	In the Interior.	Total.
January, 1916 .	—	—	—	—	—	—	250	1,210	1,460			
February ,, .	1,018	3,416	4,434	—	—	—	321	1,206	1,527			
March ,, .	641	3,257	3,898	—	—	—	170	843	1,013			
April ,, .	553	2,434	2,987	71	331	402	192	660	852	816	3,421	4,241
May ,, .	337	3,210	3,547	54	457	511	161	753	914	552	4,420	4,972
June ,, .	569	3,000	3,569	82	428	510	169	787	956	820	4,215	5,035
July ,, .	475	3,068	3,543	64	459	523	189	794	983	728	4,321	5,049
August ,, .	414	3,578	3,992	18	417	435	131	998	1,129	563	5,124	5,687

Note.—For the months of January and February, the number of cases of syphilis *in the Army* includes not only patients in hospital with syphilitic chancre, but also those suffering from secondary affections; in the interior since the Army started, note has only been made of those patients in hospital with syphilitic chancre.

present with the colours; no account is taken of the men mobilised in munition works. Up to the present there is, unfortunately, no record of the cases of syphilis among them; and these, from personal observations and the confirmation of numerous doctors, appear to be of enormous frequency.

For all these reasons, interesting as are the statistics of venereal diseases among the troops, in that they enable us to follow the variations of venereal con-

tamination, and appreciate the results of prophylactic measures, they give but a very incomplete idea of the frequency of syphilis amongst a military population. If it were possible to register the total number of contaminations, this would, I believe, work out at 4,000 to 5,000 per month, say 50,000 to 60,000 per annum, which for three years of war would make 150,000 to 180,000 contaminations.

Pautrier, chief of the venereological centre of the eighth district (Bourges), in February 1916, observed 724 cases of primary or secondary syphilis amongst hospital patients, or those who came to consult him. This centre had only been worked from the month of September 1915, that is, for the period of six months.

"If one considers," he says,* "that the venereological centre, unfortunately, does not yet receive all the cases of syphilis in the district, a certain number of patients being wrongly detained in general or regimental hospitals, while others suffer from syphilis unrecognised by the medical man or concealed by the patient, and if one must admit without exaggeration that this calculation, to be correct, should be multiplied by 4 or 5, one sees what an impressive total would be reached in the eighth district alone. By multiplying this number by that of twenty other territorial districts and adding the very considerable figure of the army zone, it is possible to conceive that the cases of syphilis contemporaneous with the war will not be reckoned by tens of thousands, but by hundreds of thousands."

He considers that 200,000 syphilitics will be a highly probable number.

* Pautrier, "On the General Organisation of Military Venereal Hospitals and of the Annexed Services." Report presented at the Meeting of the Heads of the Venereological Centres, held July 13th, 1916 (*Annales de dermatologie*, September 1916, p. 233).

CHAPTER II

ON THE ORIGIN OF SYPHILITIC CONTAGION IN THE ARMY

As may be supposed, the origins of syphilitic contagion in the Army are multiple.

It is frequently difficult to determine them. All patients do not lend themselves to investigation with equal readiness : some have contracted syphilis under circumstances which they do not care to divulge ; others refuse, from a spirit of chivalry, to denounce the woman who accorded them a favour, whether gratuitous or paid for ; some, on account of drunkenness, are unable to give either place, time of meeting, profession, or colour of the hair of their temporary partner ; while others, again, have had so many and such frequent adventures with different women that they are unable to blame one more than another.

Despite the difficulties of the inquiry, a certain number of soldiers have replied to the questions with apparent veracity, and medical men have been able to obtain information of sufficient accuracy.

Some of these inquiries have been published, and they contain a sufficient number of names to be of value, especially those of Jolivet and Carle.

Take first Jolivet's * inquiry, which contains a list of the first 100 venereal patients treated in an infectious hospital in the army zone, and the information he

* Jolivet, " Origin of the Contamination of 100 Venereal Patients treated in the Army Zone " (*Annales de dermatologie*, May 1916, p. 126).

was able to obtain as to the manner of their contamination.

	Syphilis.	Gonorrhœa.	Simple Chancre.
I.—Official Prostitution, 52%			
Houses	16	10	—
Meeting-houses	—	1	—
Licensed prostitutes	9	14	2
II.—Clandestine Prostitution, 48% :			
Married Women: Dressmakers	—	1	—
Married Women: Laundresses	1	1	—
Married Women: Publicans	1	—	—
Married Women: Profession unknown	2	2	—
Married Women: Legitimate wives	3	13	—
Married Women: Refugees	2	—	—
Legitimate mistresses	1	1	—
Laundresses	3	2	—
Work-women	2	4	—
Waitresses in cafés	1	4	—
III.—Category Undetermined	1	—	—
IV.—Extra-genital Contagion (?)	1	—	—
V.—Contagion from pederastic acts	—	—	2 (1 in army. 1 in hospital.)

Carle * has obtained statistics giving the mode of contamination of 291 men observed in the venereological centre of an army.

These two statistics are particularly interesting, because they both of them treat of contaminations incurred as much in the army zone as in the interior ; thus allowing comparison of the mode of syphilitic dissemination in two entirely different centres.

The following statistics, prepared by Madame Govaerts with scrupulous accuracy, record 165 syphilitic men observed in my clinic in the St. Louis Hospital, from February 15th to August 15th, 1916, and in these cases it was possible to trace the origin of contamination.

* Carle, " Three Months' Work in the Dermatological and Venereological Sections of an Army Ambulance. Statistical and critical study " (*Archives de Médecine et de Pharmacie militaires*, June 1916, p. 865).

Carle, " Prophylaxis of Venereal Diseases in the Army. Measures taken, Measures to be undertaken." Report at the Meeting of the Heads of the Venereological Centres, July 13th, 1916. (*Annales des maladies vénériennes*, September 1916, p. 536.)

The statistics refer to both military and civil patients; I thought it better to combine them in the same table, in order to show that, in the interior, the majority of syphilitic contaminations are due to prostitution, amongst the civil as well as amongst the military population.

It is interesting to determine the source of syphi-

—	General Total.	Army Zone.			Interior.		
		Total.	Gonorrhœa.	Syphilis.	Total.	Gonorrhœa.	Syphilis.
Legitimate wives (to their husbands) .	12	1	1	—	11	7	4
Married women (townswomen and farmers' wives) . .	43	31	24	7	12	7	5
Work-women .	24	14	8	6	10	5	5
Servants and cooks . .	13	5	3	2	8	5	3
Farm-girls, or girls met on farms . .	17	15	8	7	2	2	—
Waitresses .	33	12	7	5	21	6	15
Landladies .	78	17	10	7	61	40	21
Professionals, either licensed or clandestine	71	18	14	4	53	40	13
Total . .	291	113	75	38	178	112	66

litic contagion separately in the different military classes : soldiers at the front, those in the depots and sedentary services, and men mobilised in munition works.

Men at the front may be contaminated either in the Army or the interior ; statistics show that they become affected much more frequently in the interior than in the army zone.

SOURCE OF CONTAMINATION IN 165 SYPHILITIC PATIENTS OBSERVED IN MY CLINIC
(February 15th to August 15th, 1916)

Class of Patients.	General Total.	Professionals.	Women met in restaurants or hotels.	Probable contamination by professionals: Patient could not or would not give information.	Probable contamination by professionals: Patient denied extra-conjugal intercourse.	Workwomen.	Married Women.	Wives or mistresses with whom patient had lived for a long time.
Military . . .	31	20	1	2	1	3	3	1 (wife)
Mobilised workmen .	21	12	1	2	3	2	—	1 (mistress)
Rejoined . .	37	22	1	3	1	4	3	3 (mistresses)
Young men not yet called up; Extensions; Civilians, 76. — 16 to 20 years of age .	24	15	2	—	—	6	1	
3 of 20 „ „								
7 „ 19 „ „								
8 „ 18 „ „								
4 „ 17 „ „								
2 „ 16 „ „								
20 to 50 years of age .	42	28	1	5	1	4	1	1 (wife) 1 (mistress)
Half of these are of foreign nationality	—	—	—	—	—	—	—	
50 to 73 years of age .	10	2	—	3	2	2	1	
7 of 50 to 60 yrs. of age								
1 „ 64 „ „ „								
1 „ 66 „ „ „								
1 „ 73 „ „ „								
Total . .	—	99	6	15	8	21	9	7

Jolivet, whose inquiry yielded 100 cases of venereal disease, observed in an infectious hospital near the front, gives the following table :

		Syphilis.	Gonorrhœa.	Simple Chancre.
Men contaminated in the army zone (24%) .		11	11	2
Men contaminated in the interior (76%) . .	In the depots .	24	13	1
	On leave	8	29	1

Carle, out of 291 men under observation in the venereological centre of the Army (see Table on page 9), takes 178, *i.e.* 61%, as having been contaminated in

the interior. In a series of 238 cases, more recently observed, he counts 170 contaminations coming from the interior, *i.e.* 71%.

In adding together the totals of these three statistics, out of 629 cases of venereal disease, 524 contagions are from the interior, *i.e.* 73·6%.

Tzanck has communicated the following statistics to me ; they were obtained in a military venereal centre, and bring more evidence to bear upon the part played by prostitutes in syphilitic contamination at the base.

	Syphilis contracted At the Front.	At the Base.
Free prostitutes	6	140
Landladies	—	2
Servants	2	6
Married women	—	8
Legitimate wives	—	1
Total	8	157

Hence, soldiers at the front most frequently contract syphilis in the interior, either in the depots before returning to the front, or when on leave.

Men on leave have various opportunities of contracting venereal disease : from the moment of quitting their unit they pass through towns in the military zone where syphilis is rampant, and stop at railway and transport junctions, often in Paris, where the station approaches are seething with women of all kinds. Jolivet, out of 100 patients, cites no less than 6 cases (2 syphilis, 4 gonorrhœa) contracted from women near railway stations by men passing through the towns. I have heard authoritatively that men have even been contaminated in the train taking them on leave by women who walk the trains and succeed in escaping observation.

At the place of destination there are various sources of contagion : barmaids, waitresses, laundresses, and work-girls give themselves up to clandestine prostitution ; there is also the mistress who, abandoned on mobilisation, has since taken one or more lovers. Men

who have been mobilised longest sometimes incriminate their wives : medical men at the front cannot verify the accuracy of the statements of their patients, and, despite the number who assert that their wives have contaminated them (16 in Jolivet's statistics, 11 in Carle's), may be sceptical. Facts observed in the interior, of women infected in the absence of their husbands, and dreading to infect them when on furlough, leave no doubt as to the reality and relatively large number of these contagions. Indeed, it has occasionally been possible to examine the husband when on subsequent leave, and make an accurate inquiry into the evolution of the two infections with syphilis. I myself have seen more than forty absolutely authentic cases.

In the *army zone*, contamination mostly emanates from women whose business brings them in contact with soldiers : restaurant keepers, barmaids, laundresses to whom the men send their washing on returning to quarters ; seamstresses, who mend their clothes, as well as farm-girls met near camp, or in the open country. Often the women are married (31 out of 113 contaminations in the army zone, according to Carle's statistics), town or country women ; these latter are almost as numerous as professionals, registered or clandestine, free or in houses, mentioned in the same statistics (35 professionals as against 32 married women).

To sum up, in the army zone, venereal diseases are transmitted more often by women who are not professional prostitutes than by official or clandestine prostitutes living solely by their bodies. If one could separate the contaminations occurring in large towns and at the base from those occurring in the army zone, the part played by true prostitution in the dissemination of syphilis and venereal diseases in the immediate neighbourhood of the front would be very considerably diminished.

In the Table published by Carle a suggestive comparison may be made of venereal contaminations by professionals, according to whether these were produced in the army zone or in the interior ; in the latter they give 114 contaminations out of 178, *i.e.* 64%, and in the army zone 35 out of 113, *i.e.* 31%, or less than half.

There is, therefore, a danger to soldiers in women who are apparently most innocent, and the importance of this cannot be exaggerated. I even heard some military surgeons say that every woman in the war zone ought to be watched, and that no social position should prevent the suspicion of syphilis from being traced to its lair. Proportionally as the war is prolonged, the opportunities for these women contracting syphilis will be multiplied, with consequent increase in the dangers run by the troops.

Syphilis is very irregularly distributed in the different bodies of troops, and I could cite such and such a regiment in which the number of cases of syphilis is at the lowest, although, and perhaps because, medical inspection is made regularly and carefully. In others, on the contrary, syphilitic morbidity is high. These inequalities, for the greater part, are due to the sanitary condition of the women with whom the men have intercourse : owing to the small number of women living near the front zone, it only requires a few of them to become syphilitic for contamination to multiply with extreme rapidity. Equality amongst the different bodies of troops, in this respect, tends to re-establish itself by the movements of the men on furlough.

In the *base zone*, on the other hand, contagion originates especially with professional prostitutes who swarm in the large towns * in search of soldiers quartered

* L. Spillman (" On the Increase of Syphilitic Morbidity among Troops on Active Service," *Comptes rendus de la Société de Médecine de Nancy*, December 22nd, 1915) has noted the increase in the number of prostitutes at Nancy. This has also been reported to me from all the large towns near the front.

in these towns, and with other women brought there by their duties, or passing through when on furlough. For some time there has not been one of these large towns in which syphilis has not made an incessant advance ; statistics are wanting as to the sanitary condition of these towns, but the declarations of both civil and military surgeons, and the afflux of syphilitic women into the hospitals, prove it abundantly. It is in these towns that the most rigorous supervision of both official and clandestine prostitution should be exercised.

The risks of contamination in the base zone explain why syphilis is extremely frequent amongst men staying there, or who have easy access ; such, for example, as the staffs of aviation camps, motor-drivers, secretaries of the general staff, amongst whom a high proportion of syphilitic cases have been observed by the medical men.

In the *depots* and sedentary services, the sources of contamination are similar to those noted with men on leave. They are, as in times of peace, but in higher degree, prostitutes of all kinds. Statistics of my clinic show that, out of 31 syphilitic soldiers, 20 had been contaminated by avowed professionals, and 3 others also probably by professionals. In these 20 contaminations it was always a case of solicitation, especially around the Paris railway-stations and near the depots. We thus come to a proportion of 64, or perhaps 70% of infections by prostitutes. Comparing, in the same statistics, the round numbers (civil and military combined) of cases observed (165) with those of the contaminations emanating from professionals (which extend certainly to 99, and probably to 122), a similar percentage is reached, which shows that 60 and probably 73% of the contaminations are due to professionals.

Meetings take place on the public highway, near the Paris railway stations, in military centres, at depots, concerts, cinemas, etc.

For men mobilised in *munition works*, the habitual source of syphilitic contagion is also the prostitute, at least in Paris. In provincial towns, it is more likely to be caught in the workshop : the promiscuity of the sexes entailed by the necessities of work, and more especially its inspection (women being inspected by foremen) facilitates more or less durable *liaisons*, with resultant contaminations. It is noteworthy that a certain number of pre-war prostitutes, whose clientele had been reduced by mobilisation enrolled themselves amongst munition workers. It has been stated that, in a large provincial town, the majority of certified prostitutes were engaged in munition work, their wages increasing the profits, reduced by war, of prostitution, which they continued to practise with their fellow-workmen.

Non-venereal contaminations occur in the Army ; the proximity of the trenches and camps, the common interchange of mugs, forks, pipes, etc., are sufficient to explain these. Cuts from the improvised barber's razor, often a poor one, may also produce syphilitic infection.

As a matter of fact, however, despite inadequate precautions, such contaminations appear to be rare in the Army.

CHAPTER III

SYPHILIS AS A NATIONAL DANGER

THERE is no exaggeration in stating that the present-day frequency of syphilitic contamination constitutes a danger of the first importance, which will have an influence upon the nation quite as considerable as that of the most deadly epidemics.* This danger can only be compared to that of tuberculosis, against which it is justifiable to take the most rigorous and expensive precautionary measures.

Before showing of what these dangers consist, the modes by which the propagation of syphilis undermines the national defence, compromises the vitality of the nation, racial vigour, and the repopulation of France, it may be well to complete the picture of syphilis in this country and to sketch rapidly its present effect on the civil population.

SYPHILIS AMONGST THE CIVIL POPULATION SINCE THE BEGINNING OF HOSTILITIES

In the preceding chapter I indicated the frequency and origin of syphilis in the Army, and the influence of the civil upon the military environment.

Like all contagious diseases, and more especially for

* This is no new danger, nor is it the result of the present war alone. Landouzy ("Syphilis before the War. Disregard of its extreme Frequency," *Bulletin de l'Académie de Médecine.* Meeting of April 18th, 1916, p. 434) has shown with great force and appropriateness that it has long been in existence, and has remained unsuspected by far too many.

the majority of them, endemic syphilis in the Army does not limit its effects to the soldiers themselves, but has an immediate and extensive repercussion upon the civil population. The conditions of syphilitic transmission explain, without further detail, this exchange, which is far too free. Let us see how this influence of a military centre affects civil life.

Here, again, available statistics are wanting. Syphilitic morbidity of different social districts in times of peace is subject to variations, difficult to disentangle from a rough accumulation of figures, and these social centres have been upset by the war. The influx of refugees has modified the population, especially the number of those attending the hospitals ; the utilisation of female labour has changed the composition of workshops, causing an influx of women of restricted means, forced by the war to earn their own living. What can I say further ? In the hospital clinics the proportion of syphilitic cases recently reported, among the total number in hospital, would seem to indicate an increase of syphilis ; but the conditions of admission to hospital of cutaneous affections are quite different to those of peace time : refugees are sent to hospital for benign diseases which would have been treated at home ; patients suffering from chronic affections have left hospital to work, etc. The result is, without counting that the diminution in number of medical students does not allow of the collection of all facts from the hospital statistics, that these statistics do not contribute elements of certainty to the study of the increase of syphilis.

It is imperative, therefore, to abide by the impressions of medical men ; and all declare that syphilis has increased, not only specialists, but general practitioners as well.

Brocq * wrote in January, 1916 : "I shall not, in

* Brocq, "The Influence of the Present War on Cutaneous Affections" (*Bulletin médicale*, January 22nd, 1916, p. 111).

this note, insist upon the heartrending frequency of venereal diseases, and the terrible increase in syphilis since the beginning of hostilities : my sole occupation to-day will be cutaneous affections properly so-called, and yet I cannot state too emphatically that the true aspect of our clinics during the war is dominated by the deplorable prevalence of syphilis."

A very distinguished doctor, belonging to an Accidental Insurance Company, Dr. Borne, recently informed me that, whereas before the war he rarely saw one patient a month in whom he could find a trace of venereal disease, syphilitic eruptions, mucous plaques, gonorrhœal arthritis, etc., at the present time he comes across three to four per week.

There is no doubt that, in a general way, the number of cases of recent syphilis has increased amongst the civil population since the war, and there is evidence of still further advance. I repeat, this is the result observed, from the discussions I have had with a number of medical men, all of whom have confirmed these statements.

This does not apply specially to Paris ; it has been observed by all medical men I have questioned, both in large centres and small localities.

Indeed, not only is the increase of syphilis observed in Paris and large towns ; it has also been noted in small towns and localities soon after a military influx (near the front, in training camps, especially quarters at the base, in the rest billets, depots for troops, motor and aviation centres, hospitals, etc.), and among munition workers. It is even relatively perhaps more important in small localities than in big towns, where syphilis has always been present.

There are two civil classes especially in which this augmentation has been surprising : amongst married women and young men.

All medical men at special hospitals have noted that the number of *married women* who come to

consult them for syphilitic troubles is altogether abnormal, and out of proportion to what occurred in time of peace.

I learn from Louis Spillmann that the number of married women in hospital at the Nancy free venereal clinic, which in 1914 was 5, with 1 syphilitic, had in 1916 risen to 43, with 23 syphilitics.

Of these women, some contracted syphilis from a civilian of some kind, a man recalled to the colours, or too old for military service, or from a refugee met by accident in the workshop or the street; here, there is no difference from what is seen in time of peace. Others have contracted the disease from men at the depots, munition workers, soldiers on leave or under treatment in the hospitals.

These two classes comprise women of varying morality, some of whom only had recourse to extra-conjugal relations as a means of augmenting their incomes, which had been reduced since the departure of their husbands.

By the side of these are the *women contaminated by their husbands* home on leave, or returned home after being discharged wounded. These women are undoubtedly syphilitic owing to the war, and they are numerous: not a single day passes without two or three, and sometimes more, presenting themselves at St. Louis Hospital for consultation. They are of all ages, sometimes young; a large number of them have no suspicion of what they are suffering from, and no idea of the nature of the sore throat, roseola, or alopecia for which they are seeking advice. They are ignorant of syphilis and its contagion, and, as a rule, it would never occur to them to blame their husbands; it is only on inquiry that the medical man, when hearing the history of the illness, verifying dates, and, finding when the husband came home on leave, has traced it to its source, this being confirmed later by the statement or examination of the husband.

I repeat, these facts are legion ; I myself having seen above a hundred cases.

Here, again, mention must be made of the munition workers. As I have already stated, and again repeat, an enormous proportion of these men are syphilitic, and, despite every possible advice, many of them take no care of themselves at all. The result is the frequent contamination of their wives, whether these live at a distance or have remained with their husbands. I have already seen a large number of married women whose husbands, munition workers, had infected them.

All these women, respectable mothers of families, sometimes pregnant or having been recently confined, are totally ignorant of syphilis, or of the fact that they may contaminate their *children*. On several occasions I have seen two or three children brought to me suffering from chancres transmitted to them by their mothers—this would be an exceptional occurrence in peace time, when the majority of syphilitic women treated in hospital know how to account for their illness.

Another fact which has struck all medical men is the frequency of syphilis in *young men* since the war began. There is no day in which several do not come up for consultation ; at the St. Louis Hospital, I myself never see less than two or three at each consultation, from 16 to 18 years of age. They have generally contracted the disease from some woman met in the street, the suburbs, or on the outer boulevards. There is little doubt that they have listened to her solicitations : won't they soon be soldiers, and must they not now prove their manhood ? When questioned, many of them reply, with a certain conceit, that they cannot say what day they were affected, as the occasions had been numerous. Then, again, there are a number of women on the streets, many of them " unemployed " owing to the reduction of the male population of the suburbs, and they have much to answer for in juvenile contamination.

These young syphilitics are the soldiers of to-morrow : military surgeons have reported with horror the proportion of recent cases of syphilis amongst the youths who have joined up during these last months.

The Social Consequences of Syphilis amongst Soldiers

To return to syphilis amongst soldiers.

On account of its frequency amongst soldiers and munition workers, this has become a danger :

1. Because it compels patients to submit to treatment which, during the contagious periods, cannot be carried out at the front, or while men are still engaged in munition works, because, in a word, it *diminishes* the effectives.

2. Because it *diminishes a man's value.*

3. Because, being transmissible to a patient's descendants, it *compromises the race* at an epoch when, more than ever before, it is imperative that the race should be numerous and robust.

Diminution of Effectives.—In order to reduce syphilitic propagation, whether genitally or extra-genitally, it is essential that the patient should be removed from his habitual environment—from his work or duty—as long as he is a carrier of contagion : this is a fact disputed by no one. This precaution is all the more necessary because genuinely effective treatment of syphilis is not compatible with the requirements of military duties in time of war.

Moreover, no matter how intense and active the treatment, in order to sterilise the contagious lesions, chancre or mucous plaques, a minimum of time is required, which varies according to the methods employed. Medical men, aware of the necessities of national defence, endeavour to reduce this period ; but, owing to the number of syphilitics, it represents a very appreciable time, and consequently a waste of effectives.

Further, syphilis, even at an early stage, and especially if not treated effectively at the beginning, may give rise to lesions which necessitate more or less prolonged treatment in hospital, so as to avoid contagion: jaundice, albuminuria, headache, ulcerative cutaneous lesions, etc., which form one part in the percentage of army morbidity.

It must be noted, also, that syphilis may play a part in the progress of wounds, retard their cicatrisation and osseous consolidation, and perhaps facilitate infection. From what I know of the operative results on syphilitic cases in general, and what I have seen since the outbreak of hostilities, this part seems very restricted; still, certain surgeons consider it of real importance. It must, therefore, also be included when estimating the influence of syphilis on the diminution of effectives.

Diminution of Men's Value and of the Duration of Human Life.—Syphilis, during its various periods and for a long time, causes a series of lesions and troubles which diminish the physical and intellectual power of man. This is not the place to describe, nor even to enumerate the cerebro-spinal, cardio-vascular, hepatic, renal, and osseous localisations which, while often attributed to other causes,* are none the less a part of syphilitic infection and gravely encumber statistics of morbidity and mortality.

There are no statistics in existence which enable one to estimate the reduction of human power entailed by the morbidity and mortality of syphilis. It would be necessary to take into account the loss of time and money caused by treatment; the incapacity to work due to the disease itself, and the influence it might exercise on different affections, especially infections and intercurrent intoxications.

* Letulle and Bergeron, "The Wassermann Reaction in Chronic Diseases" (*Bulletin de l'Académie de Médecine.* Meeting of February 22nd, 1916, p. 204).

As an indication, I may refer to the fact that, as regards workmen's accidents, the tribunals, when they have to appreciate the reduction of professional capacity as the result of syphilis, fix this reduction between 15 and 25%.

In order to give an idea of the relative frequency of later syphilitic manifestations, Fournier * compiled a Table giving the results of the examination of 4,000 patients who had consulted him for tertiary symptoms. The following is a résumé of this Table:

Syphilides and gummata	1,655
Lesions of genital organs	271
,, ,, the tongue and lips	304
,, ,, the pharynx and palatine arch	566
,, ,, of bones and of the nose	541
Gummata of tendons and muscles	19
Lesions of the digestive tube	21
,, ,, ,, respiratory passages	55
,, ,, ,, heart, aorta, and arteries	22
,, ,, ,, liver	9
,, ,, ,, kidney	31
,, ,, ,, testicle	245
,, ,, ,, eye	110
,, ,, ,, ear	24
Syphilis of the brain	764
Cerebro-spinal troubles	29
Syphilis of the medulla	135
Tabes	676
Neuritis and muscular atrophy	24
General paralysis	83
Ocular paralysis	120
Facial hemiplegia	23
Sundry nervous affections	13
Sundry localisations	19
	5,749

As regards syphilitic mortality, Blaschko,† drawing upon the statistics of insurance companies, comes to

* Alf. Fournier, *The Social Danger of Syphilis*. Report presented at the First International Conference for the Prophylaxis of Venereal Diseases. Brussels, 1899.

† Blaschko, "The Influence of Syphilis on the Duration of Life" (*IV. International Congress for Medical Insurance*, Berlin, 1908).

the conclusion that the deaths caused by syphilis represent 6% of the total mortality, that at least 30% of patients who have had syphilis die of this malady, and that syphilis shortens the duration of life by four years.

Audry * has proved that incomplete, contradictory, and doubtful results of syphilitic mortality are given by the statistics of insurance companies, the various statistics of mortality published and those of tertiary syphilis, and that inquiries into treatment in clinics and the impressions of syphilologists only give incomplete facts. He has, nevertheless, recognised that their comparison yields interesting results. The impression obtained is that the mortality, in round figures, of syphilis, specific and deuteropathic, approximates to 14 or 15%. It is believed that in France the mortality of syphilitic subjects regularly treated, young and sober, should not exceed 4 to 5%, whereas there can be no hesitation in multiplying this proportion tenfold for old men, drunkards, and certain decrepid individuals.

These causes of sickness and death enter but rarely into play during actual war, but their weight will be felt more severely by syphilitics during the following years, all the more heavily as fatigue, war emotions, preoccupations of all kinds, which will follow peace, facilitate the development and localise the disease on an organism, which, healthy and immune from syphilis, would have been able to resist it.

The consequence is a waste, of which it is impossible to estimate the importance. It is hoped, however, that the energetic treatment of primary syphilis will greatly diminish its proportions, although they cannot be ignored. Further, this waste, the direct consequence of war syphilis, will occur during the years in which the nation has the greatest need of the energy, the

* Ch. Audry, "Essay on the Mortality of Acquired Syphilis" (*Semaine médicale*, June 26th, 1906).

physical and intellectual vigour of its children, in order to repair the disasters caused by the war, and reconstruct the frame-work of industry, instruction, and scientific personnel.

Inauspicious Influence upon the Birth-rate and Future Generations.—It seems a commonplace remark, and yet it is one that must be repeated, that, after the war, it will be necessary for the French to produce many children : not only must the birth-rate fill up the gaps in the nation made by war, but, further, those which are the result of many years' voluntary restriction of births. The lessons taught by this war have been so cruel that a new mentality will spring up, quite opposed to the old order, as regards the procreation of children.

It is imperative that the classes 1935, 1936, and the following years should exceed in numbers the classes 1915, 1916, and, even if they cannot attempt to surpass them in heroism, then they must do so in physical vigour, so that they may have the maximum qualities of resistance and of physical and intellectual development, which will result in a high proportion of men fit for military service.

But, with the propagation of syphilis, precisely the opposite result will be obtained. What is the value of a syphilitic as a procreator ? Nothing for several years. Not very much during subsequent ones ; so much so that nearly all syphilologists * are of opinion that marriage should be forbidden for four years at least, no matter how intense and active † treatment may have been, or what the serum reaction may be.

Alfred Fournier ‡ for many years has made a study of the influence of syphilis upon future generations.

* Civatte, "Under what Condition can the Marriage of Syphilitics be permitted?" (General review, *Annales de dermatologie*, 1907, p. 734).

† Brocq, "The Question of the Marriage of Syphilitics" (*Bulletin médicale*, February 21st and 24th, 1914, pp. 183 and 197).

‡ A. Fournier, *Syphilitic Heredity*, Paris, 1891, p. 89.

He has based his conclusions upon 500 observations, in which he has been able to distinguish paternal heredity, maternal heredity, and mixed heredity (father and mother), and considers that these three kinds of heredity have the following influence on the morbidity and mortality of the child:

	Indications of Morbidity.	Indications of Mortality.
Exclusive paternal heredity .	37%	28%
„ maternal „ . .	84%	60%
Mixed heredity . . .	92%	68·5%

These statistics show that maternal heredity has a much greater noxious influence than paternal heredity: the contamination of a woman by her syphilitic husband may take place several years after his infection, thus pushing further back the period during which the pair can have healthy children.

The noxious influence of syphilis certainly becomes more attenuated as the years roll by; not only do the number of abortions diminish, but the mortality of children born at term also decreases rapidly.

Alfred Fournier * has recorded the deaths of 176 children out of 239 pregnancies in syphilitic families, and has noted the date of these pregnancies in connection with maternal infection:

First year	88
Second year	34
Third year	17
Fourth year	7
Fifth year	5
Sixth year	6
Seventh year	5
Eighth year	5
Ninth year	1
Tenth year	1
Eleventh year	2

* A. Fournier, *Syphilitic Heredity*, Paris, 1891, p. 104.

Twelfth year	3
Eighteenth year	1
Twentieth year	1
Total	176

Out of 103 pregnancies, the issue of a syphilitic father and healthy mother, and in which the paternal influence was noxious, the same author has noted the manner in which the noxious effect was exercised.*

Children born alive, then immediately or soon affected by congenital syphilis	17
Children born alive, then showing symptoms of retarded congenital syphilis	2
Abortions or premature confinements of dead children	41
Children dead after varying periods (but generally after a short period), without any evident specific manifestations	43
Total	103

Bar has kindly shown me the observations made on syphilitic women confined in the Tarnier clinic from January 1st, 1915, to August 31st, 1916.

Those women are regarded as syphilitic who present active syphilitic troubles, proved syphilitic antecedents, or whose blood (mother's venous blood or from the cord) gives a positive Wassermann Reaction.

These statistics are interesting, as they enable us to appreciate the injurious effects of syphilis upon the offspring of women mostly subjected to the modern methods of treatment.

Out of a total of 118 pregnancies, the number of children living at the time the mother left the clinic after her last confinement is 40, *i.e.* 34%.

But this is taking a round number, which, in order to indicate the real influence of syphilis, should be

* A. Fournier, *Syphilitic Heredity*, p. 75.

RESULTS OF PREGNANCIES OF 53 SYPHILITIC WOMEN CONFINED IN THE TARNIER CLINIC FROM JANUARY 1ST, 1915, TO AUGUST 31ST, 1916.

	Last Pregnancy.	Previous Pregnancies.
1. *Pregnancies prior to syphilitic infection:*		
Miscarriages	3	15
Children macerated or still-born	20	18
Exencephalus	1	—
Children dead before mother left hospital	3	—
Children died within first year	—	10
Living children	15	5
2. *Pregnancies appearing after syphilitic infection:*		
Living children (certain or very probable contamination of mother during pregnancy)	9	—
Dead children (contamination of mother during pregnancy)	2	—
Living children born after series of miscarriages or still-born babies	—	11
Still-born children (albuminuria of mother before a series of miscarriages or still-births)	—	5
Condition of child not known	—	1
Total	53	65

subjected to an important correction, for a certain number of these pregnancies were anterior to the woman's contamination.

Counting all the pregnancies as such, where this anteriority is probable, we find that out of 90 pregnancies certainly posterior to the syphilis, there are 20 living children, *i.e.* 22%.

By taking an average, we come to the conclusion that 28% at the most of pregnancies of syphilitic women yield a child likely to live.

Further, it must be noticed that for children of the last pregnancy, observations cease 8 to 10 days after birth. How many are there still living at 20 years of age ?

Like time, anti-syphilitic treatment attenuates the noxious action of heredity. So, for a very long time, which is longer still if treatment has been inadequate,

or if syphilitic symptoms have a tendency to reappear, the syphilitic man begets a child unlikely to live, which will either not come to term, or will die in a few days. And, further, not only will the child not live, but, according to doctrine still under discussion, it will have an injurious effect upon the woman who bore it; it will infect her, render her syphilitic, will be the cause of her bearing no healthy children for several years, and thus prolong the duration of sterility in the family.

But that is not all: the syphilitic man, who for years has been unable to beget living children, will for some years longer be unable to beget healthy or well-formed ones. His first child having been, vulgarly speaking, "rotten," his later ones will be, at any rate, "tainted." True, they live, but are often born prematurely, and are small and pallid-looking. At the end of some days or weeks, their syphilitic tendency is revealed, their nostrils and lips become covered with scabs and fissures, mucous plaques develop on their lips and tongues; if breast-fed, the discharge from these lesions often causes a syphilitic chancre to develop on the nipple of the nurse, with resultant troubles of all kinds for the parents.

Later children may be born at term, and reveal syphilitic troubles neither at birth nor in the following weeks; for some months their development may be almost normal, but later on they show signs of *retarded congenital syphilis*, so ably described by Alfred Fournier. They may be apparently healthy, with the exception of some accident which indicates their disease (gumma, exostosis, lesion of palate, testicular atrophy, etc.); but, as a rule, they are sickly, badly formed children, with weak bones, subject to chronic scrofulous ulcerations; their genital organs are imperfectly developed, their cerebral functions affected in varying degrees, from intellectual debility or simple arrested development to complete imbecility with or without hydrocephalus.

Black as this description of syphilitic degeneration appears to be, it is but too true and too frequently realised.

Syphilis is one of the most dangerous enemies of the race and its preservation, as well as the preservation of its physical and intellectual qualities ; with alcoholism, and much more than tuberculosis, it deteriorates, if it does not radically inhibit, reproduction.

The disastrous influence of war syphilis will be felt throughout the whole country, not only in towns, where for a long time syphilis has been one of the causes of the decadence of the population, but also in country places, where previously it was not very prevalent. Therefore, the danger is perhaps greater in the country than in towns : for one reason, as experience has shown me, family contaminations are more frequent and numerous, owing to the ignorance and habits of the patients, and medical instructions are less regularly followed. On the other hand, the country may, so to speak, be regarded as the conservator of racial vigour ; the best military contingents, from a physical point of view, come off the land, and, after the terrible bleeding of the war, it will be more than ever necessary to safeguard its population, which is even now barely sufficient for agricultural purposes.

True, all syphilitics are not destined to die without issue, or to leave behind them offspring without value in the defence or enrichment of their country. Energetic and sufficiently prolonged anti-syphilitic treatment, combined with the attenuating action of time, will enable them to procreate living children, well developed both physically and intellectually : all medical men are acquainted with syphilitics who, after having been treated by the older methods, have been allowed to marry after a reasonable time, and whose children, born under good conditions, are at the present time serving with the colours. We have all seen—and I could cite several—the children of syphilitic parents who

showed undoubted manifestations in their early days, but, as the result of active and careful treatment, developed physically and intellectually enough to be regarded as fit for military service. There is reason to believe that the intensive treatment in use at the present day will yield even more satisfactory results.

It must be emphasised, however, that this is the lot of patients who have been well advised, carefully treated, and have regularly followed the orders of their medical attendants.

Amongst the legions of syphilitics infected since war began, it is easy to imagine that, after the cessation of hostilities, many of them, removed from the supervision of the medical man who attended them in the early stages, and seeing no further syphilitic manifestations appear—especially after intensive arsenical treatment—will consider themselves definitely cured, and take no further trouble, with subsequent inability to beget healthy children. To prove that these fears are not exaggerated, it is only necessary to see, at a hospital consultation, the carelessness of old syphilitics, the number of those seen for the first time and treated properly who never return and follow no treatment at all until some grave symptom appears. In an artisan population, and still more in a rural one, it is the exception to see syphilis properly treated; miscarriages, as the result of carelessly tended specific disease, being the rule. Medical and administrative propaganda for regular and prolonged treatment have still much to do before erasing this culpable negligence.

Syphilitics recruited into the Army belong for the most part to men of marrying age, or who have been recently married, whose procreative faculties are in full development, and who are destined to repopulate the country. From a national point of view, it is of very little importance that a man of 50 or over should contract syphilis; his procreative work is

done. But a man of 25 to 35 who becomes syphilitic has forfeited his reproductive power. As a rule, a man who develops syphilis between 35 and 45 is lost for reproduction; the period during which he should deny himself extending to an age when he will have no desire, or when his posterity would be altogether undesirable, the syphilitic influence being combined with that of age.

Taking into account the prolificness that will be necessary to bring the population of France back to its indispensable rate on the one hand, and the varied ages of the men who contract syphilis in the Army and in munition works on the other hand, there is no exaggeration in estimating that each syphilitic infection of a mobilised man will be the means of depriving France of at least one soldier and one mother of a family during the decennial period 1936 to 1945.

Pautrier expresses the same idea in the report, which I have already quoted, on the organisation of military venereal hospitals, when he says, after having attempted to specify the exact number of cases of syphilis in the Army:

"If one accepts the mean figure of 200,000, which, while hypothetical, is quite possible, and attributes to each of these cases the production of two miscarriages only, it is evident that treponemic infection will cost us 400,000 births, *i.e.* the equivalent of two classes.

"Thus, the word 'national peril' is not too strong."

Surely this consideration is of a nature to justify the most energetic measures, even the most drastic, to prevent the propagation of syphilis.

And now, when on all sides voices are being raised in denunciation of the peril of depopulation and demanding the repopulation of France, when leagues and associations are being proposed with the object of encouraging large families and protecting the life and health of children, is it not urgent to dry up the source of such a waste of life?

All that is done to protect the Army from syphilis will necessarily rebound favourably on the population.

In the following chapters I shall show how, from the military side, most rational measures have been taken under the inspiration of Medical Inspector General Vaillard. Mr. Justin Godart, Under-Secretary of State of the Health Service of the War Office, in prescribing these measures and attacking what he also, in his circular of January 5th, 1916, has called a national peril, has engaged in a more active struggle against syphilis than any minister has ever done before, and by the instructions issued on September 25th, 1916, has responded to the recommendations of the Academy of Medicine at the meeting of June 13th, 1916.

CHAPTER IV

SYMPTOMS AND DIAGNOSIS OF THE SYPHILITIC LESIONS MOST COMMONLY OBSERVED IN THE ARMY

THIS book is not a treatise on syphilis, nor is this the place to give a complete description of its various manifestations. Nevertheless, it seems advisable to refer, with necessary details, to the characteristics and diagnostic elements of the main syphilitic lesions likely to be observed amongst soldiers, especially primary and secondary symptoms. Owing to their frequency in the Army, and of their contagiousness, the military surgeon ought to be acquainted with their diagnosis.

SYPHILITIC CHANCRE

Developed at the site of inoculation of the syphilitic virus, the infective chancre in soldiers is nearly always found on the genital organs or in their immediate neighbourhood. More rarely, it is situated on the tongue, lips or tonsils, but it is then the result of accidental and not venereal contamination. It is quite exceptional for it to be found on the limbs.

After having cited the symptoms and explained the diagnosis of syphilitic chancre on the genital organs, I shall give a description of the extra-genital localisations of chancre most frequently observed.

Period of Incubation of the Chancre. Its Duration. —Syphilitic chancre—this is a characteristic of the utmost importance from the point of view of its diag-

nosis from simple chancre—does not appear immediately after the infective contact, but is separated from it by a very clearly defined period of incubation. The duration of this period is from 25 to 30 days, according to proved clinical observations, the confirmation of the patients and those who have infected them, and the experimental inoculations made on man; it is rarely less than 14 to 17 days; but may extend to 40 days, and very exceptionally even beyond that period.

Owing to the conditions of military service, especially at the front, it is often possible for the man to fix the date of the infective intercourse, when he is willing to do so. Thus, by means of careful questions, and having regard to the intelligence of the man and the conditions which may influence the veracity of his statements, it is possible to make a presumptive diagnosis from the duration of the incubation. On the other hand, comparison of the age of a chancre with the dates of leave may sometimes show the inexactitude of his statements.

In order to make use, for diagnostic purposes, of the information supplied by the soldier suffering from a chancre, it is necessary to weigh his statements very carefully, and check them in every way possible.

Causes of Localisation of the Chancre.—Syphilitic inoculation takes place through a solution in continuity of the integument, a traumatic excoriation at the moment of infective intercourse, a lesion from scratching induced by the presence of pediculosis pubis or scabies, etc. At the moment the chancre appears this lesion has nearly always disappeared, leaving no trace, and often even no recollection of it. The concomitant lesions of itch or the presence of crab-lice may still be in existence and explain certain particularities of the syphilitic infection: this is why chancres following itch are often multiple, and sometimes very numerous, the points of entry

made by the acarus being also multiple. This also explains why chancres which have appeared on persons affected with pediculi are frequently situated on excoriations due to scratching in the pubic region, inside the thighs and scrotum, regions on which a syphilitic chancre is localised more rarely than on the penis.

Commencement of the Chancre.—A chancre develops in healthy skin ; it commences as a rounded papule, bleeding easily, of firm consistency, with a slight erosion in the centre ; but at this stage it has no pathognomonic characteristic. It must be added, further, that the chancre is rarely observed by the medical man at this stage, and indeed can only be noticed in patients who are scrupulously careful or nervous, who consult a doctor the moment there is anything abnormal on their genital organs.

During the following days the lesion progresses, becomes larger and more defined, the induration increases, and the ulceration extends.

Stage of Maturity.—When the syphilitic chancre has developed it is possible to define it as an ulceration situated upon a hard base. I ought rather to say ex-ulceration, for the loss of substance is very often superficial.

Smooth, with a regular surface, presenting neither depressions nor projections, such as are seen on the irregular base of simple chancre, the ex-ulceration is ordinarily on a level with the neighbouring skin, sometimes it projects above it ; occasionally it is depressed and saucer-shaped ; more rarely still, it is excavated.

The surface of this ulceration is generally glazed of a special red colour, which has been compared by all classical writers to that of muscular tissue ; if observed carefully under a magnifying glass, it is found that it is not uniform, but very finely granulated, sprinkled with little specks of deeper red, which are

nothing but fine vascular dilatations. Some chancres are of a different colour ; they are covered by a greyish layer, almost diphtheroid, which, although not thick, is very adherent. This coloration often does not cover the whole surface of the chancre, but forms a concentric circle around its border ; the result is a peculiar appearance, which goes by the description *chancre in rosette.*

Syphilitic chancre of the genital organs does not suppurate ; here it differs completely from simple chancre : all it does is to exude a very small quantity of serous fluid, which keeps up a slight moisture on the surface and aids in giving it its glazed appearance. J. Nicolas * has called attention to the facility with which this discharge can be induced. It is only necessary, when the chancre has come to a head, to execute slight friction with a hard body such as a platinum spatula or vaccination needle, to see the surface covered over by a clear, transparent serum : this discharge, if the friction is continued, becomes abundant enough to be collected with the spatula or needle.

This characteristic is very important from the point of view of diagnosis of the chancre, because it is in this exudation resulting from serous drainage of the superficial layers of the chancre that it is most easy to detect the presence of the spirochæte. I shall refer again later to this point, when discussing the bacteriological diagnosis of chancre.

On the skin, or more accurately in the regions where the nature of the integument does not allow of a certain degree of constant moisture, the secretion of the chancre forms into more or less thick scabs (*scabous chancre*) ; but these scabs always remain dry, and no layer of pus is found below them, such as happens with simple chancre or with ecthyma.

* J. Nicolas, " Schaudinn and Hoffmann's Spirochæta Pallida and Syphilis" (*Lyon médical*, October 1st, 1905, p. 497).

Syphilitic chancre is nearly always of regular formation, extremely regular, geometrical, rounded or oval. In certain regions, like the anus, it may take on a fissure-like form, or be disposed like *the leaves of a book.*

The dimensions are variable. It may remain small through its whole evolution, in a state of *dwarf chancre*, resembling a herpetic erosion. The average size is about the size of a sixpence. It is altogether exceptional, especially on the genital organs, for it to attain the size of a shilling or over : it is only on the body that larger dimensions may be attained, meriting the name of *giant chancre.*

The ulceration of a syphilitic chancre rests upon an *indurated base* ; this is the main characteristic, which is of great importance from a diagnostic point of view, and has gained for it the name of indurated chancre. As a matter of fact, it is altogether exceptional for the induration to be absent, especially in man ; but it varies in intensity.

In order to appreciate this clearly, it is necessary to proceed methodically : the thumb and index finger, covered by a rubber finger-stall, or protected by lint,* and opposite to each other, are placed one at each of the extremities of one of the diameters of the ulceration and at a centimetre or demi-centimetre outside it ; approaching one to the other, the base of the chancre is slightly raised by means of moderate

* It cannot be urged too strongly on medical men to take precautions, when called upon to examine patients suffering from ulcerous lesions of the genital organs or other regions. They should, first of all, see that there is neither sore nor excoriation on any of the parts likely to come in contact with the suppurating lesions of their patients, and, if they have any, these should be covered up with plaster.

At a consultation, at which a certain number of venereal patients are present, it is a good thing to have rubber finger-stalls at hand, which should be put on before manipulating the chancres.

A compress, or even a thin tuft of wadding, can be used instead of gloves.

After touching an ulceration, the doctor should wash his hands

pressure ; it is then easy to feel, between the two fingers, the existence of a firm plaque of regular consistency, but varying in one case from another. It is more like the sensation that would be given by a sheet of thick paper or parchment (papyraceous induration), rather than that of cartilage, or even of a piece of wood (ligneous induration). There is always a certain elasticity in this induration. Unless it is very large, it can be distorted slightly by pre sure, and the surface of the chancre, from being level, becomes slightly convex, like a sheet of flexible cardboard.

The degree of induration is often, but not always, in relation to the dimensions of the chancre : dwarf chancres may have a very indurated base, voluminous chancres may rest upon a papyraceous induration.

The induration always extends beyond the limits of the ulceration. When it has reached a certain degree it forms, as it were, a pastille with an ulcerated centre.

The induration of some chancres is obvious : situated upon convex or cylindrical parts, they do not conform to the contour, but their two extremities project from the adjacent tissues, thus proving that their base is hard and unyielding. The induration gives rise to a particularly curious phenomenon in chancres occupying the internal surface of the prepuce near its insertion : if the prepuce is retracted, at the moment its folds reach the lower border of the chancre,

with soap and water, or, simpler still, dip the fingers into alcohol, as they may have been soiled by the secretions.

Further, I cannot recommend too strongly that the genital organs of a patient should never be examined without having exposed the entire region, and ordered the patient to remove his hands : these, which have often touched the dressings or ulcerations, may be soiled by contagious pus, and the doctor risks contamination from the scratch of a finger-nail, should the patient move suddenly.

Finally, the medical man should always see that the dressings which have been in contact with the ulcerations are not, under any pretext, placed on a chair or on the floor, but are put by the patient himself into a receptacle, or on a paper to be burned.

it is lifted abruptly on to the corona of the glans, executing exactly the same movement as the tarsal cartilage does during the eversion of the eyelid. In these cases, it is almost unnecessary to feel the induration with the fingers : it reveals itself to sight, and cannot be mistaken for anything else.

Besides the induration, the base of a syphilitic chancre may be the seat of more or less pronounced infiltration and of tumefaction, which cause considerable deformity. Thus certain chancres of the prepuce produce very marked phimosis, with enormous increase in the volume of the prepuce, giving rise to distortion, described as " bell-clapper penis," which is almost pathognomic of syphilitic chancre. Through the œdematous and tumified prepuce, it is possible to feel one or more indurated plaques, indicative of chancres of the prepuce concealed by the intensity of the phimosis.

Contrary to simple chancre, the syphilitic chancre is painless, spontaneously, under the influence of pressure, or of exterior contact. Nevertheless, chancres situated on the preputial orifice, or on the urinary meatus, are painful during micturition. External irritation may occasionally render chancres painful, no matter where situated, by inducing inflammation.

Habitual Unicity of Syphilitic Chancre ; its Frequent Multiplicity.—Although a syphilitic chancre is generally single, this is not the case as much as is currently believed from the schedule of Ricord. It is multiple in one case out of four ; but it is rare to observe more than three or four in the same subject. Multiple chancres may be situated on the same region, or on different parts of the body : in this way, one may see a chancre of the genital organs and one of the anus or cephalic extremity developing simultaneously, according to the hazards of inoculation.

Results of the Inoculation of Syphilitic Chancre on the Bearer of the Chancre.—It has long been considered an important characteristic of syphilitic chancre that it

was impossible for it to inoculate its bearer. The researches of Queyrat have recently shown that, under this form, the proposition was not correct, and that, at any rate during the first weeks of its evolution, it was possible to obtain a lesion of a chancrous nature at the point of an inoculation ; this lesion becomes more and more attenuated, in proportion to the age of the chancre, but is always characterised by more or less pronounced induration, with or without ulceration.

The old opinion, therefore, cannot be regarded as strictly accurate. It is none the less true that the syphilitic chancre differs from simple chancre, from the point of view of inoculation. Whereas the latter, up to an advanced period of its evolution, reproduces by inoculation a lesion at the end of about forty-eight hours, characterised by a pustule and leading on the fourth day to the development of a deep ulceration with detached borders, inoculation of the secretion or tissue of a syphilitic chancre produces nothing in this time, and gives rise, after ten to fifteen days, to a lesion characterised by an infiltrative papule which may afterwards become ulcerated, but never becomes an ulcer with detached borders. In short, inoculation of the infecting chancre never gives rise to the inoculation lesion made known by Hunter and Ricord ; the law of Bassereau remains always true.

Evolution of the Syphilitic Chancre.—When left to itself, the syphilitic chancre lasts about four weeks ; parchment-like chancres evolve more rapidly, while extensive ones with much induration last longer. Treatment, especially with arsenobenzol, hastens the cicatrisation of the chancre.

Healing is evidenced by diminished induration ; the diphtheroid membrane, if it existed, falls ; the surface becomes less red, granulates, and heals up ; the ulcer gradually contracts.

After healing, a level, soft cicatrix remains, which is pigmented for a long time and often retains a certain

degree of infiltration and induration appreciable to careful palpation for several weeks, especially if the chancre has not been treated with arsenobenzol.

Effect of the Chancre on the Vessels and Lymphatic Glands (*Lymphitis and Adenopathy*).—The syphilitic chancre rapidly implicates the vessels and lymphatic glands, more than any other cutaneous or mucous lesion.

A few hours after its appearance, it is frequently accompanied by *lymphitis* ; this is specially appreciable with chancres of the prepuce and glans, on the dorsal surface of the penis, in the form of one or two slightly moniliform or smooth indurated cords, which have often been taken for phlebitis. This lymphitis persists for the duration of the chancre, and disappears at the moment of its cicatrisation.

The lymphatic glands corresponding to the region of the chancre are also affected at an early date. The *satellite adenopathy* of the chancre, which, at first single, rapidly becomes multiglandular ; hard, enlarged, isolated from each other, the glands are painless on pressure, and movement. Sometimes, however, under the influence of traumatic irritation and secondary infection, they may become inflamed, increase still further in volume, become surrounded by periadenitis, and painful, but they practically never suppurate.

According to Ricord, a more voluminous gland is often seen in the midst of smaller ones, which is sometimes harder and corresponds, according to classical teaching, to the lymphatics coming directly from the chancre.

The adenopathy of a syphilitic chancre, however, is not always in direct anatomical relationship with the seat of the chancre itself ; it is not unusual, with a chancre clearly on one side of the glans or prepuce, to see adenopathy develop in both groins ; nor, with a chancre similarly situated, to find the lymphatic glands on the same side immune, whereas those

on the opposite one are the seat of very pronounced adenopathy.

It is well to note that, in exceptional cases, the regional adenopathy is absent during the whole of the evolution of the chancre.

The adenopathy persists after the chancre for some weeks, often for months ; it disappears more rapidly with patients who have been treated with arsenical preparations.

Diagnostic Elements of Syphilitic Chancre

The diagnosis of syphilitic chancre depends on four factors : the objective signs ; its evolution ; signs drawn from the patient's antecedents and the appearance of symptoms of secondary syphilis ; lastly on laboratory researches.

Diagnostic Importance of the Objective Signs

Of all the objective signs already described, the most important are : the slight depth of the ulceration ; absence of detachment of the borders, this sign enabling one to recognise that it is not a question of simple chancre ; induration of the base.

This last characteristic is of the utmost importance : a clearly defined induration, limited to the base of the syphilitic chancre, is almost a pathognomonic sign. But it is also necessary that the *induration* belongs to the lesion it accompanies, and is not superimposed.

It often happens that a simple ulceration, an excoriation occurring during coitus, herpetic ulceration, etc., has been subjected to irritant treatment, covered with unsuitable remedies, and has become surrounded by an inflammatory inflammation simulating the characteristics of basal induration.

Various remedies, sometimes the most improbable ones, may cause this condition. It is frequently noticed after the application of ashes from a pipe, a

very favourite remedy among the people. Some patients, haunted by the fear of syphilis, directly they notice an ulceration of the genital organs, hasten to heap upon it all the antiseptic liquids they have to hand : tincture of iodine, concentrated carbolic acid, permanganate of potash, peroxide of hydrogen, sublimate, nitrate of silver, etc., and to cover it with all the powders of the pharmacopœia. The result is that, when they consult a doctor, it is impossible for him to diagnose the cause of the induration, which might equally well belong to the lesion itself, or be the consequence of unsuitable treatment.

A much more frequent cause of induration is the use of calomel on ulcerations of the genital organs, either in the form of powder or of ointment. These two remedies have for long been advised by famous syphilologists in the treatment of syphilitic chancre : experience has long shown, however, that they are of no special value, and should be abandoned. But, above all, they must *never, under any pretext whatever*, be applied to an ulceration not yet properly diagnosed.

Under these conditions, *calomel, either as powder or ointment, must be prohibited in the treatment of ulcerations of the genital organs.*

Inflammatory infiltration differs from true induration by having less firmness, less regularity, and less clearly defined limitation. When the infiltrated base of a simple ulceration is pressed between two fingers, this base can be depressed and modelled, so to speak, instead of becoming tense, and raised with a certain convexity, like the syphilitic chancre ; when pressed on the two extremities of one of its diameters, its surface seems to double up under the fingers. If doubt still persists after examination and the other diagnostic elements are uncertain, the patient should be told to apply a dressing of boiled water for two or three days to the exclusion of any other remedy : an inflammatory infiltration generally becomes modified or disappears

at the end of this time, whereas a syphilitic chancre persists.

Diagnostic Value of the Signs drawn from the Evolution of the Chancre

I have already indicated (see page 34) the existence and duration of the incubation period of syphilis. It is necessary to revert to this here, in order to show that, in certain cases, this factor is of great importance in diagnosis. A simple chancre has no incubation, or at least the period is very short, not exceeding two or three days, so that, in every case where an ulceration develops more than four or five days after the last coitus, the diagnosis of simple chancre is untenable.

On the other hand, the fact of recent coitus is not sufficient to eliminate the possibility of syphilitic chancre, contamination possibly extending to an earlier one. It is only in the case where, the patient's statements appearing to be perfectly truthful, no possibility of syphilitic infection can be found for several months, apart from the recent coitus, that, relying on these statements alone, one might admit with certainty the existence of a simple chancre.

Deductions drawn from the statements of the patient, as I have already remarked, have but a relative value, depending on his truthfulness and intelligence.

Signs drawn from the Patient's Antecedents, or from the Appearance of Symptoms of Secondary Syphilis

Syphilis only recurs exceptionally; the certain knowledge of previous syphilis should put one on one's guard against the diagnosis of syphilitic chancre. To tell the truth, it is a dangerous postulate to reject this diagnosis, for the sole reason that the patient states he has previously had syphilis or a chancre. In the first place, the patient's statements may be incorrect, con-

fusion existing in his mind between all venereal diseases : what he had previously called syphilis may have been nothing but gonorrhœa, an error which can be overcome by making the patient specify the symptoms he has experienced.

In the second place, the diagnosis of the first affection may have been incorrectly made by the practitioner consulted at that time, a mistake more difficult to eliminate.

Finally, rare as they are, syphilitic re-infections do take place, contrary to the opinion of Ricord and Alfred Fournier; but these must not be admitted unless the diagnosis of the first attack, and that of the second, are based on undoubted facts.

Thus, if in a patient the antecedents of former acquired syphilis seem certain, it will be necessary, before diagnosing infective chancre, to be doubly sure and to have this confirmed by the most accurate methods—I am not now speaking of hereditary syphilis, or at least of hereditary antecedents of syphilis, for it is demonstrated by numerous observations that the descendants of syphilitics may contract the disease like others.

The development of secondary syphilitic affections appears, under normal conditions, after an ulceration which has presented more or less marked characteristics of syphilitic chancre, and may help in the diagnosis of the latter. We shall see, as a matter of fact, after having recourse to all methods of examination, that a doubt may still persist as to the nature of a genital ulceration : this can only be determined by the appearance of roseola or of mucous plaques. But, as secondary symptoms only develop six weeks after the appearance of the chancre, this is the slowest method to which one can have recourse, a final one, a makeshift one for which one would only decide to wait under very exceptional and specially embarrassing circumstances.

Indications supplied by Laboratory Researches

Experimental bacteriological researches, since 1905, have brought an aid to syphilitic diagnosis, which cannot to-day be ignored in doubtful cases.

Without discussing the laboratory inoculations of animals, which in certain limited cases may render first-class help, but are totally impracticable in the laboratories improvised in sanitary centres, there are two methods which can be utilised for general syphilitic diagnosis : research for the parasite of syphilis and complement-fixation.

Research for the Parasite of Syphilis.—The spirochæte of Schaudinn and Hoffmann, to-day generally called *Treponema pallidum* in France, if definitely found, is sufficient to classify as syphilitic the lesion in which it has been demonstrated, and if this lesion presents the objective or evolutionary characteristics of a chancre, it can be stated definitely that it is a syphilitic chancre.

It is easy to look for this parasite : it can be done with any microscope, with the aid of staining methods, if the microscope used is only an ordinary one, or by direct examination of the preparations on a dark field, if the observer possesses a so-called ultramicroscope.

The first rule to be observed, in searching for this parasite, is to examine the preparations in which it is possible to find it, if it is present.

Indeed, infective suppurating chancres supply secretions full of microbes of all kinds, in the midst of which the spirochæte is unperceived, or confused with the innumerable series of non-pathogenic spirillæ.

Further, the various antiseptic remedies used wrongly or rightly in the treatment of ulcerations of the genital organs have the effect of destroying this very vulnerable parasite, at any rate in the superficial layers of the ulceration.

Hence, if the treponema is to be searched for in an ulcer of the genital organs, whether suppurative, infective, or treated by some antiseptic, it is necessary to put a dressing of boiled water only on the ulcer for at least forty-eight hours, which should be kept on permanently and renewed twice daily, and bathe it also with pure boiled water; every antiseptic, no matter how weak, being absolutely excluded.

Chancres covered with a diphtheroid layer should also be subjected for forty-eight hours to dressings of boiled water.

To collect the material for examination: the best method consists in applying superficial friction to the surface of the ulcer, by means of a hard body, a platinum spatula or vaccination needle, which should be first sterilised by heating in a flame. The ulcer will soon be covered by an abundant serum.

Nevertheless, in chancres of long standing this serum is only obtained with difficulty, and not in adequate quantities for examination purposes; it is necessary to scarify the surface lightly and collect the mixture of blood and serum which flows from the scarifications.

The fluid is spread on a slide in a thin layer. If the examination is to be made with an ultra-microscope it is simply covered with a cover-glass and examined direct. In the absence of the ultra-microscope, recourse must be had to staining methods.

The classical method of microscopic examination of the spirochæte is that of Giemsa, which has the advantage of supplying a fairly characteristic coloured reaction. This method consists in diluting Giemsa's solution (which is composed of 3 grammes of Azur II Eosin, 0·8 gramme of Azur II in 250 grammes of glycerine, evaporated to dryness, and added to 250 grammes of Methyl Alcohol in the proportion of 1 drop to 1 cubic centimetre of distilled water. The preparation is dried in air, then fixed for ten minutes

in absolute alcohol, or it may be fixed, before drying, by osmic acid vapour ; it is then immersed for one or more hours in the colouring solution. For a rapid diagnosis, the same solution may be used, rather more concentrated and with, or without, the addition of ½% glycerine ; staining is then produced by heating until steam is produced, renewing the fluid 3 to 5 times ; staining is complete as soon as the blood-corpuscles appear vividly pink under a low magnification.

With Giemsa's method of preparation, the microbes are coloured bluish-violet, as well as the non-pathogenic spirilla and the cell nuclei, the blood-corpuscles are pink, and the treponema pallidum reddish-pink. It is seen best in the neighbourhood of the blood-corpuscles.

In default of Giemsa's * reagent, one can have recourse to silver staining, already made by Ravaut with largine, and which Fontana carries out in the following manner: the preparation is fixed and decolorised, by means of an aqueous solution of acetic acid (1%) and of formol (2%), then heated for 30 seconds in a 5% solution of tannic acid, and, after washing, treated with an ammoniacal solution of 5% nitrate of silver, also for 30 seconds.

The Chinese ink method has been employed more abroad than in France. Owing to the facility of its use, and in default of an ultra-microscope, it may be of service in army laboratories. It consists in the employment of a dilution of Chinese ink, which forms a dark ground on which the treponemas appear colourless.

As a general rule, however, the favourite method of seeking for the spirochæte is examination on a dark ground, called the *ultra-microscope* method. I think it has been adopted by all syphilologists, on

* Giemsa's solution, being the monopoly of a German firm before the present war, is now being prepared by French manufacturers.

account of its rapidity and simplicity; but it necessitates special apparatus, which is not provided in many of the army laboratories and medical centres. With the illumination obtained from this apparatus, the ground-work of the preparation remains dark, whereas the corpuscles immersed therein are vividly illuminated and show up very clearly.

The examination is made either with a dry or an oil-immersion lens, in fresh preparations, in which the spirochætes are seen living, moving from place to place, thus facilitating research and their identification.

In fixed and stained preparations, the spirochæte appears as an extremely fine thread, tapering at its two extremities and twisted into a spiral like a corkscrew, with many turns (6 to 12 on an average). The turns of the spiral are narrow, regular, and deep. The total length of the parasite is from 5 to 20 μ; its width from $\frac{1}{4}$ to $\frac{1}{2}$ μ; on an average its length slightly exceeds the diameter of a blood corpuscle.

Examined with the ultra-microscope, it is mobile. It can move round its longitudinal axis, advancing or retreating by jerks and in a straight line; or, while remaining in the same place, it performs undulations or makes movements of flexion and torsion; sometimes its two extremities unite so as to form a circle.

The Treponema pallidum is distinguished from other spirilla by its regularity, the multiplicity and permanence of its spirals, its mobility in the living state, and its reaction to staining media.

The *Spirochæte refringens*, which frequently exists on the surface of ulcerous lesions of the genital organs, and with which it might be confused, has not so many spirals. These are irregular, very elongated, and not deep; it changes but little under the influence of reagents or in its movements; it is thicker than the treponema, and is deeply stained by the usual stains.

In ulcerations of the mouth, and even of the lips,

there is a possibility of confusion with other micro-organisms, difficult to avoid, even by an expert observer. The greatest precautions must be taken, therefore, when the diagnosis of syphilitic chancre of the mouth has to be determined by bacteriological examination. The following is a list of the special characteristics of buccal spirilla, which might be confused with the Treponema pallidum.

The *Spirillum dentium* is like the treponema as regards its slimness and the regularity of its spirals, but differs as to length (4 to 10 μ at the maximum), and especially in the slighter depth of its undulations.

The *Spirochæta buccalis* is, on the other hand, easy to recognise on account of its great length, its thickness, the irregularity of its spirals, and its extreme mobility.

Vincent's Spirillum is longer and thicker than the Treponema pallidum, its spirals are irregular and not deep ; it is associated with the fusiform bacillus.

The *Spirochæte refringens* is almost the only spirillum which may be confounded with the Treponema pallidum in the scrapings obtained from ulcerations of the genital organs.

The presence of the treponema in the scrapings of an ulceration of chancrous appearance enables one to prove that this ulceration is a syphilitic chancre ; but its absence would not definitely exclude such a diagnosis.

Indeed, it is by no means exceptional for it to be absent in undoubted cases of chancre.

In the first place, it may have been dispersed by the use of antiseptics, to which it is very sensitive. Secondly, the surface of the ulceration may be the seat of various secondary infections, the pathogenic agents of which have caused the treponema to disappear, or prevented the verification of its presence in the scrapings. I have already shown that these two causes of error might be prevented by using

dressings and bathings of boiled water for forty-eight hours.

Finally, there are chancres in the scrapings of which it is impossible to distinguish the presence of the treponema, no matter what care is taken. These chancres are nearly always of long standing, extending beyond fifteen or twenty days, in which the tissue is more or less sclerosed, the scrapings yielding but the slightest exudation, and in which even deep scarifications do not succeed in reaching the foci of treponemæ.

In these cases it would be possible to obtain evidence of the treponema from sections of the chancre, hardened in alcohol and impregnated with silver after Bertarelli's method ; but it would be necessary to make a partial excision of the chancre, and the patients might refuse to submit to this ; further, this method of examination can only be accomplished in a well-appointed laboratory. It could not, therefore, be recommended in army practice.

Researches for the Fixation of the Complement (Wassermann Reaction).—Many medical men believe that the complement-fixation test, by means of the method of Bordet and Gengou called the Wassermann Reaction, is of the highest importance in the diagnosis of syphilitic chancre. Every day soldiers are sent to the bacteriological laboratories with a note, containing the following statement : " Probable syphilitic chancre; kindly make a Wassermann Reaction."

This belief is wrong, and if one relied upon the result of the Wassermann Reaction for determining the diagnosis of chancre, it would be erroneous nine times out of ten.

The views of medical men in general, and even of experts in the Wassermann Reaction, are very vague, as I have taken the opportunity of finding out, and, in plain words, absolutely false. Many medical men practically believe that, on the one hand, the existence

of this reaction is sufficient to establish the syphilitic nature of any lesion borne by the patient who has supplied the serum examined, and, on the other hand, the absence of this reaction is sufficient to prove that the same lesion is not syphilitic.

Without speaking of the intrinsic value of a Wassermann test, which depends upon the competence of the biologist who made it,* and with the quality of the antigen provided, it has been definitely established that this reaction does not appear at the same time as the chancre. It does not become positive until the end of a certain time and, when it is positive, the characteristics of the chancre are, as a rule, so clear that it brings no support to the diagnosis.

Blumenthal's statistics, which are already old, will give some idea of the variations of the frequency of the Wassermann Reaction, in accordance with the age of the chancre.

Infections dating from	Number of cases studied.	Positive Reactions.	Negative Reactions.	Proportion per 100 of the Positive Reactions.
3 weeks . . .	11	1	10	9 per 100
4 „ . . .	17	2	15	11 „ „
5 „ . . .	13	6	7	46 „ „
6 „ . . .	23	12	11	52 „ „
7 „ . . .	16	11	5	68 „ „
8 „ . . .	13	8	5	61 „ „

* The Wassermann Reaction is in no way comparable to present chemical reactions: the substances used for the examination (antigen, complement) are of variable composition, and absolutely unknown dosage; the results themselves, *i.e.* the production or not of hæmolysis, are often difficult to read and appreciate.

Further, it is not rare, with the same serum, to see one observer obtain a negative, and another a positive, reaction; sometimes, indeed, the same observer will obtain a positive reaction one day and, a few days later, a negative one.

It must be added that the different methods employed for the performance of this reaction give results very different from each other.

Under these conditions, in estimating the reliance to be placed on a reaction, not only must one know the technique followed, but also by whom the examination was made.

These statistics show that it is only in the fifth week that the proportion of positive reactions is high enough for the results to be of any diagnostic importance in doubtful cases; and at this period there is not long to wait before secondary symptoms appear. Even in the eighth week there are only two chances out of three of obtaining a positive reaction.

According to the researches of Jeanselme and Vernes, the intensity of the Wassermann Reaction grows progressively during the course of the evolution of the syphilitic chancre. Comparison of the coloration obtained in several successive Wassermann Reactions might furnish an important element in the diagnosis of chancre.

Unfortunately, these comparative colorimetric tests presuppose, at the same time, the use of an antigen of exact dosage and absolute constancy, with great expertness and constant experience of the Wassermann Reaction on the part of the operator. Even in civil practice, in times of peace, they are so difficult that I do not believe they have been followed up by any other observer.

A last reflection on the value of the Wassermann Reaction in diagnosing syphilitic chancre. Being produced with the serum of old syphilitics, this reaction occurs when they are affected by tertiary ulcerous syphilides of the genital organs, which simulate the chancre and have merited the name of chancriform syphilides. But chancriform syphilides admit of neither the same prognosis nor the same treatment, nor the same prophylactic measures of isolation as syphilitic chancre. One sees to what an error a medical man would expose himself in the presence of such lesions if he relied solely upon the Wassermann Reaction, without interpreting it by means of clinical indications and the patient's previous history.

Therefore, interesting as this reaction is for the diagnosis of secondary syphilitic lesions, and more

especially of tertiary ones, it has but few applications in the diagnosis of syphilitic chancre.

Differential Diagnosis of Syphilitic Chancre

The affections most often confused with syphilitic chancre of the genital organs are: genital herpes, simple chancre, ecthyma, scabies, traumatic ulcerations, balanitis, gangrene of the genital organs, ulcerations caused for the purpose of simulation, epithelioma of the penis, secondary and tertiary syphilides, and certain ulcerations which appear after arsenical treatment of syphilis.

Genital Herpes is characterised by circular ulcerations generally covered by a whitish coating, isolated from each other, frequently multiple, with polycyclic contours. These ulcerations are deeper than those of syphilitic chancre and have been preceded by fine transparent ephemeral vesicles, which the patients sometimes remember, but not always. The lesions appear in successive crops, and in some cases it is possible to find intact vesicles near the ulcerations. The irritation caused by dirty dressings may induce a certain amount of basal infiltration, which may simulate the induration of syphilitic chancre, but it is softer, and not so circumscribed as in the chancre.

The lymphatic glands, despite what Ricord and Fournier have said, are influenced by genital herpes; but the adenitis accompanying it, unlike that of a syphilitic chancre, is slight and painful on pressure and nearly always limited to one gland.

The course of the two affections is different: herpetic ulceration heals rapidly. In a few days, in regions in which there is no moisture, such as the penis, it is replaced by a dry scab, which becomes detached and leaves a simple macule, which disappears in fifteen to twenty days, without apparent cicatrix. In moist regions it gradually shrinks up, its borders disappear,

and for some days it remains a simple reddish spot, then disappears without leaving any trace.

Under the name of herpetiform chancres, a variety of syphilitic chancres have been described, characterised by their small dimensions and multiplicity; but, no matter how small they are, they are always more extensive than herpetic ulcerations, and without their polycyclic contours.

Genital herpes is essentially a recurrent affection: its outbreaks, sometimes accompanied by pain in the course of the nerves of the genital organs, or of the thigh (Mauriac's neuralgic herpes), recur at varied intervals. The fact of relapse is important for diagnostic purposes. Nevertheless, one must not rely on the existence of numerous previous attacks of herpes for eliminating syphilitic chancre; the more so, as the syphilitic virus may be inoculated in the herpetic erosions.

A first attack of herpes, occurring in a young man, and especially in one of thirty to thirty-five, no matter how characteristic it may be, must cause reserve as to the possibility of the later appearance of chancre. As a matter of fact, syphilitic chancre is sometimes seen to develop after and in the same place as a group of herpes (prechancrous herpes). Therefore, it is indispensable, in the case of a first attack of herpes, to keep the patient under observation during fifteen to twenty days.

Simple Chancre differs from syphilitic chancre in its irregular configuration and irregular surface, by the pus or yellowish coating which covers it, and especially by its characteristic edges. These are detached to a varying depth, but always enough at some spot to enable the point of a probe or edge of a spatula to be passed under them; they are thin, and marked by a fine yellow border, similar to fresh butter. Moreover the base, even if infiltrated, is not indurated like that of the syphilitic chancre.

Simple chancre is rarely single; the lesions, becoming easily inoculated, multiply and become much greater in number than in the case of syphilitic chancre.

The condition of the lymphatic glands varies; sometimes they are painless and hardly perceptible, having retained their normal consistency; at others they are often painful on movement and pressure, voluminous and suppurating (chancrous buboes).

The secretory products of multiple chancre contain a more or less abundant quantity of Ducrey's bacillus. The elements of this bacillus, measuring 1μ 5 in length by 0μ 5 in width, are isolated or united in fine chains of 2 or 3, with rounded extremities, resembling the figure 8; they are easily stained by Nicolle's method (gentian violet and tannin). Their demonstration is not easy, and can only be done satisfactorily by an expert bacteriologist.

A very important characteristic of simple chancre is the possibility of indefinite inoculation on the bearer, as long as the healing process is not advanced. Inoculation is made by means of a lancet or vaccination needle, intra-epidermically, or by superficial and slight scarification. Care must be taken to avoid both accidental contamination of the inoculated spot and reinoculations of the experimental chancre, by covering the inoculated region with a watch-glass held in position by a strip of diachylon plaster. At the end of the first day a red inflammatory areola appears at the inoculated point, having nothing characteristic about it; but on the third day, in the centre of the areola, the epidermis is raised in a small pustule filled with turbid fluid; on the fourth day, the fluid has become clearly purulent; the small pustule bursts and leaves a cup-shaped depression, with well-defined borders; during the following days, the chancre increases in size and depth, its borders become detached, and there is basal suppuration. Naturally, directly the experimental lesion has acquired sufficiently clear characteristics—

that is to say, on the third day, or at latest on the fourth or fifth—its progress should be arrested, which can easily be done by cauterising it fairly deeply with the thermo-cautery.

Another characteristic of simple chancre is its short incubation period. I have already stated that a syphilitic chancre is the result of intercourse fifteen to twenty days previously at a minimum, whereas simple chancre appears two or three days after coitus. Therefore, if it can be proved that no sexual relations have taken place within the five or six days preceding the development of ulceration of the genital organs, this cannot be a simple chancre.

In fact, there are rarely many difficulties in diagnosing simple chancre; but the proof of its presence does not mean that the patient has escaped syphilis. Indeed, as Rollet has shown, the difference in the duration of the incubation periods of simple and syphilitic chancres produces consequences of considerable importance from the theoretical, as well as from the practical, point of view, which are as follows: the two viruses having been inoculated simultaneously during the course of a single coitus, may give rise to mixed infection; the simple chancre appears first at its normal time, and develops in the usual way, but at the end of the syphilitic incubation period, the syphilitic chancre develops in its turn, blends its characters with those of the simple chancre, and gives rise to general syphilitic infection.

In such a case, the simple chancre does not at first differ in any way from that which results from inoculation of its own virus. Very naturally, therefore, the medical man diagnoses simple chancre; then, at the end of fifteen to twenty days, the ulcerative characteristics become modified, the base becomes hard, without any error of treatment or secondary infection the surface dries up, and its borders are less detached sometimes being completely levelled.

A *mixed chancre*, according to the happy expression of Rollet, is thus formed; the lymphatic glands, which have been immune up to then, become hard, but not painful.

It is not always easy to observe the transformation; this can only be done by careful and repeated examinations; sometimes, at the end of several days, there is no further doubt; at other times, the diagnosis remains uncertain. As these chancres are generally much infected, it is difficult to search for the spirochæte.

As long as any doubt persists, anti-syphilitic treatment should be postponed, and sometimes it is only the appearance of roseola and secondary symptoms which enable the diagnosis to be settled.

Ecthyma of the genital organs is rare, but not absolutely exceptional. It generally affects the penis, most frequently in the form of scabs. The scab, thick, greyish, often adherent, covers a regularly rounded ulceration, with well-defined edges, occasionally detached. The most noticeable characteristic is the existence of abundant suppuration under the crust, forming a more or less adherent layer over the whole surface of the ulcer; below this, the base of the ulcer is bright red, bleeding easily, and a little uneven. It is not indurated. Ecthyma of the genital organs is often accompanied by swelling of the inguinal glands, which are painful on pressure. It coincides most frequently with ecthymatous lesions of other regions, especially of the legs, the existence of which may aid diagnosis.

Scabies, which has a predilection for the human genital organs, generally causes small papules covered with greyish scabs. These lesions cannot be confounded with chancre, as they are generally elongated, raised, and non-ulcerous. When, exceptionally, they develop into large pustules, these and the ulcerations which succeed them have all the characteristics of ecthyma.

The existence of indubitable signs of scabies does not imply that all co-existent ulcerations of the genital organs are of the same origin. There is risk of syphilitic inoculation with scabies, on account of the solution of continuity it causes, and, in patients suffering from itch, syphilitic chancres are often multiple, owing to the multiplicity of these solutions of continuity.

Common Excoriations of the Genital Organs, infected as the result of uncleanliness, may become surrounded by an inflammatory infiltration simulating chancrous induration ; careful examination, however, will show that there is no true induration. Wet dressings applied for two or three days, and the suppression of all causes of irritation, will induce all trace of inflammation to disappear, and show that it is merely a simple lesion, without genuine induration.

Gangrene of the Genital Organs begins with apparently simple ulcerous lesions, often with basal infiltration, but is soon revealed by the presence of a greyish or blackish plaque, surrounded by an infiltrated zone which is liable to spread. At the same time, there are usually general symptoms and often high fever. There is no possibility of confusion with syphilitic chancre. There are cases, however, in which the gangrene situated on the gland is accompanied by intense œdematous inflammation of the prepuce as in concealed chancres of the prepuce. The existence of the eschar is only manifested by a discharge of seropurulent or sanious fluid from the preputial orifice, resembling the secretion of an ulcerous balanitis. If this fluid is collected, its gangrenous odour attracts attention and aids in determining the presence of a sub-preputial eschar.

Gangrenous lesions of the genital organs may develop with syphilitic chancre ; hence the diagnosis of gangrene does not exclude that of chancre. As chancre, when complicated by gangrene, loses all its objective characteristics, and further, as the presence

of various micro-organisms, and specially of spirilla, on the surface, prevents the discovery of any treponema which might exist there, there may be doubt as to the presence of a chancre. In a case of gangrene of the genital organs, when prolonged observation did not enable me to detect any secondary syphilitic manifestation, the Wassermann Reaction, made on several occasions, was positive once, partially positive another time, and finally became and remained negative. I was told of another altogether similar case by Dr. Ristitch. There is, thus, reason to suppose that gangrene of the genital organs may cause a temporary Wassermann Reaction, and, until the most complete study has been made of the case, the diagnosis of syphilis should be suspended till the secondary manifestations have appeared to corroborate it.

Ulcerations induced with the Object of Simulation may present objective characteristics resembling those of syphilitic chancre. All the same, it is rare for the resemblance to be close. In the few cases I have observed it was generally a question of burns from a lighted cigarette, a traumatism which produces regular rounded ulceration resembling simple, more than syphilitic, chancre. Even when, as the result of repeated irritations, the simulator succeeds in inducing a certain degree of infiltration of the ulcerative base, this is more diffuse than that of syphilitic chancre, and the absence of treponema is against this diagnosis.

As a rule, the imitation is rougher and more clumsy still. I recently saw a dry, adherent, and circular eschar on a soldier, who stated that it was due to sexual intercourse some days before, and hoped that, thanks to this lesion, he would be passed as syphilitic and sent to hospital for some time. Even the character of the eschar, which was adherent and impossible to detach, as well as its almost circular configuration with an angular prolongation at one

peripheral point, testified to its artificial origin. I could not get an acknowledgment of trickery, nor a demonstration of the caustic employed, but I have reason to believe that it was produced by oxalic acid.

Erosive and Ulcerous Balanitis is manifested by sero-purulent secretion and erosions: these erosions are multiple, irregular, often confluent, without basal induration, and can hardly be confused with syphilitic chancre. Their acute course, rapid cure by simple means, and the absence of enlargement of the inguinal glands, are points which settle the diagnosis.

Epithelioma is rare on the genital organs. It may be observed there, however, even in men called up for military service.

It commences either as a smooth, projecting tumefaction, or as a wart-like growth, which evolves slowly. It is only at the end of several months that ulceration appears: this is of variable extent, is often covered by a sanious secretion, has an irregular base of wood-like hardness. The prolonged duration of the affection, and, in default of a precise history from the patient or confidence in his assertions, the characteristics of the basal ulceration and extreme hardness of the edges should remove any suspicion of syphilitic chancre from the diagnosis.

Syphilitic lesions may sometimes be confused with infective chancre.

Erosive **Mucous Plaques** of the glans and prepuce consist, like the chancre, of superficial and circular loss of substance; but they are even more superficial than the chancre, while their border, on the contrary, is often more defined, the limit between the healthy tegument and erosion, even if the plaque is not depressed, is abrupt, and marked by a more or less definite raised border. By means of careful palpation, it can be shown that their base is of firmer consistency than the adjacent parts, but it is nothing like that of chancrous induration. Sometimes, however, in the

midst of the erosive plaques with hardly any infiltration, one will be encountered which is generally larger, with a slightly raised border and a firm base ; this is a mucous plaque developed on the site of the chancre, and by its direct transformation before complete cicatrisation.

Certain **tertiary ulcerations** of the prepuce and especially of the glans simulate chancres so much that they have been regarded as recurrences. Alfred Fournier has called attention to them under the name of *chancriform syphilides*, and has made use of their existence as an argument in support of his too absolute opinion, that a chancre never recurs.

Appearing always several years after the initial chancre, sometimes on the site of the cicatrix, these syphilides generally begin as a rounded projecting tumefaction, which softens and ulcerates at the centre. In a few days, the ulceration attains the average size of a small hazel-nut ; its form is rounded, its surface depressed, sometimes deeply excavated, often irregular and mammillated, its borders project, clearly marked, not detached ; it rests upon a firm infiltrated base ; the infiltration projects beyond the ulceration and forms a rounded nodule below it, differing from the induration of a chancre.

On the whole, the ulcerative characteristics are those of a gumma rather than a chancre, and the histological structure, in two cases I was able to study, was that of gumma.

The absence of treponemas in the scrapings from the ulceration, the positive Wassermann Reaction from the beginning of the lesion, the tendency to persistence until treatment is begun, and the rapid cicatrisation under its influence, indeed all the biological and evolutive characteristics, as well as the details of the clinical aspect, are those of ulcero-gummatous tertiary lesions.

A certain number of the male bearers of these

ulcerous lesions blame a suspicious coitus as the cause of their appearance. Finger and Landsteiner inoculated tertiary syphilitics with the products of recent syphilitic lesions and produced at the point of inoculation, not a chancre, but a tertiary lesion, thus seeming to give some probability to the assertions of these patients. This is a question requiring investigation, which we need not consider further at present. It is none the less true that these lesions differ profoundly from chancre, and that, contrary to genuine chancrous recurrences, they do not give origin to a fresh attack of syphilis with secondary symptoms.

The Pseudo-chancre of Syphilitics treated by Arsenobenzol.—It is not unusual to see an ulcerous lesion appear in syphilitics, who have been subjected to arsenical injections, at the same point at which the initial chancre was situated and somewhat resembling the syphilitic chancre. Some too zealous partisans of arsenical medication have, without hesitation, regarded it as a second chancre, and a proof of the sterilisation of syphilis by arsenobenzol.

The following is what occurs with this lesion, according to facts I have observed.

Some variable time after the initial chancre and the arsenical treatment, often some days after intercourse with a syphilitic or non-syphilitic woman, an ulceration appears at the site of the chancre, which in a few days spreads and attains the dimension of a sixpence, a shilling, or more ; sometimes in the neighbourhood of the first, one, or more rarely two, other ulcerations appear within the space of a few days.

When it has come to a head, the round or slightly oval, but always regular and clearly defined ulceration presents a regular or slightly mammillated base, covered with exudation or a whitish-grey detritus, rather creamy, and fairly easy to detach. When this exudation is removed the base appears red and sometimes bleeds easily. The borders are often slightly

raised, clearly cut out, and sometimes slightly detached in places.

The lymphatic glands are of normal size or slightly enlarged, unless they have remained enlarged after the healing of the initial chancre.

The ulceration tends to persist for several days, rarely for some weeks; it heals sometimes under moist dressings of boiled water, but at others only responds to mercurial treatment.

Research for the treponema in the ulceration scrapings gives uncertain results, even after cleansing the surface.

The Wassermann Reaction may be either positive or negative.

If the patient is left without treatment, there is no evidence of secondary symptoms during the following weeks, as there would be if it were a case of syphilitic reinfection.

Such is the ulceration which has been erroneously regarded as a recurrent syphilitic chancre: it differs from a chancre in all its objective characteristics, by its appearance a very few days after coitus, the usual absence of treponemas, and, finally, by the absence of secondary symptoms at the end of the classical period of secondary incubation.

On the other hand, it was unknown before the use of arsenobenzol, and is only observed in syphilitics treated by the arsenical method. It cannot be attributed either to insufficient or excessive doses of arsenobenzol, for I have seen it appear in patients who had only received two injections of arsenobenzol, representing about 1 gr. of this substance, and in others who had received 7, 8, or even 12 injections of 2, 4, or 5 grammes.

This lesion requires further study. At present, it may be considered as one of the consequences of arsenical treatment, a consequence without any great clinical importance or apparent gravity, and of which

the pathogenesis and conditions of development are not yet completely determined. But it should not be considered as a morphological deviation of chancre, nor as a recurrence of syphilitic infection. Its existence, without denying the possibility of a syphilitic reinfection after treatment by arsenobenzol, should make one very cautious in interpreting cases of second chancre, and permits one to challenge a certain number of the observations published in support of the occurrence of this reinfection.

EXTRA-GENITAL CHANCRES

The syphilitic chancre may occupy all regions of the body without exception. The frequency of extra-genital chancres, their aspect even, which is unusual or at least deceptive in many of them, and especially the anomalous manner of contamination they generally show, give a special interest to their study.

Extra-genital chancres do not appear to be very frequent in the Army, according to Carle's statistics.

Nevertheless, despite their infrequency, owing to the difficulties of diagnosis they sometimes present, it is necessary to give an adequate account of their two most usual localisations, these being the only places in which, up to the present, I have observed them in soldiers.*

The first, chancre of the lips, is important, because of its frequency ; the other, chancre of the tonsils, on account of the diagnostic errors to which it is liable.

Chancre of the lips is not necessarily non-venereal

* Mention must, however, be made of chancre of the beard (cheek and especially chin), usually the result of inoculation by the barber, by means of a razor or shaving-brush which has been used to shave a syphilitic. This chancre is often extensive and covered with scabs, below which is found a vegetating or oozing surface; its base is sometimes red, of inflammatory aspect, but manifestly indurated. The most important diagnostic characteristic is the adenopathy (sub-maxillary or sub-mental, according to the position), often enormous, which accompanies it.

any more than chancre of the tonsils ; both may be, and often are, transmitted by kisses or the projection into the mouth of saliva charged with syphilitic products.

Still, the mere fact of the localisation is sufficient index for admitting the possibility of contamination by accidental non-venereal contact (tumbler, fork, pipe, end of cigarette, dentist's instrument, etc.) ; an inquiry is the only way of determining whether this presumption is well founded. This inquiry, however, is often extremely difficult, especially with subjects whose interest it is to disguise the real cause of contamination and attribute their malady to "innocent" contact.

Chancre of the Lips.—A syphilitic chancre may occupy both lips, but is much more frequent on the lower than on the upper lip ; its most usual position is in the centre involving both cutaneous and mucous portions.

Of round shape, it projects from the free border of the lip in the shape of a pastille, the fore part of which is covered by a brownish, adherent scab ; removal of the scab is painful and sometimes causes bleeding. The surface is generally bright red, firm, smooth, regular, and clearly defined.

If the patient's mouth is opened, the posterior part of the ulceration, which continues the contour of the anterior part and completes the circumference, appears moist and red, or covered by a whitish-grey coating, often resembling that of mucous plaques.

The ulceration, of variable extent, from the size of a lentil to that of a sixpence or larger, rests on a tumefied base ; the lip is deformed by this tumefaction and everted.

On palpation, the base of the chancre is hard. The induration must be looked for in the same way as that of chancre of the genital organ and is easy to perceive, but often surrounded by an infiltrated zone, which

must be pressed upon in order to distinguish the induration itself.

The *adenopathy* of chancre of the lips is always considerable and can be observed from a distance. It affects the sub-maxillary or sub-mental glands, forming a rounded eminence, often the size of a pigeon's egg. Palpation enables one to recognise one or more of the glands surrounded by an inflammatory zone of periadenitis, which sometimes seem to be adherent to the maxillary bone.

The *diagnosis* of chancres of the lips is easy. Its development within a few days, often following an excoriation which has been present for some time, and which has rapidly become "festered," the eversion of the lip, basal induration, and considerable enlargement of the glands, prevent all confusion with cancerous or other ulcerations of the region. Simple lesions, inflamed by local irritation and especially by unsuitable dressings, may deceive, but their form is rarely as regular as that of chancre, and they are accompanied neither by marked basal induration nor by voluminous adenopathies.

Microscopic examination of the scrapings is of little value in these cases, for the lips harbour a large number of different parasites, especially spirilla, which dissimulate the presence of the treponema or may be confused with it.

Chancre of the Tonsil.—Tonsillar chancre is rare, but is liable to such frequent diagnostic errors that the syphilis to which it gives origin is generally not recognised until the secondary symptoms appear.

It occupies one tonsil only, covering it almost entirely, but rarely extends beyond it. Its usual size is that of a sixpenny piece ; its shape is round, oval, or irregular. It sometimes appears as an erosion of a greyish, opaline, or red coloration, regular and smooth at the base, or made uneven by the irregularities of the tonsillar surface ; at other times it may be

ulcerous, even deeply so, of a reddish-brown or grey coloration ; occasionally it is covered by a pseudo-membranous exudation, white, thick, adherent, resembling that of diphtheria.

Whatever its clinical form, tonsillar chancre always has two important characteristics :

(1) Basal induration, appreciable with the finger (covered for precautionary measures with a rubber finger-stall), or with a rigid instrument, tongue-depressor, etc., which should be handled gently and not pressed on its circumference, as in the examination of chancre of the genital organs, but on the surface itself.

(2) Enlargement and induration of the lymphatic glands in the region of the angle of the jaw are often appreciable to sight and always to palpation.

Contrary to most other localisations of syphilitic chancre, tonsillar chancre is frequently painful, owing both to its seat upon a mobile region and to the secondary infection of its surface. While often slight at the onset, within a few days the pain becomes acute, and persists for several weeks.

The *diagnosis* of chancre of the tonsil depends more on the basal induration and sub-maxillary adenopathy than on the characters of the ulceration, which vary in different cases and may simulate the most diverse affections : simple tonsillitis, Vincent's angina, diphtheria, tonsillar abscess, tertiary syphilides, tuberculous ulcerations, even epithelioma of the tonsil and gangrene of the pharynx.

It is impossible here to enter into the differential diagnosis of these different affections, a diagnosis which is often difficult, even for skilled specialists, syphilologists, or laryngologists. I consider that, whenever a medical man has the slightest suspicion of chancre of the tonsil, he should, without delay, send the patient for examination by a syphilologist or laryngologist. I cannot emphasise too much the difficulties encountered in the bacteriological examination of such

lesions: it is practically impossible to discover the treponema in the scrapings of tonsillar chancre; on the other hand, numerous spirilla may resemble it and deceive an observer who is not sufficiently wary; finally the existence in the scrapings of clearly differentiated micro-organisms, even Loeffler's bacillus, is not sufficient to eliminate the possibility of a chancre evolving at the same time as another tonsillar infection.

SECONDARY SYPHILIS

Syphilitic chancre, with its satellite adenopathy, constitutes the whole symptomatology of primary syphilis; it may even be already cicatrised before any clinical sign reveals general infection of the economy.

But after a period, called that of *second incubation*, which from the beginning of the chancre is generally forty-two to forty-five days, roughly six weeks, general syphilitic symptoms begin to appear in cases which have not been modified by intensive treatment, constituting the *secondary period* of the disease.

In this chapter I shall limit myself to summarising the principal manifestations of secondary syphilis. For the military surgeon, they are relatively less important than the chancre, not because they are less frequent in the Army, but because diagnosis is generally easier, owing to the history of the initial chancre, generally easy to obtain, because their clinical forms are less varied than those of chancre, and also, because the Wassermann Reaction is almost constantly positive.

General Phenomena

The secondary period is accompanied by general phenomena: fever of variable type, which, in rare cases, may simulate typhoid, more or less marked general malaise, anæmia, the hæmatological characters of which

are still indefinite, emaciation, often headache varying in intensity, generally nocturnal, sometimes continuing during the night and preventing sleep ; the lymphatic glands become enlarged and can be felt in all regions accessible to palpation, especially at the nape of the neck, in the neck, and above the olecranon. The viscera are subjected more or less to the action of the pathogenic agent of syphilis ; they react sometimes in the form of clinically appreciable disturbances ; as a rule, however, no symptoms reveal their implication.

Cutaneous Lesions

The secondary period is especially that of cutaneous lesions.

These lesions (*secondary syphilides*) have the following general characteristics : rounded form ; a tendency to form circles or semicircles when grouped on neighbouring points; red coloration, due to the combination of cutaneous congestion with a certain degree of dermic infiltration and pigmentation, a coloration which has been compared to that of copper, or lean ham ; sometimes, but less often than is generally believed, there is, at the periphery, a slight epidermic elevation (Biett's collar) ; the tendency to generalisation or at least to very considerable extension, contrasts with the regional limitation of tertiary lesions ; the tendency of the lesions to polymorphism, is very great in certain papular forms ; the absence of pruritus ; finally, the tendency—an exception being made to a particular form of syphilides occurring in malignant syphilis—to heal without cicatrisation, but often leaving a cutaneous pigmentation which persists for some time.

The co-existence of a positive Wassermann Reaction may aid diagnosis.

The cutaneous lesions of secondary syphilis present the most varied dermatological types.

Roseola.—The erythematous type, or roseola, is

the most simple and the most frequent of all secondary syphilides. Generally appearing towards the forty-fifth day after the beginning of the chancre, syphilitic roseola first appears on the abdomen, then the internal surface of the thighs and trunk, afterwards extending to the neck and upper arms. The first pale, round elements may be difficult to recognise, and should be looked for carefully; they soon multiply from day to day, till in a few days the eruption is complete. The medical man, who has been obliged to await the appearance of roseola before determining the diagnosis of an ulceration of the genital organs, should look out for it about the fortieth day after the commencement of the chancre; when he has detected a few red spots all doubt will be removed by their rapid multiplication.

Roseola consists of round spots, sometimes with ill-defined borders, the size of a lentil to that of a threepenny piece, isolated from each other; these spots are sometimes flat (*macular roseola*), sometimes raised (*papular roseola*), or sprinkled with small projections (*granular roseola*), sometimes raised and of a paler colour (Alfred Fournier's *urticarial roseola*).

The colour of roseola disappears under pressure, leaving a slight yellowish macule.

If not treated, syphilitic roseola persists for several weeks; whereas, under the influence of treatment, it quickly fades and disappears gradually, without causing desquamation or leaving any trace beyond a very minute macule, faintly pigmented, which disappears in its turn in a few days.

Along with this form of generalised roseola with round elements of small dimensions, which appears towards the seventh week of syphilis and is never reproduced during the whole course of the disease, another erythematous syphilide must be mentioned, known under the name of *recurrent* or *delayed roseola*. This appears at varying times, from three months

to fifteen months, rarely later, and may recur once or twice; it consists of rose-coloured spots, paler than those of early roseola, and of larger dimensions, reaching the size of a two-shilling piece. These spots, like those of early roseola are sometimes nummular and of uniform coloration over their whole surface; they are often circinate, their rose contour forming a more or less complete crown around a zone of normal skin. The spots disappear on pressure; they are much less numerous than those of early roseola, and are often limited to one region of the body, principally the abdomen, but sometimes to the limbs.

This recurrent roseola may develop in patients who had previously presented early roseola at the normal date; but it is observed much more frequently in subjects who have been given arsenobenzol at the beginning of syphilis, and, not having followed regular treatment, have never had roseola. The interval between treatment and the commencement of delayed roseola is most variable, being three to four months most frequently. It appears that arsenobenzol, in inhibiting the appearance of the symptoms, has merely retarded the eruption, which, at the period at which it eventually appears, no longer does so under the form of generalised early roseola.

Diagnosis of Syphilitic Roseola.—Roseola, whether early or delayed, can hardly be confounded with any of the great exanthems, *morbilli*, *rubella*, which are easy to recognise by their exanthematous characteristics, rapid appearance, and general concomitant phenomena.

Medicamental Erythemas, induced by various drugs (quinine, antipyrine, chloral, etc.), may appear in the form of isolated spots, resembling roseola; their rapid development and especially the sensations of heat and pruritus which accompany them, distinguish them from this form of syphilide.

Gibert's Pityriasis rosea is frequently mistaken for a

syphilitic roseola. It is only necessary to bear in mind the existence of this affection and the possibility of confusion in order to avoid it. Pityriasis rosea is characterised by a more or less abundant eruption of rose spots, of very varied dimensions, round when small, more frequently irregularly oval as soon as they attain the size of a sixpence, with rose-coloured contour, and bright chamois yellowish centre. The epidermis, which is always intact in syphilitic roseola, is slightly creased in pityriasis rosea, and, when the skin is stretched in the direction of the long axis of the plaque, it takes on the appearance of crepon ; moreover, without actually desquamating, it is often raised at the periphery of the chamois-coloured zone forming a fine white border. Pityriasis rosea generally commences with a large oval patch (Blocq's "mother plaque"), which may attain the size of a two- to five-shilling piece ; this may appear on any part, usually the upper portion of the thorax, from whence other spots extend progressively to the abdomen. The former existence of syphilitic chancre and the co-existence of mucous plaques are not sufficient to exclude the presence of pityriasis rosea, for this disease sometimes develops during the course of secondary syphilis, without any accountable reason.

Papular Syphilides.—The cutaneous papular lesions of secondary syphilis are frequent and of varied aspect.

Several very different kinds must be described :

1. The *syphilitic plaques* of Bazin and Legendre, characterised by circular prominences, with sharp contours, round or oval, and red or brownish periphery ; the slightly depressed centre, generally of a brown colour, often shows superficial desquamation. These lesions appear at a variable date of the secondary period, sometimes before the roseola, but more frequently during its course and decline, and are often situated on the neck and upper part of the trunk.

Lesions of the palms of the hands, frequent during

the secondary period, generally under the defective name of *palmar psoriasis*, must be included amongst syphilitic plaques. They consist of a central zone stripped of its epidermic covering and surrounded by a circular squamous elevation of variable thickness. They are situated symmetrically on both hands in varying numbers, sometimes being very numerous. They may appear at any time in the secondary period, and are cured completely by syphilitic treatment.

In the folds (axillæ, umbilicus, inguino-crural region, inter-gluteal fold, commissures of toes), the plaques become exudative or ulcerated, and their appearance is absolutely identical with that of plaques of the external genital organs ; like them, they may become hypertrophic.

In the beard and scalp, they are covered by raised scabs, sometimes forming thick and oozing patches of varying size.

Syphilitic plaques are frequent on the genital organs, and sometimes remarkably recurrent. Of erosive form on the prepuce and glans, where they resemble mucous lesions (hence the name of mucous plaques), on the scrotum they are erosive or ulcerous, often hypertrophic, prominent, and of papillomatous appearance.

2. *Papular syphilides with large papules*, which often begin before the disappearance of the roseola, are characterised by flat papules, rarely very prominent ; their dimensions may reach and exceed those of a large pea or a small hazel-nut ; generally well defined, surrounded by a collar of epidermic desquamation, they are of a more or less deep reddish-brown colour and of firm consistency. After a duration which is only limited by treatment, they subside and their colour fades, but a brown pigmented patch remains for several weeks, or months ; sometimes wheals, when the eruption is situated on the trunk.

Scales of varying thickness may develop on the

papules, resembling sometimes those of pityriasis, sometimes these of psoriasis ; the syphilides then take the name of *papulo-squamous syphilides*.

The large papular syphilides may be situated on any region of the body, but have a certain predilection for the body, and, in alcoholics, for the face.

They are indicative of grave syphilis, and nearly always coincide with an abundant lymphocytosis of the cerebro-spinal fluid (Ravaut).

3. *Syphilides with small papules* always appear after roseola, sometimes at the moment of its disappearance and on the spots of the roseola. They have a tendency to form irregular groups, reminding one of constellations of stars, the groups being irregularly distributed over the trunk, but rarely on the limbs.

Their elements, developed around the hair-follicles (hence the name of *follicular syphilides*) vary in appearance in different cases, often indeed in different groups of elements in the same patient, even in different elements of the same group ; thus exhibiting a polymorphism more pronounced than in any other syphilide.

Some are prominent, acuminated, or smooth, covered by adherent epidermis, sometimes shining (*lichenoid syphilides*, still erroneously called syphilitic lichen) ; others have a slight central desquamation corresponding to the orifice of the hair-follicle, or a very small pustule, which dries up and is replaced by a thin scab (*acneiform syphilide*), also wrongly called syphilitic acne).

These elements do not exceed a grain of millet-seed in size, hence the name *miliary syphilides* which has been given them.

Small papular syphilides are often very resistant to treatment, even to an intensive course of arseno-benzol.

They may be confused with Wilson's lichen, from which they differ essentially, besides their objective

characteristics, in the absence of pruritus, and especially with follicular tuberculide or lichen scrofulosorum, of which the elements occupy the same positions, and are disposed in the same way, but are larger and tend to suppurate; moreover, lichen scrofulosorum is only found in patients with active tubercular lesions, specially adenitis and suppurative osteo-arthritis.

Vesicular, Bullous, and Pustular Syphilides.—These are rare; the diagnosis rests upon the co-existence of syphilitic lesions in other situations, and on the previous existence of chancre.

Ulcerative Syphilides.—Ulcerative lesions are rare during the secondary period. They constitute a special form of syphilis, known under the name of *malignant syphilis*, which some authors have wrongly wished to separate from syphilis.

They commence with flat nodules of a red or brownish colour which rapidly soften, forming round ulcers with sharply cut borders and an irregular base, covered by pus or by dry grey scabs, often limpet-shaped; at the circumference of the ulcer is a red zone of infiltration of variable extent. These ulcers may reach three to four centimetres in diameter or more. They leave behind them deep circular cicatrices, often surrounded by a pigmented zone.

The ulcers may be irregularly distributed all over the body; they have, however, a predilection for the lower limbs. On the face, where they are seen but rarely, they sometimes cause extensive destruction and leave considerable deformity behind them.

Malignant syphilis occurs in patients debilitated by privations, serious illnesses, and in "lymphatic" subjects. It appears to be but rarely observed in the Army.

Pigmentary Syphilide.—The pigmentary syphilide is much more common in a woman than a man, but it frequently attains a size and intensity in the latter which is altogether exceptional in a woman.

Contrary to the teaching of Alfred Fournier, who regarded it as a lesion *sui generis*, it is to-day well established that the pigmentary syphilide always follows *in situ* a previous cutaneous lesion, most frequently roseola, more rarely syphilitic plaques of the skin or papular syphilides. It is characterised by a greyish-brown coloration, of varying intensity, occupying the neck symmetrically; on this pigmented and patchy surface are disseminated round areas, the colour of which, by contrast with the surrounding pigmentation, seems paler than that of the normal skin; these areas, of a round or oval form, are of variable dimensions, generally on an average that of a large pea; their boundaries are well defined; their site and dimensions correspond exactly to that of the eruptive element, which preceded the pigmentary syphilide.

In another variety of the pigmentary syphilide the pigmentation forms a border to the less dark zones.

The favourite site of the pigmentary syphilide is the neck, principally on the anterior and lateral surfaces; from there it may extend to the upper part of the thorax and on to the back.

In very extensive forms, which are relatively frequent in man, it is not limited to the cervical region, but occupies the periaxillary regions in front and behind, sometimes the groins, and may even extend to the trunk.

The pigmentary syphilide, once established, persists for several months, and only disappears very slowly, no matter how intense the antisyphilitic treatment. It is of great value in diagnosis.

The co-existence of cerebro-spinal lymphocytosis, established by Ravaut, gives a certain prognostic importance to the pigmentary syphilide, and is an indication for energetic treatment, in order to prevent the later development of serious lesions of the nervous centres.

Syphilitic Alopecia

Alopecia is frequently a symptom of secondary syphilis, especially in cases not treated at all, or imperfectly treated.

It appears without any apparent previous lesion of the scalp, without desquamation, as well as without objective phenomena, such as pain or pruritus ; the fall of hair, which becomes more and more abundant, leads to the production of areas of alopecia scattered irregularly over the scalp, resembling the empty spaces in a badly planted wood.

It may be observed exceptionally in the beard. It frequently coincides with a pigmentary syphilide of the neck.

This form of alopecia is almost pathognomonic of syphilis, for it is altogether exceptional in other general conditions (tuberculosis, convalescences from severe illnesses, etc.) which cause diffuse loss of hair. The bald areas of alopecia areata are larger and smoother than those of syphilis.

It may, therefore, aid in the diagnosis of syphilis, and is worthy of attention as it may be the first syphilitic manifestation noticed by the patient. Indeed, it is not rare to see it appear in subjects who have had a dwarf chancre which healed in a few days and was not noticed, who, probably, have not had any cutaneous syphilide, and in whom the most careful examination has only revealed a few slightly enlarged lymphatic glands and one or two small syphilitic plaques of the mouth.

The presence of this alopecia is an indication for the most careful search for all the signs of syphilis, even the slightest, and, in the absence of any other sign, examination by the Wassermann Reaction.

Syphilitic alopecia generally begins during the third month of syphilis ; it always heals without leaving any trace behind. It may heal spontaneously,

but cure is hastened by mercurial, and especially by arsenical treatment, which is sometimes followed by a regrowth of hair more abundant than before the syphilis.

Lesions of the Nails

The nails may be attacked during the course of secondary syphilis, become cracked, detached, or hypertrophied. More frequently, after periungual syphilides, swelling of the bed of the nail (perionyxis) may develop.

Lesions of the Mucous Membranes

All lesions developed during the course of secondary syphilis on the visible mucous membranes may be reduced to two; diffuse erythematous inflammations, often transient, seen usually on the pharynx, and the *mucous plaque.*

Wherever situated, the mucous plaque begins as a round lesion with slightly raised edges and an eroded, slightly depressed centre. The erosion, of variable extent, is red and exudative. The border is red on mucous membranes that are simply moist; on those of the digestive tracts, its constant impregnation by saliva gives it whitish or opaline colour.

The configuration of the parts which are the seat of mucous plaques modifies their form, and makes them irregular or fissured, especially on the lips.

Local irritations and infections may modify their appearance and cause deep ulceration, or on the other hand, hypertrophy and a papillomatous appearance (hypertrophic mucous plaque, condyloma latum).

Lesions of the Buccal Mucous Membrane.—Mucous plaques may occupy different regions of the buccal cavity. On the *lips* they are situated either on the commissures, in the form of round erosions with a raised border; they are rarely hypertrophic, except in patients who smoke much and place the cigarette

or pipe at the corner of the mouth : or on the free border, in the form of round erosions, with a white margin, a deep red and flat base, exudative and sometimes covered with a scab ; this last localisation occurs almost exclusively in smokers.

On the *internal surface of the cheeks* the plaques are usually erosive, round, or slightly irregular, red in the centre ; the border and a more or less extensive portion of the centre is often white, sometimes like silver, resembling leucoplakia.

Mucous plaques must not be confused with mercurial stomatitis, the lesions of which first affect the gums but may also occur on the cheeks ; with aphthae (thrush) which consist of round plaques, covered with a white creamy or slightly yellow deposit and evolving rapidly ; with lesions artificially induced (burns from a cigarette, acid, etc.), which are round, regular, and covered with a white deposit, sometimes detached at one part (rupture of the phlyctenule) and healing rapidly ; with the plaques of leucoplakia, which are more irregular, more extensive, and occupy principally, either the neighbourhood of the labial commissure, or that of the large molars. This last diagnosis is of real importance, a certain number of soldiers attacked by leucoplakia, due to former syphilis, exploit their lesions to gain admittance to hospital, when there is no reason for this, the lesion being non-contagious.

On the *tongue*, mucous plaques often assume a special aspect, owing to the papillary structure of the mucous membrane : they are round or oval, clearly defined, flat, with no trace of papillæ (*depapillated plaques*). Sometimes they are erosive, regular or irregular, surrounded by a white or *opaline* border.

Mucous plaques may be confused with marginate exfoliative glossitis. This differs in the irregularity and variability of its contour, which has been compared with that of a geographical map, and by its white, slightly raised, clearly marked border, the

eccentric and irregular progression of which extends from day to day; with leucoplakia, which has been referred to above; with Wilson's lichen, a much rarer and more persistent affection, the lingual lesions of which coincide with the white spots on the mucous membrane of the inner surface of the cheeks, and with very pruriginous cutaneous lesions.

Lesions of the Pharynx

These are of great frequency, more so perhaps than those of the mouth.

On the *soft palate*, they consist in mucous plaques of regular or irregular form, generally opaline, as if a slight coating of pale grey paint had been spread over the mucous membrane; they are rarely erosive. They often attain considerable dimensions, forming a large surface of vivid or deep red on one or both of the anterior pillars, limited by a semicircular, slightly projecting border, forming a kind of large arcade (*giant plaques* of the soft palate).

Sometimes, at the beginning of syphilis, a diffuse bright redness is observed.

The *tonsils* may be the seat of various lesions: they are very often *hypertrophied*, voluminous, irregular, of almost normal or reddish colour, and firm consistency, more pronounced than in common tonsillar hypertrophy. The mucous plaques, sometimes opaline, sometimes erosive, are often very numerous, sometimes small and difficult to discover.

In certain cases the lesions attain very considerable development: the plaques occupy almost the entire tonsil, and are covered by a thick, greyish white, adherent deposit, beneath which the tonsillar tissue is ulcerated and bleeds easily. This diphtheroid form of syphilitic angina may be confused with diphtheria, and with Vincent's angina.

The last confusion is the easier because Vincent's

spirillar infection may be grafted on syphilitic lesions of the tonsil, or coincide with secondary syphilis.

Visceral Affections

Secondary syphilis may attack all the viscera and tissues ; I shall only describe the most important of the deep localisations.

Nervous Affections of varying intensity and gravity are frequent during the course of secondary syphilis.

Headache is extremely frequent, practically constant in untreated syphilis : sometimes frontal, sometimes occipital, in some patients it is so severe as to prevent sleep ; it is characterised by its occurrence or exacerbation in the evening or at night. It is often, but not always, accompanied by hypertension and lymphocytosis of the cerebro-spinal fluid, even if the headache is not very violent ; it is sometimes, but not always, relieved by lumbar puncture. In certain cases it is due to endo-cranial periostoses, and is then both intense and persistent.

Grave cerebro-meningeal symptoms may be observed during the course of secondary syphilis.

These symptoms assume various clinical types.

Hemiplegia, either preceded or not by premonitory signs, such as difficulty in speech, cerebral fatigue, or headache, occasionally commences suddenly. It is established progressively within a few hours, soon becoming complete, and at the same time intellectual obnubilation ends in more or less complete coma. It may be followed by death in some hours ; more frequently the patient recovers, but is often left with paralysis and contractures.

When affecting the right side of the body, it is often accompanied by aphasia, which is generally curable.

Of all the nervous manifestations of syphilis, hemiplegia is the one most likely to appear at an early date. It may precede other secondary symptoms and

occur even in the first days of syphilitic evolution: in a case of Millard's, which terminated fatally, the chancre had only been in existence eleven days.

At the post mortem, special lesions of the arteries at the base of the brain are found, as well as meningeal changes.

Facial paralysis, of peripheral type, is more frequent than hemiplegia; it generally occurs in the second or third month.

Paralysis of the oculo-motor muscles is more rare, but may accompany facial paralysis.

These paralyses are the result of basal meningitis, causing compression of the corresponding nerves, as it produces compression of the optic and auditory nerves.

The spinal meninges participate in the process of basal meningitis.

Along with rare cases, manifested by definite symptoms of spinal meningitis and *acute meningo-myelitis*, there are other more common cases, in which the meningeal changes are not revealed by appreciable objective symptoms; in these cases lumbar puncture shows the presence of *lymphocytosis of the cerebro-spinal fluid* and albumen in this fluid. Ravaut has shown the frequency of cerebro-spinal lymphocytosis in secondary syphilis and proved that it may indicate the later development of serious cerebro-spinal lesions.

The **sensory organs** may be attacked during secondary syphilis.

Deafness, tinnitus, and vertigo may be caused by lesions of the auditory nerve and labyrinth. These affections, to which attention has been directed since the use of arsenical preparations, were known of before the discovery of arsenobenzol, but appear to be particularly frequent in patients treated with this substance.

Optical lesions are much more common.

Iritis is the easiest to recognise, and the most apparent of all ocular lesions; it generally develops between the

fifth to the tenth month after the chancre, usually about the sixth month, sometimes earlier, and must be regarded as indicative of particularly severe syphilis.

Generally unilateral, it is manifested by periorbital pains of varying intensity, often slight, by photophobia and more or less pronounced diminution of visual acuteness as well as by objective symptoms which any medical man, even if not versed in practical ophthalmology, must know and cannot fail to recognise : more or less marked pericorneal injection, change in the colour of the iris, which loses its brilliant appearance and takes on a greyish tint, contraction and immobility of the pupil, due to congestion of the iris or adhesions. Atropine dropped into the eye induces dilatation of the pupil ; but if adhesions are present, the dilatation is unequal and the pupil irregular.

Syphilitic iritis assumes various clinical forms (serous iritis, gummous iritis, etc.) into the details of which I cannot enter here. It is sufficient for me to point out the signs by which it can be recognised, for its gravity is such that every syphilitic patient suffering from iritis should be subjected to examination by an ophthalmic surgeon.

Again, iritis frequently accompanies lesions of the deeper portions of the eye, such as cyclitis and choroiditis.

Optic neuritis and *retinitis* are frequent during the secondary period of syphilis, even at the beginning. They are often unrevealed by any functional symptom, and can only be recognised by examination of the fundus of the eye. In default of the systematic examination of all syphilitics by an ophthalmologist, a large number of these complications pass unnoticed. I may add that they are accompanied by lymphocytosis of the cerebro-spinal fluid.

Secondary Syphilitic Icterus is characterised by its appearance in conjunction with generalised eruptions ; it is accompanied by phenomena of biliary retention, but

the gastric troubles of catarrhal icterus are generally absent. It usually terminates in recovery without any complication, within fifteen to twenty days; a few rare cases of grave icterus in secondary syphilis have been reported, presenting the ordinary symptomatology of this syndrome.

Secondary syphilitic icterus would appear to belong to the class of hæmolytic icteri, according to recent researches, particularly those of Gaucher and Giroux.

Secondary Syphilitic Nephritis, apart from any former renal taint, generally occurs in the third and eighth month of syphilis. It is revealed most frequently by sudden and considerable dropsy, and by albuminuria, which frequently reaches 10 to 15 grammes daily, sometimes even 50 grammes. More or less pronounced signs of uræmia may accompany the dropsy: vomiting, headache, etc. Recovery is the rule, provided the patient is energetically treated, and as soon as possible after the beginning of the disease; it is often slow, and the albuminuria may persist for several months.

Finally, I must mention **Phlebitis,** which is frequent during the secondary period and often coincides with the roseola. It affects the superficial veins of the lower limbs, and nearly always several of them simultaneously, often those of both legs. It is characterised by the development of hard cords, neither voluminous nor painful, often indeed painless, and never gives rise to œdema or embolism.

GENERALITIES OF TERTIARY SYPHILIS

There is no necessity to describe the tertiary lesions of syphilis; they are met with relatively seldom in military practice, and have no special indications, apart from the question, not without importance, of the invaliding they may bring about. Their treatment offers no particular indication, beyond the necessity, always important in the army, of carrying out as

actively as possible the cure of soldiers who, after recovery, may be again sent to their unit. Although certain localisations of tertiary syphilis may be contagious, this is so exceptional that there is never any necessity to send a tertiary syphilitic to hospital when the lesions by which he is affected do not interfere with the performance of his military duty, or do not necessitate energetic treatment incompatible with the obligations of service.

I must insist upon this last point, because I have too frequently seen men sent to hospital who were suffering from tertiary lesions of the skin or tongue, neither ulcerated nor painful, which did not in any way prevent them from carrying out their duties, and only required treatment which could easily be carried out with the unit. Men often take advantage of their disease to impose on the medical man.

I shall only briefly summarise the principal localisations of tertiary syphilis.

As regards the skin, syphilides of various types are observed, papular, papulo-tubercular, ulcerous, gummatous, always characterised by : (1) their form, which is nearly always round, or reniform, and their disposition in groups of more or less rounded configuration, and by centrifugal extension when they are multiple ; (2) the small number of their elements, and their habitual limitation to one region of the body or to a small number of regions, contrary to secondary syphilides, which are usually generalised ; (3) the tendency to ulceration, or, if they do not ulcerate, to interstitial absorption of the invaded tissues ; hence the usual persistence of indelible cicatrices, often, but not always, surrounded by a zone of pigmentation ; (4) the absence of functional phenomena, pruritus, and pain, except when there is ulceration, and often even when they are situated in the neighbourhood of orifices and in very mobile regions.

The diagnosis of tertiary syphilitic lesions rests on

these characteristics: on the former existence of recognised syphilitic affections (it must be borne in mind that syphilitic antecedents are frequently absent, less often, however, in a man than a woman), on the verification of syphilitic stigmata, cutaneous cicatrices, Argyll Robertson sign, abolition of the tendon reflexes, on the existence of a positive Wassermann Reaction; in doubtful cases, rapid recovery by mercurial, arsenical, or iodide treatment may settle the diagnosis.

The most frequent lesions of the accessible mucous membranes are ulcerations and sclero-gummatous lesions of the tongue, with or without leucoplakia, or at least certain of its forms, for it would be, at the present time, excessive to state that leucoplakia is always caused by syphilis; ulcerous lesions of the soft palate, leading generally to rapid perforation, and which it is necessary to treat very actively from the beginning.

The visceral, arterial, cardiac, nervous, hepatic, and other lesions, which constitute an important part of internal pathology, need not be described here.

CHAPTER V

TREATMENT OF SYPHILIS

THE SPECIAL CONDITIONS OF THE TREATMENT OF SYPHILIS IN THE ARMY

The anti-syphilitic medicaments may be reduced to three substances—mercury, iodine, arsenic; but the methods of administration and the preparations of these three substances are numerous. Each syphilologist has made a choice amongst these preparations, and laid down special rules for their application, which seem to him to respond best to the therapeutic indications of syphilis. Thus, he has evolved an elective type of syphilitic treatment which he habitually employs; but, if he has the medical spirit, he knows how to deviate from this type and modify it, according to the indications of each case, as well as to the social condition of the patients.

The conditions of military life, more especially those of the present war, introduce special indications and choice of treatment, which military surgeons and syphilologists must take into account. In default of this adaptation to military conditions, the doctor will meet with great difficulties, sometimes the formal opposition of the staff to the execution of the treatment he prescribes: indeed, he may cause a useless reduction of effectives and cripple the necessities of national defence.

Let us first consider the special indications in the army during the present war.

In the case of combatant soldiers at the Front, men remaining at the depots, or employed in the interior, especially men in munition works, attacked by a contagious disease of any kind, it is necessary, in the first place, to put them out of the way of doing harm to others by transmission of their disease. On the other hand, they must be rendered fit for service in their companies or workshops as soon as possible, and the evil effects resulting from their disease must be rereduced to a minimum.

In the case of syphilis, these necessities indicate two precepts :

(1) Cause the disappearance, by the most energetic treatment possible of contagious lesions, which, fortunately, develop on surfaces accessible to direct examination, and may, consequently, be recognised and watched.

(2) When the contagious lesions are healed, the treatment should be continued, less energetically than at first, but sufficiently to protect the man from later contagious lesions and the different manifestations of the disease, by processes which do not hinder his military duties from being carried out.

Certainly, the problem would be solved in its entirety, if one knew of a sure and rapid method of sterilising syphilis by medicamental or biotherapeutic treatment. Despite the somewhat incautious pretensions held out by Ehrlich on the action of arsenobenzol, the problem has not been solved ; I shall show later what one must think about this subject.

We must, therefore, content ourselves with the measures at our disposal to do the best we can, under somewhat contradictory conditions, to deal with the problem of the treatment of syphilis in the Army.

In order to determine these measures and their application, it is necessary to find out what can be

expected of the different antisyphilitic agents and their various modes of employment.

I will first of all eliminate iodine and its different compounds, iodide of potassium and of sodium, tincture of iodine, organic preparations of iodine, etc. All these agents have their proper place in the antisyphilitic arsenal; but, with the exception of mercurial iodides, which will be studied with the mercurial compounds, their place is in the background. They are almost entirely without action on the sterilisation of syphilis, on its first manifestations, or its various contagious lesions, and, in any case, cannot be considered in the primary or secondary periods, either as active agents of treatment or as having a prophylactic action on subsequent complications. It is during the course of the tertiary manifestations that they have a real value in the treatment of gummatous or ulcero-gummatous syphilides of the skin and mucous membranes, or on the cardio-vascular lesions, so common in syphilis. But tertiary lesions are beyond the scope of this study.

There remain, then, mercury and arsenic.

MERCURY

As regards syphilitic therapy in the Army, there is one point of great importance. This is the mode of administration of medicaments.

The conditions for supplying bodies of troops and medical centres with drugs, for distributing these to the patients, and, in the case of prolonged treatment for which the soldier cannot present himself daily at the hospital, the necessity of his being able to take his supply of drugs with him; the advantage there is in men, and especially officers, being treated in more or less secrecy, are some of the principal considerations which must guide the military surgeon in his selection of the method of treatment—apart from the special action and form of the drugs.

I shall, therefore, consider successively:

(1) Mercurial medication by ingestion (solution, syrups, pills, tabloids, cachets);

(2) Mercurial medication per rectum (suppositories);

(3) So-called endermic mercurial medication (rubbings);

(4) Intramuscular mercurial medication (injections of soluble and insoluble preparations);

(5) Intravenous mercurial medication.

Mercurial Medication by Ingestion

(*a*) **Solutions and Syrups.**—These two pharmaceutical forms are absolutely inapplicable at the front, by reason of the difficulties there would be in supplying the regimental hospitals, and the impossibility of transporting the liquids.

In medical centres in the interior there would still be the inconvenience of manipulation of large quantities of liquids.

Although the absorption of a drug in solution is more regular than in the form of pills, these or tabloids completely replace the solutions.

However, in some cases—especially of tertiary lesions, which are rarely observed in the Army and are beyond the scope of this study—van Swieten's * Liquor in small doses, according to Brocq's method (five cubic centimetres administered four to six times daily) is better than treatment by pills.

With regard to mercurial syrups, of whatever kind, there is no reason to use them in the Army. Gibert's syrup, the best known and most used among them, is a bad preparation, often causing gastralgia; its dosage in iodide of potassium is insufficient for

* Van Swieten's Liquor, a solution of sublimate in a thousandth part, is given in the *Formulaire pharmaceutique des hôpitaux militaires*, and the preparation is prescribed without alcohol.

carrying out mixed treatment with iodide and mercury.*

(*b*) **Pills, tabloids, cachets.**—For a long time, pills have been the form in which drugs are most used in the treatment of syphilis : " Treatment, easy to carry out in secret, even when travelling," according to the well-known formula.

They have the great advantage of being easily taken about and of keeping a fairly long time, and are consequently capable of being stocked in all hospitals and medical centres. They can be given to men for continuous and prolonged treatment without obliging them to report frequently to the doctor. They must be well prepared, the pill mass should be soft, with a sufficient quantity of glycerine added to prevent desiccation. When hard as stones, as they are sometimes, they pass through the digestive tract undissolved and are rejected without doing more than simulate treatment.

The *Formulaire pharmaceutique des hôpitaux militaires* mentions no other mercurial pills, except those of protoiodide of mercury.

The formula is as follows :

Protoiodide of mercury	2 gr. 50
Powdered opium	1 ,,
Powdered liquorice	2 ,,
Extract of juniper	*Q.s.*

D. in 100 pills.

Each pill contains 25 milligrammes of protoiodide of mercury, a very judicious dosage, which enables the

* Gibert's Syrup is given in the *Formulaire pharmaceutique des hôpitaux militaires* under the name of mercuric iodide. Its composition is as follows :

Mercuric iodide	1 gr.
Iodide of potassium	50 ,,
Distilled water	50 ,,
Simple syrup	900 ,,

Therefore, per 20 gr. it contains a centigramme of mercuric iodide and 50 centigrammes of iodide of potassium.

daily dose to be graduated according to the tolerance of the patients, and far preferable to the dosage of 5 centigrammes in Ricord's pills.

The difficulty of this formula is to supply pills which dissolve easily when they have been prepared a certain time. Medical men must, therefore, be careful to renew their supplies at sufficiently short intervals, without waiting for the period of quarterly supply for drugs.

When patients wish to pay themselves for their supply of protoiodide pills, it will be better to give them the following prescription for a *soft* pill :

Protoiodide of mercury	25 mgr.
Extract of thebaine	1 cgr.
Glycerine excipient	*Q.s.*

Protoiodide of mercury is, *par excellence*, the drug for secondary syphilis : its renown for this period is universal. It has the advantage of being tolerated by the stomach, but produces salivation more easily than sublimate.

The usual dose of protoiodide to be prescribed daily is 10 centigrammes ; this represents four pills to be taken four times daily, after meals.

Certain patients cannot tolerate protoiodide well, in which case another mercurial salt must be given. The best is sublimate, the basis of Dupuytren's famous pills.

Sublimate pills do not figure in the *Formulaire des hôpitaux militaires*, and so are not supplied in quantities to regimental hospitals : they can only be made up in medical centres provided with a chemist, or from prescriptions made up by a civil chemist.

The simplest formula is the following :

Corrosive sublimate	*aa.*
Extract of thebaine	one centigramme
Glycerine excipient	*Q.s.*

for a *soft* pill.

Usual daily dose: 2 pills, *i.e.* 2 centigrammes of sublimate.

Sublimate is generally tolerated well by the gums, but often causes gastric pains or diarrhœa; it may be useful then to increase the dose of extract of thebaine in the pills.

Compressed tabloids are used too rarely for the administration of mercury. They have the advantage of pills, in dissolving easily and completely.

The Central Pharmacy for Military Hospitals supplies tabloids containing 0·025 gr. of protoiodide of mercury for the use of regimental infirmaries and medical centres, which can be used in the place of pills. I believe that these tabloids are now being supplied.

Cachets are rarely employed as a medium for the administration of mercury. A few years ago, Alex. Renault recommended them for this purpose, and they constitute an improvement on mercurial pills: the rapid and complete absorption of the drug is assured by this form, which can be easily transported and only necessitates more careful packing.

Mercurial cachets are not entered in the nomenclature of drugs supplied by the Central Pharmacy for Military Hospitals.

All men in a position to bear the expense, especially officers, who prefer them to pills because they are less compromising, can procure them at their own cost.

Protoiodide of mercury is the only mercurial salt suitable for administration in cachets; if sublimate were introduced undissolved into the stomach there would be a risk of causing erosions or chemical ulcerations; calomel is unsuitable, owing to its somewhat irregular action, and its transformation into sublimate under the influence of certain foods.

The following is Alex. Renault's formula for cachets:

Protoiodide of mercury	5 cgr.
Powdered opium	1 or 2 cgr.
Powdered cinchona	*Q.s.*

to fill a small 25 centigrammes cachet.

He prescribes 4 per day, *i.e.* 20 centigrammes of protoiodide of mercury.

I prefer using cachets with a dosage of half the quantity, *i.e.* 25 milligrammes of protoiodide, and not to exceed the daily amount of 10 centigrammes of this salt.

The various modes of administration of mercury by the mouth, together with mercurial inunction, were for a long time the only means of treating syphilis.

Although they have a real action on syphilis, and especially on secondary troubles, it is acknowledged that this action is weak and in no way comparable to that of the drugs which will be considered later on.

They cannot in any way be used to attack the disease at its onset, bring about the abrupt cicatrisation of chancre, or the rapid cure of mucous plaques.

They must, therefore, never enter into the initial treatment of syphilis, in the intensive treatment given in hospital for sterilising contagious symptoms.

But they have a real value as a means of continuous and prolonged mercurialisation, after cure of the contagious troubles, as a means of maintaining treatment by Fournier's " intermittent cure."

As men can carry them easily, or renew their stock when exhausted, pills, tabloids, and cachets should be prescribed for them when they are leaving the hospital, after they have been subjected to intensive treatment, and when they require treatment for some non-contagious manifestation, compatible with the continuation of their military service.

If the various ways of buccal mercurial administration have the advantage of avoiding the necessity of the patient's frequent visits to the doctor, they have, on the other hand, the disadvantage of removing him from direct medical supervision. Here, it is necessary to rely on the patient to attend to himself regularly. The doctor must warn him not to neglect the ingestion of the pills or cachets.

With regard to the general cure of syphilis, I shall indicate the progress of treatment by pills later (see page 146).

Mercurial Medication per Rectum

Rectal mercurial medication by means of suppositories is but rarely used, too seldom in fact.

Recommended by Charles Audry (Toulouse) it is well borne, and but rarely gives rise to local trouble ; it has the great advantage of protecting the upper digestive tracts in patients, numerous amongst colonial troops, whose stomach and small intestine cannot tolerate mercury administered by ingestion. With these patients, as with gastropaths in general, it replaces subcutaneous and intramuscular injections of mercury which, as we shall see, are not often applicable to syphilis in the army.

Mercurial suppositories cannot be kept as long as pills, necessitate more careful preparation, much more complicated packing, take up a little more room, are more expensive than pills, and finally are not included in the Pharmaceutical Formulary for Military Hospitals; so that they can only be used by soldiers under treatment in certain medical centres, or who are able to buy them.

Their indications are almost similar to those of mercurial cachets, with this difference that they are suitable for patients suffering from lesions or gastric troubles, but their use is not always compatible with the promiscuousness of camp life.

It would be well, however, under suitable conditions, to employ them more largely than has hitherto been the case, especially for officers, and I have sometimes found them beneficial.

Audry * recommends suppositories prepared with

* Ch. Audry: "Preliminary note on the administration of mercury per rectum," *Annales de dermatologie*, October 9th, 1905, p. 703; "Treatment of syphilis per rectum," *Annales de dermatologie*, March 1906, p. 231.

40% grey oil. The daily dose of metallic mercury suitable for the treatment of syphilis in an adult per rectum being 3 centigrammes, the suppositories are prepared in the following way :

Grey oil, 40%	gr. 0·075
Cacao butter	4 gr.

Melt the cacao butter, let it cool again, and when it begins to lose its transparency mix rapidly with the grey oil and pour into the mould.

Endermic Administration

Mercurial inunction, for long the classical process, is to-day practically abandoned. This is not the place to discuss whether it should be re-established. Indeed, it appears to me to be completely useless in army practice. The difficulty the men would have in carrying it out in camp, the impossibility of their taking baths, the dirtiness of mercurial ointment and soiling of their clothes prohibit its employment in the army zone. In the medical centres the difficulties are almost the same, and inexperienced orderlies are often entrusted with the rubbings, which require a certain amount of practice to be done well, and are liable to cause severe stomatitis.

Moreover, whatever one's opinion may be of the therapeutic value of mercurial inunction, it is unsuitable both for the intensive treatment at the onset of syphilis and the continuation of treatment afterwards, and, even in times of peace, its indications are limited.

Intramuscular Administration of Mercury *

Two series of mercurial preparations may serve for the intramuscular treatment of syphilis ; the one

* I say intentionally intramuscular and not subcutaneous, because I consider that all mercurial injections, whether of soluble or insoluble preparations, should be made into the muscle, and not in the subcutaneous tissue as some authors advise.

insoluble, the other soluble. The frequency of the injections, their effects, and administration differ essentially, according to which series is employed.*

(*a*) **Injections of Insoluble Preparations.**—Insoluble mercurial injections have the *advantage* of introducing into the muscular tissue a relatively large quantity of mercury which, under the influence of chemical reactions produced by substances in solution in the blood and plasma, dissolve gradually and, by therapeutic action taking place at regular intervals, really constitute a continuous and regular treatment. The mercurial reserve deposited in the muscles is calculated in such a way that its solution and absorption are sufficiently advanced at the moment the next injection is given.

In practice, the injections are made at intervals of a week, which enables the patient to regulate his visits to the doctor.

As a corollary to this advantage, there is the *inconvenience*, more theoretical than real, of exposing the patient to an overdose of mercury, when the solution of the mercury is too rapid.

If certain rules are ignored, the injections might cause the deposit of too large a quantity of mercury in the tissues; the patient could not be relieved of this surplus of mercury, or only with difficulty by surgical intervention, if the phenomena of mercurial intoxication developed; hence the possibility of grave accidents, even death.

As a matter of fact, the dangers of insoluble mercurial injections, of which some medical men have unjustly made a scare, are practically non-existent: in all, or nearly all, the fatal cases, reported in their

* Some soldiers may be tempted, on account of the pain, to escape treatment by intramuscular or intravenous injections. A judgment of the War Council, dated September 7th, 1916, condemned a soldier to three months' imprisonment for having refused to submit to an intramuscular injection prescribed by the medical man in attendance.

entirety, some error is revealed : the doses of mercury have been too high, the injections too close together, and, above all, these have been continued when signs of mercurial intoxication, especially stomatitis, have already appeared. These phenomena should have caused the suspension of the injections.

These accidents have been observed specially with grey oil. Now, for twenty-five years I have made, or caused to be made, more than 60,000 injections of grey oil and have only seen two of my patients succumb. In one of these the injections had been continued by error, after the appearance of stomatitis. The other died after the untimely extraction of twelve or fourteen dental stumps at one sitting, during the course of treatment, which was followed by extensive necrosis of the jaw.

A more justifiable objection may be raised to insoluble intramuscular injections—the pain they sometimes cause. This is often severe after injections of calomel, but is generally absent after injections of grey oil, provided it is well prepared and a sufficiently fine needle is used. Nevertheless, pain may be produced after piercing a nervous filament, and, as the injection is made in the gluteal muscles, this may impede walking. Sometimes the pain following injections of grey oil may result from the development of an inflammatory nodule in the subcutaneous cellular tissue or in the muscle ; it then appears on the third or fourth day and subsides in about a week. It is altogether exceptional for the nodules to suppurate, and, when suppuration appears, spontaneous opening or an incision results in rapid recovery.

The sole possibility of pain, of the unfitness of the man—pain which may be more or less real, which some soldiers may exaggerate and even make a pretext for discharge from duty—suffices to show that insoluble injections cannot be used in the treatment of syphilis at the Front.

Grey oil has an activity inferior to that of cyanide of mercury in intravenous injections, but equal or superior to that of the majority of soluble intramuscular injections ; it is of very practical use in the *continuation of treatment.* The injections, made in doses which will be indicated later on, once a week in a series of six to eight, every three or four months, constitute sufficient medication, after intensive treatment at the onset. The doctor is sure an injection has been made, he is not always sure that a pill has been taken and swallowed; neither he nor the patient is too busy for a weekly injection.

Calomel in intramuscular injections is one of the most active mercurial preparations ; it is specially indicated in refractory localisations of tertiary syphilis in the tongue or brain. But the injection often causes acute pain ; appearing on the third or fourth day, it reaches its maximum on the fifth or sixth, and is often sufficient to prevent the patient walking. It persists for three or four days, leaving behind it painfulness in the gluteal region.

Injections of basic *salicylate of mercury* and *yellow oxide of mercury*, less used than calomel, have the same inconveniences.

Finally, these three preparations, as well as grey oil, are not suitable for the treatment of syphilis at the Front. They may be employed in medical centres, on patients suffering from grave lesions, removed from active service for some time by illness or wounds.

The grey oil mentioned in the *Formulaire pharmaceutique des hôpitaux militaires* is that of the Codex, containing 40% of mercury ; 100 cubic centimetres contain :

Purified mercury	40 gr.
Sterilised anhydrous lanoline	26 ,,
Sterilised oil of vaseline	about 60 ,,

Prepared with the necessary care, on which I need

not insist here, it should be homogeneous in appearance, and, under the microscope, only reveal minute grains of mercury.

The weekly injection of grey oil is made with a dose of seven to eight centigrammes of mercury, which corresponds to three and a half or four divisions of a Pravaz syringe of one cubic centimetre capacity. When making injections of grey oil, it is necessary to use very accurately marked syringes; the rod of the piston should have an index, so as to avoid the correct dose being exceeded.

Calomel oil appears in the *Formulaire pharmaceutique des hôpitaux militaires* with the following composition:

Calomel	5 gr.
Sterilised anhydrous lanoline	16 ,,
Sterilised vaseline oil	100 com.

I prefer the following formula, which causes less pain:

Calomel washed in alcohol	5 or 10 gr.
Sterilised sweet oil of almonds	100 gr.

The oil should be thoroughly shaken before being introduced into the syringe.

The quantity of liquid injected must be calculated in such a way as to introduce 5 to 10 centigrammes of calomel into the muscle.

The injections are repeated once a week, not exceeding four or six injections in a series.

Insoluble injections must be made in the muscle, with the precautions which will be indicated later when describing the technique of intramuscular injections (see p. 105).

(*b*) **Injections of Soluble Preparations.**—Numerous soluble mercurial preparations have been proposed for the treatment of syphilis by means of injections. A few only, which I shall enumerate farther on, have

been retained, owing to their activity and tolerance by the tissues.

In a general way, the activity of these preparations does not vary very considerably from one to another, on condition that they are employed in comparable doses. This activity is inferior, on the one hand, to that of intravenous injections, and, on the other, to that of calomel injections. It is still more inferior to that of arsenical preparations.

Therefore it is impossible, with any of these soluble preparations, to carry out the intensive cure of syphilis, which, at the present time, is a strict obligation at the period of chancre or of secondary symptoms. I myself have seen too many syphilitics who, after being in hospital for a chancre for two or three months, and having received from forty to ninety soluble mercurial injections during this time, have hardly been discharged before they are admitted to another hospital with an eruption of generalised syphilides, or a crop of mucous plaques on the mouth.

Soluble intramuscular injections have the advantage over insoluble injections of not exposing the patient to the danger of mercurial accumulation. I have already shown that these dangers are in reality very small with a careful technique.

They are not often painful, but here again distinction must be made between the preparations: those which have the reputation of being painless, like mercuric benzoate, are painful if the needle touches a nerve; they may even, if not injected deeply and with care, produce nodules and abscesses, which are often very painful.

Compared with injections of insoluble preparations, those of soluble preparations have the disadvantage of requiring the patient to attend for treatment three to six times a week, whereas an injection of grey oil is only made once a week.

In short, intramuscular injections of soluble prepara-

tions are unsuitable for the intensive treatment of syphilis, and in later treatment they require too frequent visits to the doctor. The pain they may cause, moreover, renders them unsuitable for men engaged in active service, especially those who are serving at the Front.

Hence, their applications in war practice are very limited ; they are reduced to the treatment of syphilitics who, in hospital for some cause, apart from syphilis, nevertheless require mercurial treatment more active than by pills, or those who do not tolerate these, or men whose veins are not prominent enough for intravenous injections.

The solutions for intramuscular injections, given in the *Formulaire pharmaceutique des hôpitaux militaires*, are the following :

(1) *Solution of benzoate of mercury.*

Benzoate of mercury	1 gr.
Pure chloride of sodium	0·75 gr.
Sterilised distilled water	100 ccm.

This solution contains 1 centigramme of benzoate of mercury per cubic centimetre.

It is injected in a dose of 1 cubic centimetre daily or every other day.

(2) *Aqueous solution of biniodide of mercury.*

Biniodide of mercury	0·50 gr.
Iodide of sodium	0·50 gr.
Neutral phosphate of sodium	1 gr.
Pure chloride of sodium	0·35 gr.
Sterilised distilled water	50 ccm.

This solution contains one centigramme of biniodide of mercury per cubic centimetre, corresponding to 0·044 gr. of metallic mercury.

(3) *Oily injection of biniodide of mercury.*

Iodide of mercury	0·20 gr.
Guaiacol	0·10 gr.
Purified and distilled olive oil	46 gr.

Cyanide of mercury, which has been recommended, has to be discarded, owing to the pain caused by its injection into the tissues.

Oxycyanide of mercury in an isotonic solution, or with the addition of its weight in stovaine, is not painful. It is injected in a dose of 1 centigramme.

Neutral salicylate of mercury in an aqueous 2% solution is well tolerated.

Technique of Intramuscular Injections. — Intramuscular injections must be made with needles of sufficient length to reach the muscular tissue, *i.e.* 4 to 5 centimetres. I specially recommend that steel needles should be used, as they pierce better than platinum ones, and, for the same inside calibre, have a smaller external diameter than the latter. This last point is of importance for injection of grey oil; it often happens that, when the needle is withdrawn, a certain quantity of the liquid injected runs back along the track; the larger the passage left by the needle, the greater this reflux, and the more chance is there of its going into the cellular tissue. Now, it is the penetration of grey oil into the superficial fascia which causes the formation of subcutaneous nodules after injections. Another reason has caused me to discard platinum needles: these are manufactured by rolling and soldering a platinum plate, and are often perforated after a certain number of sterilisations in the flame; the result is that a small drop of grey oil may escape through one of these perforations, penetrate into the cellular tissue and cause the development of a nodule there, or in the dermis, thus producing an eschar which takes a long time to heal.

Intramuscular injections of preparations dissolved in water can be made almost without inconvenience in the buttock; care must be taken, however, to avoid the neighbourhood of the sciatic notch. This precaution is still more necessary with injections of insoluble preparations; the penetration of fluid into the

vessels which run through the sciatic notch might give rise to embolism and cause death.

In order to avoid this dangerous zone and, if nodules do develop, to prevent their inconveniencing walking or dorsal decubitus, the injections should be made in an area the width of two fingers in height and of three fingers in width, the external border of which is 3 centimetres behind the great trochanter and the lower border 2 centimetres above the lower border of the trochanter ; or in the upper third of the buttock.

When an oily fluid is injected, or insoluble substances are held in suspension, I cannot warn too strongly that the injection should never be made without the needle having first been introduced alone, to be sure that no blood appears, the flow of blood indicating penetration of a vessel.

The Intravenous Administration of Mercury

Baccelli introduced intravenous injection for the administration of a certain number of drugs. It was employed by Abadie for the treatment of ocular syphilis, and entered into the practice of syphilologists long before colloidal substances were used in general medicine.

The only mercurial salt commonly used in syphilis is *cyanide of mercury*. The number of mercurial compounds suitable for intravenous injection is singularly restricted by the conditions to be fulfilled. These are as follows : the drug must be soluble, stable, have a fixed and determined mercurial content, be easily prepared, sterilisable, and, finally, must not precipitate the blood albuminoids.

Now, cyanide of mercury practically fulfils all these conditions. The radical cyanogen is, as it were, dissimulated in the same way as arsenic in organic arsenical compounds and, from the point of view of toxicity, no relation can be established between it and cyanide of potassium.

Aqueous solution of biniodide, which has been recommended by some authors, has not been admitted into current practice.

The *advantages* of intravenous injections are multiple: complete absence of pain when the injection is made correctly; rapid absorption and elimination of the mercury which, at the end of an hour, appears in the urine, presenting its maximum at the end of three to six hours, hence the absence of accumulative effects and the possibility of renewing the injections at short intervals; total absorption, and absence of all cause of error in dosage; finally, rapid and energetic therapeutic action. I shall refer to this point again later.

The *inconveniences* and *accidents* are real, but may be nearly always avoided, given good technique. They consist in the possible introduction of the fluid into the wall of the vein and subcutaneous cellular tissue, with resulting venous indurations and dermo-hypodermic eschars; in the action of the drug on the digestive tube, with dysenteriform and hæmorrhagic colitis. Seeing the importance of the question of the technique of intravenous injections in general in the treatment of syphilis, I have grouped together in a special chapter all that concerns technique, injection accidents and the means of preventing such accidents (see p. 148).

An objection raised with regard to intravenous injections is the complicated and difficult technique: I repeat that with a very small amount of skill and attention every medical man should soon learn how to make an intravenous injection correctly. In hospital, my pupils succeed at the end of a few days in acquiring sufficient dexterity. For several months many military surgeons have come to my clinic to learn the operative technique of intravenous injections, and have been able to perform these perfectly after two or three days at the most.

Another objection raised to intravenous injections

is the time they require ; it is certain that, in a doctor's practice, an intravenous injection and its preparation demand an appreciable time ; but this does not sensibly exceed that taken by an intramuscular injection and its preparation. In a hospital treating a number of syphilitics and provided with a staff of well-trained dressers, the time of preparation is distributed amongst the total number of patients ; it is reduced in proportion to the number of injections made at the same sitting, and what might be termed the therapeutic yield becomes considerable.

As against the inconveniences, one must put *the therapeutic value* of intravenous injections of cyanide of mercury. This value, I can say without hesitation, is enormous and superior to that of all other forms of mercurialisation ; it can only be compared to that of injections of calomel in tertiary syphilitic lesions of the mucous membranes.

It is not rare to see syphilitic chancres dating from eight to ten days cicatrise after two or three intravenous injections of cyanide of mercury ; syphilitic lesions of all sites, secondary or tertiary, mucous plaques of the pharynx, hypertrophic cutaneous syphilides become cicatrised or healed in a few days. One cannot pretend that these results are constant, and I have seen syphilitic lesions resist this mode of treatment ; I consider that, when a series of ten to twelve intravenous injections of cyanide of mercury has not effected the cure of the syphilitic lesion, it is not worth while continuing this treatment and better to have recourse to another.

It is none the less true that in the generality of cases, especially primary and secondary lesions, intravenous injections constitute a very active treatment, an *attacking treatment* for which no mercurial preparation, and above all *no mercurial preparation* suited for the treatment of syphilis in soldiers, *can be substituted.* I shall show later the practice I have devised for the

purpose of associating intravenous injections of mercury and those of novarsenobenzol.

Intravenous injections of cyanide of mercury are made with a 1 % solution of this salt in sterilised distilled water.

In the centres where injections of cyanide of mercury are of current use, this solution may be kept in glass-stoppered bottles; they must be replaced every two or three days.

When there is only a small consumption of cyanide, the provision must be kept in sealed ampoules of 1 or 2 cubic centimetres capacity.

The injections are repeated every day, or every two days, according to the rapidity with which the treatment is to be carried out. They may be given daily without inconvenience for twelve to fifteen days; but must be suspended if they produce either stomatitis, which is rare, colitis, or hæmorrhagic stools, which are more frequent.

The ordinary dose of cyanide to be injected at one time is 1 centigramme, say 1 cubic centimetre of the 1 % solution. It is prudent to commence with an injection of 5 milligrammes only, say a half cubic centimetre, in debilitated or aged subjects, or in those in whom intestinal troubles are suspected; but if the first injection is tolerated well, the normal dose of one centigramme may be given after the second or third injection.

When it is necessary to push the treatment very actively, for example, in patients whose military duties do not permit more than a short sojourn in hospital, or when one has to deal with grave syphilitic lesions, such as iritis, meningitis, etc., two centigrammes of cyanide (*i.e.* two cubic centimetres) may be injected every day, or one day out of two, in which case there should be an injection of one centigramme on the intermediate days.

In a word, the medical man must vary the doses

according to the indications given by each patient from day to day.

ARSENIC

For some considerable time arsenic has been used in the treatment of syphilis, as an accessory medication. Donovan's solution, which dates from 1839, contains it in association with iodide of potassium and mercury; numerous medical men add arsenic, either to mercury or iodide of potassium, and use it for combating the anæmia and asthenia of syphilitics, or prescribe thermal baths for these patients, where the waters contain arsenic, especially at Bourboule.

From the time that Armand Gautier introduced arsenical derivatives with an organic base into therapeutics, these have been employed largely in antisyphilitic therapy. Brocq obtained good results with iodo-mercuric cacodylate; arrhenate of mercury, salicylarsenate of mercury have been used. Anilarsinate of sodium, which was discovered by Béchamp in 1863, reappeared in Germany in 1907, under the name of atoxyl, and enjoyed an ephemeral vogue, but was soon abandoned owing to the numerous and serious accidents it caused (blindness, death).

In 1909, Balzer obtained good results with *benzo-sulphono-para-amidophenylarsinate of sodium*, discovererd by Mouneyrat and sold under the name of hectine; associated with mercury in a special preparation, under the name of hectargyre, it had a certain vogue, which rapidly diminished upon the appearance of arsenobenzol.

Arsenobenzol

Dichlorhydrate of dioxydiamido-arsenobenzol was discovered by Ehrlich, in 1909, when experimenting with arsenical compounds on the spirilloses. It is commonly

known by the name of "606," which indicates its number in the series of Ehrlich's experiments. It has been patented under the name of Salvarsan by the Hoechst Chemical Manufacturing Dye-works of Meister, Lucius, and Brüning. The name *arsenobenzol*, a simplification of its chemical denomination, under which it has been manufactured and sold everywhere, should be the only one used.

Arsenobenzol is a canary yellow powder, impalpable to the touch, of an astringent and acid taste, with a slightly sulphurous odour; it changes under contact with the air, and must be kept in hermetically sealed phials, in nitrogen.

In water, it gives a solution, with an acid reaction.

It was at first used for intramuscular injections, in the form of an acid oily suspension, but this method of employment was soon abandoned owing to the severe pain it caused. Arsenobenzol was then administered solely by intravenous injection: its aqueous solution, being acid, has been abandoned, on account of the painful reactions it caused; recourse has been had to neutralised solutions, or those rendered alkaline by the addition of solution of soda.

The quantity of solution of soda to be added varies in accordance with the doses injected.

The addition of solution of soda to the aqueous solution of arsenobenzol produces a precipitate, which dissolves on the addition of more alkaline solution.

Arsenobenzol solution, rendered alkaline by soda, cannot be injected unless diluted by a certain quantity of physiological serum, so that the volume injected shall reach 150 to 200 cubic centimetres.

Each operator prefers his special method, the preparation of the solution, and the instruments necessary for the injection having been subjected to numerous modifications. It is not possible here to give details of these different techniques, the more so because, as I shall state later on, I do not consider arsenobenzol

can be utilised in the treatment of syphilis in the Army.

When first used, arsenobenzol gave rise to the greatest hopes. Ehrlich did not hesitate to say that it enables one to effect, by means of a few injections, the "sterilisatio magna" of syphilis. Experience quickly showed that, even granting that these injections given at the onset of syphilis were indeed followed in a short time by cicatrisation of the chancre, if the secondary symptoms did not appear at their ordinary date, they were simply delayed and were frequently seen later. In an attempt to stop the secondary symptoms, it was necessary to increase the number of injections. True, when the disease was more advanced, active troubles certainly disappeared, most frequently in a marvellous way, but these also reappeared at the end of some weeks, and sometimes then resisted arsenobenzol, even in large doses frequently repeated.

Thus the initial enthusiasm was damped; injections were multiplied, and doses increased.

Moreover, accidents happened, even deaths being reported. Many of these accidents were due to errors of technique or the use of excessive doses and could not be attributed to the drug. As regards the deaths, the majority were due to the general condition of the patients. Ehrlich soon announced that there were contra-indications to the use of arsenobenzol, and advised its non-employment in cardiac affections, aortic aneurisms, and general paralysis.

Nevertheless, disastrous results were still observed sometimes; it had to be acknowledged that, granting they were more frequent in old age, and in cardiac, albuminuric, hepatic, and cachectic patients, they were also observed in young, apparently healthy subjects. It was soon noticed that they rarely appeared with the first injection, but most often with the second, diminishing in frequency with the third and subsequent ones.

Further, nervous troubles such as paralysis of the cranial nerves sometimes appeared in patients treated by arsenobenzol; their frequency aroused distrust of the drug.

I shall revert again later to the question of accidents.

Arsenobenzol caused accidents, independent of the doses of the drug injected, as well as of the technique; it necessitated a complicated technique, and, despite improvements, few medical men were persuaded to use it.

The discovery by Ehrlich of a substance, of closely allied chemical composition, easily giving a perfect solution with neutral reaction, rendered the arsenical medication of syphilis practicable.

Novarsenobenzol

Dioxydiamido arsenobenzolmonomethylene sulphoxylate of sodium was called " 914 " by Ehrlich, in accordance with its position in his experiments; it was sold by the firm of Meister, Lucius, and Brüning, under the name of Neosalvarsan. By way of analogy with arsenobenzol, it is generally designated under the name of *Novarsenobenzol*. Like arsenobenzol, it can be prepared and sold by all manufacturers of chemical products.

It is a bright yellow * powder, of impalpable consistency; when placed on water it floats, but melts with extreme rapidity, making a clear solution, of neutral reaction, which can be injected into the veins direct.

The perfect and rapid solubility of novarsenobenzol in water in every proportion, or in physiological serum,

* When novarsenobenzol changes, its colour becomes brown. Before making the solution, care should always be taken to see that the product has retained its normal colour. It is well to know that the density of novarsenobenzol is not always constant, so that the volume in the ampulla occupied by the same dose of the drug may vary considerably.

has caused this substance to obtain a well-merited renown.

Novarsenobenzol changes rapidly when in contact with the air : like arsenobenzol, it must also be preserved in hermetically sealed ampoules. This is the form in which it is put on the market and delivered to medical centres, by the Central Pharmacy of Military Hospitals and the local pharmacies, in ampoules containing doses of 0·15 gr., 0·30 gr., 0·45 gr., 0·60 gr., 0·75 gr., 0·90 gr., the doses usually employed for the treatment of syphilis. The ampoules have a uniform capacity of 4 to 5 cubic centimetres.

The activity of novarsenobenzol is lower than that of arsenobenzol ; both from the point of view of toxicity and of therapeutic effects, it may be regarded as equal to two-thirds of that of arsenobenzol. Thus, the doses should be half as much again as those of the latter drug.

Novarsenobenzol solution should be prepared the moment it is to be used ; its effect changes on contact with the air, and this becomes more accelerated the higher the temperature. Further, these solutions should be used with *cold water*.

The Vehicle for Injections of Novarsenobenzol

Amongst the causes of accidents due to the use of arsenobenzol, great importance has been attributed to the liquids used in preparing the solutions ; the *question of the water* has been the subject of numerous investigations, and, in the production of toxic accidents, all impurities of the water, both chemical and microbial, have been incriminated ; salts of lead, alkaline silicates, bicarbonate of lime or magnesia, derived from the glass of the distilling apparatus, copper if this was in metal. Chloride of sodium was also blamed if the injection was made with physiological serum. It was not sufficient for the water to be distilled, it was

necessary that it should be distilled at least twice, the last time being on the day itself, or the evening preceding, its use ; further, it was imperative that it should be distilled in an apparatus made of special glass.

When novarsenobenzol was first used it was dissolved in 150 to 200 cubic centimetres of fluid, like arsenobenzol.

Ravaut * made a great advance in the technique of treatment by novarsenobenzol when he showed that the question of water could be solved in a very simple fashion, by reducing the quantity of the vehicle ; by injecting less liquid, and thus injecting a smaller quantity of toxic substances contained in it.

But when a liquid is injected into the veins it must not alter the blood corpuscles and cause hæmolysis.

Traditionally, to avoid hæmolysis, it was customary to dissolve the novarsenobenzol in physiological serum. Ravaut showed that solutions of novarsenobenzol respect the integrity of the blood corpuscles provided a certain content of arsenobenzol is maintained : this content, in his opinion, is 0·45 gr. for 10 cubic centimetres of distilled water. Therefore for the injection of a full dose of novarsenobenzol, 0·45 gr. or more, only 10 cubic centimetres of distilled water need be used, with a proportionate volume for smaller doses, say 3 cubic centimetres for 0·15 gr. of novarsenobenzol.

Later, Ravaut † showed that the quantity of liquid injected could be still further diminished. The solubility of novarsenobenzol in water is such that *two cubic centimetres* of water will dissolve 0·90 gr. These

* Ravaut, "New Process of Intravenous Injection of Neosalvarsan" (*Bulletin de la Société française de Dermatologie*, February 7th, 1913, p. 118). Ravaut and Scheikevitch, "Study on the New Process of Injection of Neosalvarsan in Concentrated Solutions" (*Annales de Dermatologie*, April 1913, p. 208).

† Ravaut, "New Simplification of the Technique of Concentrated Intravenous Injections of Arsenobenzol" (*Presse médicale*, October 1915, p. 398).

concentrated solutions do not alter the blood; they cause no inconvenience, except that they may be painful if, by accident, the fluid is injected outside the vein (see "The Technique of Intravenous Injections," p. 148). It is wise, however, to make the injection more slowly than with larger quantities of solutions.

The water problem is solved by the method of concentrated injections, and to such a point that it is no longer even necessary to use distilled water for these injections. In a hospital at the front, Ravaut has performed injections with water that had been simply boiled and filtered through absorbent wool, without causing any accident.

I have myself proved on several occasions that injections of novarsenobenzol, dissolved in ordinary water, which had been sterilised by boiling for some minutes, do not cause accidents of any kind, and no greater febrile reaction than those made with freshly distilled water.

Nevertheless, one must not use water too highly charged with calcareous salts, as they would react on the novarsenobenzol. When it is impossible to obtain any other, calcareous water may be used, if it is boiled a long time, in order to precipitate the calcareous salts, and then sterilised afresh by boiling after decanting.

To summarise, injections of novarsenobenzol may be made with physiological serum, distilled water which has been prepared less than three months, preserved aseptically or recently boiled, and in case of urgency with ordinary water boiled and filtered through cotton-wool, in a volume *of two cubic centimetres* per injection, whatever the dose of novarsenobenzol.

This method of highly concentrated injections is recommended on account of its simplicity, and the facility with which the necessary material and appropriate syringes can be obtained. It is also recommended because of its innocuousness, by reducing the accidents due to the drug to a minimum. It is the

only method I have used in my hospital work for the past year ; it responds better than any other to the requirements of antisyphilitic therapy in the Army and at the medical centres.

Balzer and Dumouthiers have recommended *intramuscular injections* of novarsenobenzol. This method, which may be compared to injections of insoluble mercurial preparations, has the advantage of not introducing a high dose of arsenic into the circulation ; it is therefore less dangerous than the method of intravenous injections.

Injections, in doses of 0·25 gr., are made twice a week.

As a rule, they are painless, but sometimes painful.

But, as with intramuscular mercurial injections, the possibility of painful local reaction prohibits the adoption of this method for the army. Moreover, its therapeutic action appears to be both less intense and less rapid than that of intravenous injections.

The Effects of Novarsenobenzol on Syphilitic Manifestations

Like arsenobenzol, but in higher doses, novarsenobenzol has a very rapid action on the cicatrisation of *syphilitic chancre*, even in its early stages, and no matter what its extent. From the very first days, the chancre becomes of a paler colour, its borders are less marked, the basal induration diminishes, its appearance resembles that of simple ulceration, its surface contracts, and, within the space of 6 to 12 days, it has completely cicatricised ; the satellite glands, once treatment has begun, cease to increase in size, become less hard, and within a few days again resume their normal dimensions.

The effects are no less remarkable *on secondary lesions*. The *mucous plaques* of the genital organs, anus and mouth are very rapidly influenced by the drug. If they are of the erosive form they heal in

4 to 6 days; hypertrophic plaques, even the most voluminous, subside from the first 2 or 3 days following the first injection, lose their papillomatous appearance, and in 12 to 15 days, *i.e.* after the second injection, they have completely disappeared, without any local treatment.

Cutaneous lesions are also influenced rapidly by novarsenobenzol; as with all active treatment, mercurial, as well as arsenical, they are often the seat of a more or less local congestion, known under the name of Herxheimer's Reaction, during the first hours following the injection. After this temporary congestion, they fade rapidly and disappear; roseola in 5 to 8 days, papular syphilides with large papules in the space of 6 to 8 days, syphilitic plaques of the skin a little more rapidly; papular syphilides with small papules resist treatment more and do not always disappear after the third or even the fourth injection; ulcerous syphilides heal fairly rapidly, and their cicatrisation may be complete in 8 to 15 days, even if they are extensive and deep.

The rapid influence of arsenobenzol on cutaneous lesions of syphilis, especially on ulcerous syphilides, has led some authors to state that the principal effect of this drug is to hasten cicatrisation, and some have denied that it had any other quality.

It is incontestable, however, that it has an action on the visceral manifestations of syphilis, which is as rapid as that which it exercises on the cutaneous lesions.

Secondary syphilitic *headache* is nearly always influenced by it. It is not unusual for patients suffering from violent headache and consequent insomnia for several days to regain sleep the night or following night, after the first injection. The same thing applies to the pains in the limbs, which are sometimes so distressing in secondary syphilis.

More serious troubles, such as hemiplegia of the

face and limbs and medullary lesions of secondary syphilis, are also influenced rapidly.

Iritis and Irido-choroiditis are very quickly modified by novarsenobenzol; the preorbital pain yields in a few days, sometimes in a few hours, the iris regaining its contractility and coloration; no more adhesions are produced, and in fifteen to twenty days the iris has resumed its normal aspect, with the exception of a slight sluggishness and some tendency to dilatation, and, of course, the cicatrised remains of adhesions prior to treatment.

The *general condition* of the patient responds very rapidly to the influence of arsenical medication; the febrile condition common in secondary syphilis subsides in two or three days, the sensation of fatigue so frequent in the early stages, the pallor or earthy colour of the face, rapidly give place to a sensation of well-being, normal coloration of the skin, and renewed vigour. Many syphilitics declare that their health is far better since treatment with arsenobenzol than it was before the onset of syphilis: they soon put on flesh to a noticeable extent, their appetite returns, and often the growth of hair is more abundant than it was before. The above are the effects of any active arsenical medication, at the maximum of intensity and rapidity, owing to the richness of the drug in arsenic.

With patients who had previously been subjected to mercurial medication and in whom this drug had reacted on the buccal mucous membrane, a very rapid modification of the mercurial gingivitis must be added to these favourable effects: the ulcerations become clean and heal, salivation ceases and mercurial treatment can be renewed later on without bringing about a return of the stomatitis.

To sum up, in the great majority of cases, excepting the rare instances of intolerance or resistance to the drug, novarsenobenzol, like arsenobenzol, rapidly causes the disappearance of the lesions of primary and secon-

dary syphilis, and at the same time improves the general condition of the patient to a degree not attained by mercury.

This is undoubted, and evidence would have to be repudiated if it were not acknowledged.

The question is, whether the action of arsenobenzol is symptomatic—a rapid and energetic action on the lesions only, or fundamental—a curative action on the disease itself. In a word, does novarsenobenzol "whitewash" the syphilitics, or does it cure syphilis?

I have already said that the *sterilisatio magna* announced by Ehrlich has not been realised by a small number of injections of arsenobenzol. Can this result be obtained by multiplying the injections, and using higher doses of the drug?

Opinions vary. Some hold that sufficiently energetic treatment will cure syphilis radically and definitely. According to others, this result is never attained.

One fact seems now to be established, *i.e.* that, in order to hope to sterilise syphilis by arsenobenzol or by novarsenobenzol, the disease must be attacked from the primary period, preferably from the second or third weeks of the chancre, and that, once the secondary troubles have appeared, one can no longer expect such a result.

In what proportions has this sterilisation been realised in cases of syphilis treated from the onset? This is difficult to ascertain. Some authors claim results which are truly marvellous. But their statistics are generally based on the experience of a few months, and their statement that syphilis has been sterilised rests on the fact that no symptoms have been seen during the period of observation, and that the Wassermann rection became and remained negative.

This last argument is inadequate, no matter what has been said, to justify one in asserting that the syphilis has been cured. Prolonged observation during several years would alone authorise this conclusion.

In fact, syphilis, treated either by mercury or not at all, may remain for many years without any external signs, and yet manifest more or less serious symptoms at the end of 12, 15 years and more—I have even seen a case after 54 years.

An apparently more weighty argument has been supplied by the fairly numerous observations of several medical men, who, after treating a syphilitic chancre by arsenobenzol, have seen a new one develop later. In virtue of the axiom that an infective disease which recurs is one in which the first attack has been cured, one must conclude that the first attack of syphilis had been cured.

I have already shown, with regard to the diagnosis of syphilitic chancre (see page 64) the probable explanation of some lesions—the majority, in my opinion—regarded as reinfection chancres in patients treated by arsenobenzol.

Apart from the pseudo-chancre of reinfection, later syphilitic manifestations are often seen in patients treated by arsenobenzol.

After a latent period of several months, lesions of the mucous membranes, simple or hypertrophic plaques, may appear, often accompanied by a circinate erythematous eruption, of the type of recurrent roseola (see p. 72) which respond again to treatment with arsenobenzol or mercury, sometimes to again reappear after a variable period.

Other syphilitic manifestations of different kinds and varied locations may also appear, especially nervous affections, and these I shall mention again.

What is remarkable is that the most characteristic symptoms of the secondary period are usually absent; the typical roseola is not observed in patients treated with arsenobenzol. Again, delayed lesions of the tertiary type often occur at a period at which they would not have had time to appear in untreated syphilis or that treated by mercury. Arsenical medication

seems both to retard or inhibit the appearance of early lesions and hasten the appearance of the later manifestations of syphilis.

Detractors of arsenical medication have taken advantage of the appearance of these delayed lesions, and have cited cases in which they appeared after arsenical treatment of varying intensity and duration.

It is impossible to deny that patients treated by high and repeated doses of arsenobenzol, from the first days of the chancre, have presented indubitable syphilitic lesions, of a more or less serious character, at the end of a few months.

On the other hand, trustworthy observers have cited cases treated from the first days of chancre with arsenobenzol, in which the Wassermann Reaction has become negative and remained so for two or three years, without the appearance of any syphilitic trouble.

It is, therefore, justifiable to conclude that arsenobenzol may definitely cure syphilis, when it is employed at the initial period,* but also that definite cures obtained with this drug are rare, no matter at what period of syphilis it is instituted or what dose is given.

With regard to the Army, this conclusion should lead medical men to regulate the use of arsenical medication in the hope of attenuating syphilis, and curing it if possible. It does not justify them, however, in endeavouring to obtain a result which is always exceptional, by means of extremely energetic and prolonged medication which would prevent the patient from performing his military duties and diminish the number of efficient soldiers.

This consideration is of importance, owing to the fact that it is not certain whether very high doses and prolonged use of arsenobenzol may not have a noxious effect. During the six years in which arseno-

* See specially Brocq's *mémoire* ("How to administer Salvarsan," *Annales de dermatologie*, December 1912, p. 669) in which this question is handled with the greatest caution.

benzol has been used, we cannot pretend to be acquainted yet with its remote effects. When the nervous system frequently responds to arsenobenzol by a reaction which ends in grave disorders, it is possible that too energetic initial treatment may lead to more or less pronounced inflammatory conditions, and perhaps predispose to terminal localisations of the treponema in the grey matter.

There is a risk, of which the civil surgeon should warn his patient, when proposing an energetic abortive treatment, but which the army surgeon does not appear to have the right of imposing upon the men who are confided to his care.

In what Doses should Novarsenobenzol be injected?

The most varied and contradictory opinions have been stated as to the suitable doses of the arsenical compound to be injected.

Ehrlich, relying on his experimental researches, fixed the dose of arsenobenzol at one centigramme per kilogramme of body weight, and stated that this should never be exceeded at one injection. Assuming that the toxicity of novarsenobenzol is two-thirds that of arsenobenzol, the maximum dose for a man of average weight of the new compound is 1·5 centigramme per kilogramme.

The great majority of authors agree that it is never necessary to give this dose, and no one advises it for the first injection.

All agree that the first injections—or at least the first one—should be made with smaller doses than the succeeding ones. By a massive dose at the beginning, too great a number of the treponemas are destroyed at one stroke, and the products of bacteriolysis add their noxious action to those of the drug, and cause intense reactions. Further, as experience has proved, the organism has to become accustomed to the toxicity

of the arsenic, so that a dose, which at the first injection would cause toxic troubles, does not do so if the ground has already been prepared by previous injections. This tolerance disappears, or is at least attenuated by time, so that if medication by arsenobenzol or novarsenobenzol is resumed after a period of rest, the first injection must be made with a smaller dose than the last of the preceding series.

Finally, it seems evident that the susceptibility of all patients to the toxicity of arsenobenzol is not the same ; the first injection enables one to feel one's way, and reduce the dose of this drug in subjects who are intolerant.

For all these reasons, it is rational, and experience has shown it necessary, not to give the highest dose of the drug at the beginning of treatment.

But with what dose should one commence ? Some authors, alarmed by the accidents observed, have proposed that one should start with very small doses, 0·30 gr., or even 0·15 gr. of novarsenobenzol, and increase this progressively by 0·15 gr. at each injection.

Others, not less expert in therapeutic matters, commence with 0·60 gr. of novarsenobenzol, reach 0·75 gr. at the second injection, and often keep to this dose for the following ones ; they do not seem to have had more accidents with this method than others who are more cautious.

Every one has been guided in his line of conduct by the facts observed and the theories he has evolved.

As far as I myself am concerned, I was struck by two fatal cases in young women after small doses of novarsenobenzol. In one case, the first injection had been made with a dose of 0·20 gr., the second of 0·15 gr. ; in the other case, the injections were respectively 0·30 gr. and 0·45 gr. As I constantly use larger doses without accident, I do not consider that weak initial doses are free from risk, and think there is no danger in commencing with a dose of 0·45 gr. in healthy

men. In women I generally reduce the initial dose to 0·30 gr., and even in men who are anæmic, or nervous subjects upset by the idea of the danger of arsenobenzol, or presenting some taint or suspected history (albuminuria, cardiac disturbance, etc.).

With young and healthy subjects, like most men serving in the Army, the initial dose of 0·45 gr. never shows any contra-indication. By beginning with an active dose, one has the advantage of reducing the duration of treatment and hospitalisation, an advantage which, in time of war, must always be aimed at, if it is not purchased too dearly.

When the first injection has been badly borne and has caused a febrile reaction, arsenic intolerance must be suspected. It is, therefore, prudent to suspend the use of the drug, at any rate for a time, and, if imperative to again resort to it, the weakest doses must be given, 0·15 gr. for example, and its effects carefully watched.

In the following injections, the dose should be increased to 0·60 gr. and 0·75 gr. In the majority of cases, contagious lesions are cicatrised after the second injection, given in a dose of 0·60 gr., and if necessary we can limit ourselves to these, on condition, as I shall show later on, that mercurial treatment is continued. Many of my patients, who were given two injections only, before being subjected to mercurial treatment, did not later present any syphilitic symptoms.

Nevertheless, I consider that it is more efficacious to begin with a dose of 0·45 gr., which is fairly high ; the therapeutic effect of two successive doses of 0·45 gr. and 0·60 gr. is at least equal to that of these two doses preceded by one injection of 0·15 gr. or of 0·30 gr.

If the cure of the contagious troubles is delayed, a fresh injection will generally have the desired effect.

Some authors consider that a cure is more certain and durable, and the chances of the return of syphilitic

symptoms more remote, if the treatment is continued. They also advise that the injections should be continued until a total dose of about 3 grammes has been reached, which represents an injection of 0·45 gr. and four injections of 0·60 gr. or one injection of 0·45 gr., one of 0·60 gr., one of 0·75 gr., and one of 0·90 gr.

The utility of such doses is not evident to me ; I do not think that they have an absolutely prophylactic action against later troubles, and I consider that this action is obtained more certainly by the association of mercury.

Periodicity of the Injections

It is necessary to have intervals between the injections, in order to permit the organism to eliminate the drug, which requires four to five days, and to recover from the shock induced, and the humoral and visceral troubles that have been provoked. It is admitted almost unanimously that the interval between two injections should be a week. Even if small doses of the drug are injected, it is not wise to have them closer together.

The After-effects of Concentrated Injections of Novarsenobenzol

As Ravaut has shown, the after-effects of concentrated injections of novarsenobenzol are generally very slight.

If the patient's temperature is taken carefully every three hours, it will frequently be found that a rise begins six to eight hours after the injection. This rise of temperature, which is quite as high after dilute injections, is more intense after the first injection than after subsequent ones ; it is specially marked in patients suffering from secondary symptoms, who have been recently subjected to mercurial or arsenical treatment. It is generally absent after subsequent injections.

The temperature may rise to 40° C., but as a rule does not exceed 38°, and falls at the end of 6 to 8 hours.

This early febrile reaction, due to the effect of the drug on the treponema, must be distinguished from a delayed reaction, occurring the day after, or two days after, the injection, which rarely exceeds 39·5°, does not last beyond twenty-four hours, and seems due to toxic phenomena.

With certain patients, the injection of novarsenobenzol is followed by a slight fall of temperature, below 37°, some hours after the injection. This is much more frequent after the third and following injections than after the first.

In many patients the rise of temperature is not accompanied by any noticeable malaise. In others there is headache, usually mild. This headache is of little importance unless it increases with subsequent injections of larger doses.

Also, nausea and vomiting are not exceptional after the first injection, which they follow almost immediately, but are rare after subsequent ones.

Some patients suffer from diarrhœa on the night following the injection, but this is rarely severe, although sometimes sanguinolent.

The following are the after-effects of injections observed in my clinic, where the injections are always made in concentrated solutions.

The injections are made between 10 a.m. and noon, the patient resting quietly afterwards and only taking a small quantity of liquid. The temperature taken in the axilla every 3 hours from 3 p.m. did not exceed 37·5°. *i.e.* a figure which may be regarded as normal in 80% of the cases ; in 32% it remained below 37°. With certain patients it rose to 37·2° or 37·3° at 3 p.m., reaching its maximum at 6 p.m., then falling to 37° at 9 p.m., and remaining at that figure during the night. With other patients it reached its maximum at 3 p.m. ; then fell to 37° at 9 p.m. and remained

below 37° during the night or at 6 p.m. These patients experienced no trouble or discomfort of any kind.

In 18% of the cases the temperature rose above 37·5° but did not exceed 38·5°; this rise was generally of short duration, and reached its maximum at 3 p.m. or 6 p.m.; the patients often had no malaise, but some had a slight rigor, passing headache, or some nausea. These febrile attacks were observed especially in patients who had intense secondary cutaneous manifestations. In one patient I saw a generalised scarlatiniform eruption; in another an urticarial eruption a few minutes after the injection.

In 2% of the cases there was marked rise of temperature, reaching 40° C. at the same time that the patients suffered from rigors, headache, and nausea, which were more intense than in the preceding cases, but only of short duration.

Such are the reactions, which may be called normal, after concentrated injections of novarsenobenzol: they have no real importance, and the fear of them should not prevent recourse to the drug. The attenuating influence that previous mercurial treatment has on them should make one precede the injections of novarsenobenzol by mercurial treatment whenever possible. I shall again revert to this point.

Other accidents may, however, result from this medication. They are similar to those observed with other methods of treatment by arsenobenzol or novarsenobenzol. These are the accidents which have so frightened certain medical men, and compromised the arsenical treatment of syphilis. They are much more rare with concentrated injections than with other methods. All the same, they must be described here.

The Serious Accidents of Arsenobenzol and Novarsenobenzol

It is impossible to separate the accidents caused by novarsenobenzol from those produced by arseno-

benzol; although much less frequent with novarsenobenzol, they are of the same order and may be of equal gravity.

The conditions of development of these accidents are multiple, their pathogeny is complex, and still a matter of dispute. Their interpretation has given rise to discussions, sometimes acrimonious, into the details of which I cannot enter without exceeding the limits of this book. I shall content myself with giving a brief summary of the most important of them.

It must be remarked, first of all, that certain of these accidents cannot be attributed to the drug, but to ignorance of its contra-indications. It would be impossible to-day to include, amongst accidents of the medication, the serious consequences which may result from its use, especially in high doses, in subjects suffering from grave lesions of the heart, liver, kidneys, and in cachectic patients. In these pathological conditions, the administration of arsenic is contra-indicated.

Again, the method cannot be blamed for the fatal results of injections made with arsenobenzol, the composition of which has changed from contact with the atmosphere, or with solutions prepared in advance, the toxicity of which results from chemical transformations of the arsenobenzol.

The reduction of the amount of liquid injected has eliminated the noxious action of the water and of its chemical impurities; the substitution of novarsenobenzol for arsenobenzol has done away with the accidents produced by the insufficiency of alkalinisation of the solutions of the original product.

The uncertainties of dosage which always occur on the first appearance of any new drug have long ceased; the excessive doses preferred by some authors have been the cause of accidents, which no longer happen with those in use at the present time.

The number of serious accidents, and especially of

deaths, tends to diminish more and more, and is infinitely less, especially with the method of concentrated injections, than during the first years in which arsenobenzol was employed.

The serious accidents caused by arsenobenzol and novarsenobenzol specially affect the *nervous system*.

The gravest of these accidents takes the form of *acute encephalitis ;* it appears sometimes after the first injection, more often after the second, and rarely after the subsequent ones ; it generally begins in the three first days following the injection, rarely later.

It is characterised by severe headache, rise of temperature, facial congestion, delirium, followed by coma, repeated epileptiform attacks, and vomiting, generally leading to death within a few hours.

At the post-mortem, intense hyperæmia of most of the organs is found, and particularly punctiform hæmorrhages in the cerebral substance ; at the same time lesions of acute nephritis are often present.

The great majority of deaths following the administration of arsenobenzol, and more rarely novarsenobenzol, belong to this type. It occurs not only in patients suffering from visceral troubles, but also sometimes in healthy, young, and vigorous subjects, in whom there was absolutely no warning of what was about to happen, and this after moderate doses of the drug. It must be recognised, however, that inexplicable deaths from arsenobenzol have become the exception.

Encephalitis appears more frequently after the second injection of arsenobenzol than after the first. Its development must be specially suspected in subjects who, after the first injection, presented an intense febrile reaction, facial congestion, the phenomena described by Milian under the name of nitritoid crises, and especially morbilliform or scarlatiniform cutaneous eruptions.

It is advisable with patients who have suffered from

reactions of this kind, after the first injection, to suspend treatment, or at least only to employ moderate doses.

Besides this grave form, there is a series of phenomena, of a less tragic character, described under the name of *neuro-relapses*. These consist chiefly in paralysis of the cranial nerves.

They appear some weeks after treatment is finished, and are preceded, during some days or weeks, by headache of varying intensity, diffuse or predominating on the side of which the paralysis is situated, and pains in the nape of the neck, the back, or limbs. According to the statistics of Bénario, this paralysis affects the auditory nerve in 44·5% of the cases, the optic nerve in 30·2% ,the oculomotor nerve in 7·4% and the facial nerve in 7%.

Affection of the auditory nerve is manifested by tinnitus, auditory hallucinations, unilateral or bilateral deafness, which may be accompanied or not by slight vertigo and rarely by vomiting.

Lesions of the optic nerve result in optic neuritis, neuro-retinitis or retinitis with stasis of the pupil, often without very pronounced functional troubles.

Lesions of the oculomotor and facial nerves give rise to paralysis of the corresponding muscles.

The unilateral or bilateral lesions sometimes affect several cranial nerves simultaneously; hence the variety of clinical syndromes, sometimes rendered more complex by the co-existence of lesions of the spinal nerves: paralysis of the type of Landry's disease, polyneuritis, intercostal neuralgia, etc.

Lumbar puncture reveals abundant lymphocytosis of the cerebro-spinal fluid.

Functional disorders generally recover after a variable period; but auditory affections may persist indefinitely.

These different lesions result from compression of the cranial nerves by basilar meningitis, often associated

with latent spinal meningitis, which is only revealed by lumbar puncture.

These facts have been the subject of various interpretations. When arsenobenzol was first used, their frequency caused them to be attributed solely to the toxic action of the drug. It was soon remarked, however, that lesions of the same kind were observed in syphilitics before the use of arsenobenzol, only less frequently ; and, on the other hand, that they were only observed amongst syphilitics and never appeared in patients treated with arsenobenzol for affections independent of syphilis. Attributed to the neurotrophic action of arsenobenzol, they were soon put down to the action of the pathogenic agent of syphilis, hence the name of neuro-relapses, which has been given them. This denomination is disputable because it is not a question of the recurrence of previously existing lesions, but it has entered into current language. It is recognised to-day almost unanimously that, if the lesions are of a syphilitic nature, arsenobenzol may favour their development.

As Ravaut has shown, syphilis frequently causes meningeal lesions, which remain latent clinically, and are only revealed by changes in the cerebro-spinal fluid (lymphocytosis, albumin), which are exacerbated by arsenobenzol, resulting in neuro-recurrent phenomena. The *neurotropism* of arsenobenzol, which has been invoked to explain the production of these accidents, does not exist, according to Ravaut, unless the nervous system is already invaded by the treponema. This explains why these lesions are observed especially in syphilitics treated too late with arsenobenzol, at a period when the treponema has already reached the nervous system, and do not occur in patients submitted to arsenical injections from the very onset of the chancre.

The frequency of these lesions is diminished by associating mercury with arsenobenzol, especially

when the arsenobenzol treatment is preceded by a course of mercury.

The various organs may present more or less acute reactions under the influence of arsenobenzol.

Icterus is sometimes observed; it appears to be favoured by renal insufficiency. It often accompanies fatal encephalitis, but may also exist alone. It is presented under very variable aspects, from a rapidly curable form to a fatal one, with symptoms of grave icterus (acute cirrhosis, yellow atrophy of the liver). The pathogenesis of the icterus of arsenobenzol has not been definitely elucidated.

Albuminuria appears in some cases to be provoked by arsenobenzol. It often happens that long-standing albuminuria may be exaggerated or reappear; it may persist and be accompanied by uræmic troubles; it ceases if arsenical treatment is at once interrupted.

Gastro-intestinal disorders which are usually hardly noticeable, sometimes attain a certain intensity: repeated vomiting, copious diarrhœa.

Cardiac disturbance rarely becomes pronounced, except in the case of a lesion of the heart, and especially of aortic aneurism, which forms a contra-indication to the use of the drug. It is usually limited to palpitations, or at most lipothymia, which forms part of the nitritoid crises.

Cutaneous eruptions of an erythematous, rubeoliform, or more frequently scarlatiniform type may occur after injections of arsenobenzol, usually about the second day; they constitute a sign of severe intoxication. Some cases of generalised exfoliative erythrodermia have occurred from the use of arsenobenzol.

To sum up, multiple, grave, even fatal lesions may follow injections of arsenobenzol and of novarsenobenzol. The pathogenesis of some of these seems to be established; in the case of nervous lesions, the phenomena are comparable to Herxheimer's Reaction,

and are probably due to the action of the arsenical products on tissues already inhabited or altered by the spirochæte. In others, the pathogenesis remains obscure.

One fact has been established, namely, that these disturbances are less frequent and not so grave with novarsenobenzol as they are with arsenobenzol, and that concentrated injections still further reduce their number and gravity.

It is none the less true that they may exceptionally follow injections made quite correctly, and without there being anything to indicate their approach.

Fear of these disturbances must, nevertheless, not prevent recourse to arsenical medication, especially in the case of young patients; for indeed this sometimes protects the patient from syphilitic manifestations, which are often graver and in any case more frequent.

Other Arsenical Preparations

Various other products with an arsenical basis have been proposed for the treatment of syphilis.

I may recall the fact that, before Ehrlich's discovery, benzo-sulpho-para-aminophenylarsinate of sodium, sold under the name of hectine, had a certain vogue; its activity being much lower than that of arsenobenzol and novarsenobenzol, preference has been given to these two last substances. It has no special indication in army medicine and cannot replace novarsenobenzol. The same applies to its combination with mercury, under the name of hectargyre.

Mouneyrat discovered another arsenical compound, tetraoxydiphosphaminodiarsenobenzene, described by the number 1116, which is sold under the name of galyl. This substance is presented in the form of a yellow powder, without either smell or taste, insoluble in water and the majority of neutral solvents. When placed in a weak solution of carbonate of soda, it

dissolves instantly and yields a brown or yellowish brown fluid. According to its promoters, galyl is less toxic than arsenobenzol, causes no congestive phenomena, and is tolerated well. They say, it should be used for man in a total dose of 1·50 gr. spread over three injections with an interval of eight days between each.

Whatever its activity or innocuousness, this product, like the original arsenobenzol, Ehrlich's "606," has the inconvenience of not dissolving, except in an alkaline medium. If the dosage of carbonate of soda is not absolutely accurate, and this seems to offer some difficulty, either an imperfect solution is obtained or a hyperalkaline fluid, which irritates the walls of the veins and causes painful indurations, independently of any operative unskilfulness. For this reason, this drug does not seem to me to be suitable for army medicine.

More recently, Danysz proposed a complex arsenical compound for the treatment of syphilis, containing antimony and silver, stibico-argentic sulphate of dioxydiaminoarsenobenzol, described by the number 102, and placed on the market under the name of luargol.

The compound is presented in the form of a yellowish-orange powder, which, like other products of the arsenobenzol series, has to be preserved in hermetically sealed vacuum tubes. It is insoluble in water, but soluble in dilute alkaline fluids, forming a very dark brown solution, which changes rapidly in a bright light, and more slowly in the dark. *This solution must be filtered before use.* Its toxicity appears to be lower than that of arsenobenzol, and its greater activity enables one to obtain therapeutic effects comparable to those of novarsenobenzol, with smaller doses. Owing to its weak toxicity, it seems to me to be very useful in the treatment of syphilis in exhausted, overworked, and elderly patients.

Luargol has the inconveniences of all substances

which only dissolve in an alkaline medium; even in the hands of experts, it sometimes produces venous changes, distension of the vein at the moment of injection, with subsequent pain and induration of the vein; it cannot, therefore, be recommended as a suitable drug for the Army at present.

To sum up, the different agents of arsenical medication, in experienced hands, may give satisfactory results in the treatment of syphilis. Those who have had much experience with one of these substances may prefer it to the others. In army practice, where it is necessary to treat patients actively, rapidly, and with the least possible risk of local and general disturbances, in my opinion, with the limited material at our disposal in the medical centres, one can only recommend novarsenobenzol for the routine administration of arsenical treatment.

Association of Mercury and Arsenic

When intensive arsenical medication was first commenced, Ehrlich announced that syphilis was sterilised by arsenobenzol; one might have believed that mercury was going to be removed from the list of antisyphilitic drugs.

To-day, even, some medical men believe that arsenobenzol suffices for the treatment of syphilis from its onset to its latest periods. Their number has never been very large, and I believe that it is diminishing more and more.

As a matter of fact, all medical men, even those who have retained the greatest belief in arsenobenzol, have seen patients thus treated—not only with novarsenobenzol, which may be less active, but also Ehrlich's salvarsan—with high doses and repeated injections, who have, nevertheless, shown grave syphilitic manifestations, often a short time after the last injections. Patients, having first received 3 to 5 grammes of

arsenobenzol in 6 to 8 injections, then one or two series of similar injections, who had had no lesion beyond a chancre, have come to consult me for roseola of the type of recurrent roseola, or for a papulo-tubercular syphilide. I repeat, every one has seen similar facts, the reproduction of which has become significant.

No doubt syphilitics have shown grave syphilitic disturbances directly after mercurial treatment, even during its course, and after it had been followed carefully for what was regarded as an adequate period.

But, having regard to the relative number of patients treated intensively with arsenobenzol, the cases are much more frequent in which this drug has not prevented later disturbances.

Hence, the majority of syphilologists are of opinion that it is at least advantageous—most say a necessity—to complete the arsenical treatment of syphilis by a course of mercury.

By means of this combined method the patient benefits, on the one hand, by the quickness of action of the arsenobenzol, the rapid healing of lesions, and, in cases of primary or secondary syphilis, by its markedly retarding action of secondary manifestations; on the other hand, by the greater security offered by mercurial treatment as a prophylactic measure against later manifestations.

The association of mercury and arsenobenzol has another advantage, upon which Ravaut has rightly insisted. If administered before the arsenical treatment, mercury kills a certain number of treponemas; the first injection of arsenobenzol will therefore destroy a smaller quantity of treponemas, and consequently the proportion of bacteriolytic products distributed in the circulation will be sensibly diminished. The result is that the fever, the intensity of which is directly due to intoxication by the bacteriolytic products of the treponema, is less in patients first treated by large

doses of mercury.* This result is particularly important to obtain in the secondary period, with cutaneous and mucous manifestations which are rich in treponemas.

For these reasons there is almost complete unanimity amongst syphilologists as to the necessity of combining mercurial and arsenobenzol treatment.

But how are these two drugs to be combined? Must they be prescribed simultaneously, alternatively or successively? Here, as for the dosage of the drugs, all kinds of opinions are expressed; each syphilologist has his own method, derived from his theoretical conceptions of the effects of the drugs and from the good or bad results he has witnessed.

Some authors are afraid of using mercury at the same time as giving arsenical treatment, and dreading accidents, especially with secondary syphilitics, do not begin arsenobenzol until after a prolonged mercurial treatment, stopping the mercury directly they commence using arsenobenzol.

The majority of syphilologists consider that these fears are exaggerated, and that the two drugs may be alternated and combined without danger.

For my own part, I have interposed injections of cyanide of mercury between injections of arsenobenzol in hundreds of cases, and have not seen any bad effects. I have, therefore, no scruple in preferring this method of treatment.

In military practice it has the advantage over the successive or alternative use of the two drugs of reducing the duration of treatment, the intervals between the injections of arsenobenzol being made use of for the mercurial treatment, or at least for a considerable part of this treatment. During the primary and secondary periods, when contagious lesions compel the patient to be sent to hospital, it is then possible, without loss of time, to combine the arsenical treatment simul-

* Ravaut and Scheikevitch, *loc. cit.*

taneously with the most active mercurial treatment. In this way, the whole weight of the attack is at once brought to bear upon the syphilitic infection from its onset.

SCHEME FOR THE TREATMENT OF SYPHILIS IN THE ARMY AT THE DIFFERENT PERIODS OF INFECTION

After describing the different methods of treatment of syphilis, their advantages, disadvantages, and dangers, it is necessary to consider the course to be followed in the treatment of syphilis in the Army.

Here, again, it is only a question of formulating routine *treatment* of syphilis, which the medical man must modify, according to the particular conditions of the patients and of their disease. With regard to military patients collectively, relatively few differences are found in general conditions of age, health, physical resistance, etc. Syphilitic manifestations being generally observed in them at an early stage and under fairly similar forms, this routine treatment will have more chance of responding to the indications of the great majority of cases than it would in the case of any other group of patients.

I again repeat, that the treatment must be instituted in such a way that it will *reduce to a minimum* the ineffectiveness of the soldier. In order to do this, every soldier suffering from contagious syphilitic lesions —sent to hospital on account of contagion and necessarily isolated—should, while in hospital, be subjected to *energetic treatment* capable at the same time of causing rapid cicatrisation of the contagious lesions and of combating the general infection, and preventing, or at any rate attenuating, subsequent manifestations: treatment *by attack and barrage* against syphilis.

Further, when the syphilitic patient has left hospital, he should continue treatment when with his unit, in

order to prevent relapses of the disease at a more or less distant date : *continued* treatment, prevention of later disturbances.

I shall only describe the treatment of syphilis at the chancral period and at the secondary period ; tertiary disturbances and the sequelæ of syphilis play only a small part in war syphilology.

Period of the Chancre.—Once the diagnosis of chancre has been undoubtedly established, the syphilitic should be subjected to injections of novarsenobenzol *with as little delay as possible*, and sent to hospital for that, as well as to put him out of the way of doing any harm.

It is useful, but not absolutely indispensable, to precede the arsenical treatment by two or three intravenous injections of mercury : I say useful, because I have often seen the chancre partly cicatrise under the influence of these injections alone, and also because a febrile reaction is sometimes produced after the injection of arsenobenzol, and this reaction is attenuated by the initial injections of mercury.

After these injections, one of novarsenobenzol in a dose of 45 centigrammes is given ; eight days later, an injection of 60 centigrammes of novarsenobenzol. *If imperative*, arsenical treatment can be left at that.

Nevertheless, when the chancre has not completely cicatrised 4 or 5 days after the second injection of arsenobenzol, or if the initial dimensions of the chancre were considerable, or accompanied by pronounced adenopathy, or had not been treated until after 15 to 20 days, it is necessary to make a third injection 8 days after the second, of 0·60 gr. of novarsenobenzol. In any case, if military duties do not prevent it, it is advisable to make this third injection.

In the intervals between the novarsenobenzol injections, an *intravenous injection of cyanide of mercury* (1 centigramme) is given daily or every other day ; 12 to 15 injections in all.

As it is preferable not to make the cyanide injection on the day following the injection of arsenobenzol, treatment lasts altogether 18 to 24 days.

On condition that it is followed by regular treatment by mercurial pills, in the way that will be described later on, this is sufficient, *in the great majority of cases*, to protect the man from secondary disturbances : I had practised this method some time before the war with a certain number of syphilitics, and have been able to observe the results.

In any case, if syphilitic manifestations appear later, they are hardly likely to be of any considerable intensity.

As regards tertiary affections, I cannot affirm that they need no longer be feared, but is there any other method of treatment by arsenobenzol in larger and oftener repeated doses that is a certain protection ?

I must mention that, before subjecting the patient to injections of cyanide of mercury, his teeth must be examined, and attended to, if necessary.

At the same time as this internal treatment, it is almost unnecessary to prescribe local treatment of the chancre : washing in boiled water, dressings of wool dipped in boiling water, or, if desired, applications of powder of sub-nitrate of bismuth are sufficient to guarantee its cleanliness and prevent infection. Calomel powder or calomel ointment should not be used, as they cause irritation. Touching or painting with nitrate of silver should also be avoided; it is useless and does not visibly hasten the cure of chancres treated by arsenobenzol, and, in a general way, the use of antiseptics should be dispensed with.

In chancres of the urethra local treatment also consists in washing with boiled water. I do not advise that any dressings should be introduced into the canal ; the patient should drink large quantities of fluid to dilute the urine and render it less irritating.

Chancres of the lips should be dressed with boiled

water, or covered with a piece of thin and clean paper (cigarette paper, for instance); the lips should be washed with boiled water after each meal.

In *chancres of the tonsils* the throat should be irrigated with physiological serum; emollient, carbolic, or iodine gargles may be used.

The Secondary Period.—Not only in cases with active secondary symptoms, but also in those where the chancre is present, but has been untreated, general treatment is almost identical with that of the period of the chancre.

Here, for the reason already indicated—attenuation of the febrile reaction induced by arsenobenzol—it is highly important to precede the novarsenobenzol injections by two, three (even four if cutaneous eruptions and mucous plaques are abundant) *intravenous injections of cyanide of mercury*. Then at weekly intervals, two or more, often three *injections of novarsenobenzol* are made in the doses already recommended (0·45, 0·60, and 0·60), with interpolated injections of cyanide of mercury, so that 15 to 20 centigrammes of cyanide are given during the period of treatment, which lasts from 18 to 25 days.

Once this treatment is over, the patient must continue treatment in his unit with pills of protoiodide of mercury.

While under treatment in hospital, secondary ulcerous manifestations are attended to by *local treatment*: washing of the mucous plaques in the genital region with Labarraque's solution (solution of hypochlorite of sodium) in the proportion of two to three tablespoons per litre of water; cauterisation of the hypertrophic plaques every two days with acid nitrate of mercury,* or, failing that, touching with a nitrate of

* Acid nitrate of mercury is, without doubt, the most active and efficacious caustic for ulcerous lesions of secondary syphilis, especially for hypertrophic plaques. It must be handled with care, otherwise large and deep eschars may be caused. The following technique will guard against any accident: dip a piece of cotton-

silver pencil; touching the buccal mucous plaques with nitrate of silver or with a 50% solution of methylene blue, slight touches of acid nitrate of mercury on the hypertrophic plaques of the lips, tongue, etc.

In *severe ulcerous lesions of the skin* (malignant syphilides), which are very rare, however, in military practice, arsenical treatment must be pushed still further both as regards dosage and duration, and must be continued after the ulcerations are all healed. One should make 5 to 6 injections of arsenobenzol in doses of 0·45, 0·60, 0·60, 0·75, 0·90. At the same time, syrup of iodide of iron should be prescribed, together with a nourishing diet and fresh air.

Certain forms of cutaneous lesions of the secondary period often resist arsenical medication, even if intensive; *papulous syphilides with small papules* (follicular, miliary, lichenoid, and acneiform syphilides). It is necessary in these forms to repeat the injections of novarsenobenzol and combine them with intravenous injections of cyanide of mercury. It is sometimes an advantage to make one or two injections of calomel, and, when the resources of the medical centre permit this, to let the patient have some sulphur baths. But, as these lesions are of slow evolution, neither ulcerated nor contagious, the man is not prevented from performing his military duties, and I do not think it advisable to prolong his stay in hospital. If, at his depot, he can obtain the necessary attention, is doing sedentary work, or is engaged in munition works, from which he can attend, once a week, for an injection of novarsenobenzol, he can be discharged from hospital at the end of 15 to 20 days.

wool rolled tightly around a wooden stick into the solution of acid nitrate, press the stick against the side of the bottle to express any superfluous fluid, gently touch the affected surface with the stick, and, *as soon as it becomes bleached*, pass a thick plug of wadding full of pure water over the surface. Contact with the water will at once stop the pain caused by the acid nitrate, so that cauterisation is much less painful with it than it is with nitrate of silver.

In the case of a syphilitic with secondary lesions, who has already been treated with arsenobenzol, there need be no hesitation in continuing the same drug under the form indicated above, and even in pushing the doses still further, providing that this treatment has not caused symptoms of intolerance.

Some visceral manifestations demand special medication, even contra-indicating the above treatment.

Syphilitic headache at the beginning of the disease, with nocturnal predominance, does not often appear to be very severe amongst soldiers, apart from those who exaggerate it in the hope of escaping either from treatment or from their military duties.

Treatment, according to the foregoing rules, generally causes it to disappear rapidly; very frequently it yields after the first injection of arsenobenzol. Should it persist and prevent sleep, iodide of potassium may be given (1 to 2 grammes daily) or a mild hypnotic (opium).

Should the headache be really intense and persistent, it may be well to make a lumbar puncture, the value of which would be twofold. In the first place, it often relieves the headache; secondly, examination of the cerebro-spinal fluid enables one to find out the condition of the nervous centres; if there is abundant lymphocytosis present, more prolonged treatment should be instituted, especially with arsenobenzol.

Facial paralysis, appearing in the secondary period, with or without previous arsenical treatment, in itself reveals affection of the nervous system, and requires energetic treatment. I consider it is wiser, when it appears during the course of arsenical treatment, to keep to mercury, in the form of intravenous injections of the cyanide, or intramuscular injections of calomel. Treatment should be prolonged till the disappearance of the headache which often accompanies it, and until the paralytic symptoms have become attenuated.

Later, the patient should be kept under prolonged medical supervision and treatment.

Early *syphilitic hemiplegia* also demands energetic treatment, similar to that I have just described for facial paralysis. Although it may be completely cured, without sequelæ, it may lead to temporary or permanent disablement.

The same applies to early *meningitis*.

Iritis is much more frequent than paralysis, and also necessitates active treatment, both arsenical and mercurial. There should be no hesitation in giving 4, 5, or even 6 injections of novarsenobenzol, until a total dose of 2·50 gr. to 3·25 gr. has been reached, and at the same time large doses of mercury should be administered and continued during the arsenical cure. Local treatment should also be instituted, and consists in the use of atropine, alternating or not with that of eserine. In a case where the patient cannot be rapidly subjected to examination by an ophthalmic surgeon, in order to prevent the formation of iritic adhesions, 4 to 5 drops of the following eye-lotion should be used daily by instillation :

Neutral sulphate of atropine	0·10 gr.
Distilled water	10 gr.

Icterus of the secondary period of syphilis should be treated with mercury : intravenous injections of cyanide are nearly always tolerated well, but all the same their effects must be watched carefully, on account of intestinal hæmorrhage. In default of these injections, recourse may be had to intramuscular injections of soluble salts, and the internal use of calomel in small doses. Opinions differ as to treatment with arsenical compounds. Owing to the eclective toxicity of arsenic for the liver, I consider that it is better not to have recourse to it during the presence of icterus, nor till the liver has regained its normal volume. Also the diet must be attended to very carefully.

Syphilitic nephritis, manifested by hæmaturia and albuminuria, which is often considerable, requires great care in the administration of active anti-syphilitic drugs.

If it is evident that the albuminuria is due to syphilis, and is not of long standing and due to pathological conditions prior to syphilitic infection, anti-syphilitic drugs are indicated; but, as these medicaments are more or less toxic for the kidney, and may add their action to that of the syphilitic virus to form a chronic and incurable lesion, rapid but not too intensive action is required.

Intravenous injections are followed by rapid elimination of mercury by the kidneys; it is dangerous, therefore, to give too high doses, especially at the beginning of treatment. In such cases, it is my custom to give the injections every day in small doses, beginning with 0·0025 gr. increased gradually to 0·005 gr. and 0·0075, and, if the albuminuria does not increase, up to a centigramme at the end of eight to ten days. The albuminuria has then generally decreased slightly and the use of novarsenobenzol may be commenced; but only in small doses, 0·15 gr. or 0·30 gr. at the maximum. While carefully watching the urine, the doses of novarsenobenzol are raised to 0·30 gr., 0·45 gr., 0·60 gr., the last being repeated until a total of 2·50 gr. to 3 gr. has been reached.

At the same time, the patient is kept in bed until the albuminuria has disappeared, and put on milk diet.

Lesions of the muscles and bones rarely attain any very considerable degree in secondary syphilis, and only exceptionally necessitate any special treatment. Nevertheless, osteitis causes osteocopic pains which may prevent sleep. Mercurial, and especially arsenical, treatment acts very effectively on these pains. Sometimes, however, it is preferable to administer iodide of potassium (1 to 3 grammes daily) at the same

time as mercury. Local applications, especially mercurial plasters, combine the resolvent action resulting from their composition and the slight absorption of mercury with an analgesic action of occlusion. Sometimes it may be necessary to have recourse to hypnotics: opiates, bromide, and even chloral, at least during the early days of treatment, and until this has acted on the lesions.

Continued Treatment.—The preceding treatment is destined to combat active syphilitic manifestations, to hasten the disappearance of contagious lesions, and check syphilitic infection so as to attenuate later manifestations. It is insufficient to prevent the return of syphilis, or its hereditary influence.

It is necessary, therefore, that it should be followed by complementary treatment, and prolonged during several years.

On leaving hospital, the syphilitic must be informed that it is imperative for him to continue treatment during an adequate period. To be realised practically, this continued treatment must be simple, and not interfere with the performance of his duties.

In the Army several conditions have to be considered.

At the Front there is only one method of treatment which is suitable, the use of pills, tabloids, or cachets of protoiodide of mercury, in the dose of 10 centigrammes of protoiodide daily, in 4 pills. The periods of treatment, as a general rule, will be regulated in the way to be described later.

Should any contagious disturbance appear, the patient will be again sent to a venereal centre.

Should a non-contagious manifestation appear, which does not prevent military service, the patient should take a larger dose of protoiodide (five to six pills daily) and during a longer period, while on duty.

Sometimes, however, when the regiment is resting and in the proximity of a venereal centre, or is provided with a competent medical man, the patient may be

given one or two injections of arsenobenzol, or some soluble mercurial injections.

In the *depots* and *sedentary services* preparations of protoiodide are also the most suitable for continued treatment; but it is more feasible to make use of injection. Whenever indicated, injections of arsenobenzol may be made; these only necessitate a day, or half a day's, absence from duty. If the doctor is accustomed to making intravenous injections, it will be easy to arrange it. As to intramuscular injections, soluble or insoluble, these should be reserved for men whose duty will not be interfered with by a slight and temporary pain on walking.

For munition workers, whose mode of life differs but little from that of workmen in times of peace, treatment is easier to carry out.

Whenever possible, it is advantageous to make two or three injections of novarsenobenzol in doses of 60 centigrammes, at intervals of eight days, about two months after the initial treatment in hospital. Each of these injections only necessitates rest for a day or half a day, and could be made either at the end of the day or at the time of the half-weekly rest.

Mercurial treatment can be carried out by means of pills, as with the soldiers at the front; but, in any case, it is preferable to give injections, either intravenous of cyanide, or intramuscular of soluble preparations, when the medical service allows patients to submit, without loss of time, to an injection every second day, or to injections of grey oil when it is only possible to give them once a week.

Continued mercurial treatment, no matter what preparations are used for it, should be carried out, as far as possible, on the following lines, from the point of view of periodicity and duration: First, 20 days per month during the 3 months following hospital treatment.

For the next 9 months, 12 to 15 days per month,

and during the following year 12 to 15 days every two months.

Later on, mercurial treatment should be repeated during 2 or 3 years, twice a year for 40 to 50 days.

It must be again emphasised that, during the course of this treatment, the patient must take care of his teeth, and brush them every day; that treatment must be suspended if troubles attributable to the mercury occur—salivation, stomatitis, diarrhœa—to be again resumed later with precautions; that, if syphilitic symptoms appear, mercurial treatment must be reinforced or completed by injections of arsenobenzol according to the nature and gravity of the disturbances; in a word, it must be adapted to the indications presented.

It may be remarked that, in the regulation of this treatment, I give no place to the indications furnished by *the Wassermann Reaction*. Besides being difficult to carry out regularly with all the patients during the course of their disease, I consider, with many authors, that this reaction is of *no value* from the point of view of indication and regulation of treatment. It is an excellent diagnostic method within the limits where its accuracy can be relied on; but, whatever one may say, it does not furnish a single precise fact as to the possibility of the return of syphilitic disturbances. It may be negative in patients who, a few days previously, presented severe symptoms; again, it may be positive at a given moment, and then become negative without the patient having received any treatment.

Having regard, on the one hand, to this uncertainty, and, on the other hand, to the well-known preventive action of mercury employed in the form of successive treatments during the first years of infection, patients should be given the benefit of repeated intermittent mercurial treatment without paying any attention to the results of the serum-reaction.

CHAPTER VI

TECHNIQUE OF INTRAVENOUS INJECTIONS

As we have seen in the preceding chapter, intravenous injections play an important part in the modern treatment of syphilis. Although they do not constitute a method reserved exclusively for syphilis, and are to-day largely used in therapeutics, it seems necessary that I should here give details of the technique. The following description will, I believe, enable any medical man, who will follow it regularly, to perform the injections without any great difficulty.

Nothing is so good, however, for perfecting the technique of injections as frequenting a hospital where they are performed constantly.

Instruments

The apparatus required for intravenous injection is very simple. All the essentials are found in every medical centre, and, being constantly used for the most varied diseases, they are always kept in stock.

It includes :

(1) *An all-glass syringe*, with a capacity of 1 or 2 cubic centimetres, for injection of cyanide of mercury, and 2 cubic centimetres for concentrated injections of novarsenobenzol. In case of urgency, one might use a syringe of 1 cubic centimetre for the latter, when 30 centigrammes of arsenobenzol are injected, and fill it twice for higher doses. Syringes holding 5, 10, and 20 cubic centimetres may also be used for injecting

2 cubic centimetres of the solution, but they necessitate the use of an intermediary nozzle, which may get lost, and, owing to the size of the piston, this requires a greater effort of pressure ; it is therefore, preferable to use a syringe with a small capacity.

(2) *The needle.* Any needle that pierces well and is not too large is good, on condition that the operator knows how to use it.

The bevel of the needle should be as slight as possible, so as to avoid an accident, to which I shall refer

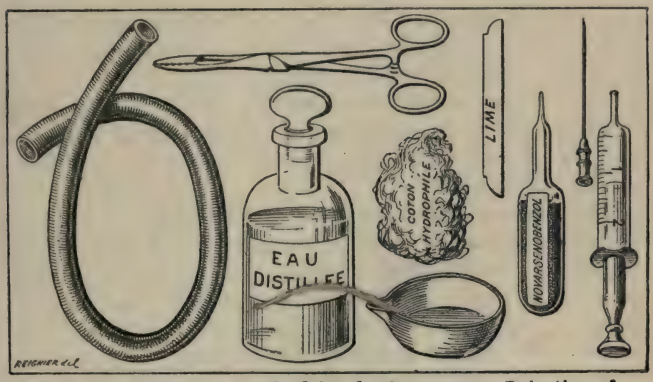

FIG. 1.—Apparatus required for the Intravenous Injection of Novarsenobenzol.

later on ; but it must not be too flat-nosed, because needles of this kind pierce badly.

I much prefer needles of *steel* to those of either platinum or nickel, as they pierce better ; if they are well taken care of, *i.e.* are kept greased, they do not become oxidised and last for a long time ; further, they can be easily sharpened, and are not expensive. There is no advantage in a platinum needle, especially as for intravenous injections it has always to be sterilised in an autoclave or in boiling water ; if sterilised in a flame, there is always danger of the

formation of carbon concretions in the bore of the needle.

Some medical men have suggested various devices, such as the use of a rubber attachment to the syringe. Clement Simon * has devised a bent attachment to the syringe, in order to facilitate the introduction of the needle into the vein, and allow of its being directed almost parallel to the skin. When it is only necessary to inject a small quantity of fluid (1 or 2 cubic centigrammes), these arrangements have the inconvenience of making the amount of drug injected uncertain. They have no practical advantage; they are easy to lose, and difficult to replace.

(3) A *rubber tube* for a tourniquet.

(4) If the medical man works alone, or with a somewhat inexperienced assistant, he must have a pair of pressure forceps to fix the tourniquet.

(5) *Absorbent wool.*

(6) An *antiseptic fluid* for disinfecting the skin. I advise the use of alcohol or ether for asepsis before making the injection, because they are colourless, and do not cover up the vein, and tincture of iodine for aseptic purposes after the injection.

(7) The *product to be injected.*

Also, if novarsenobenzol is to be injected:

(8) *Distilled or boiled water* for making the solution †; and

(9) A *small receptacle* (porcelain or glass) for making the solution, although the ampoule containing the drug may be sufficient.

* Clement Simon, "Technique of Intravenous Injections" (*Journal de Médecine et de Chirurgie pratiques*, June 10th, 1918).

† As novarsenobenzol is completely soluble in water, it is not necessary to filter the solution, and the expensive and fragile apparatus provided for filtration is useless if care is taken not to aspirate the very last drops of the solution into the syringe.

When boiled water is used, one must be certain of its filtration without risking contamination. Ravaut has proposed a very simple device for this purpose. This consists in applying the extremity of the syringe against the wall of the receptacle in which

The syringe, needle, and receptacle intended for preparing the novarsenobenzol solution must of course be sterilised, either in a steriliser or by prolonged boiling in pure water. In places where the water is very chalky, in order to avoid precipitation of carbonate of lime in the needle, syringe, or receptacle, sterilisation must be effected either by distilled water, or water which has already been boiled, and decanted.

Mode of Operation

The liquid to be injected having been prepared and aspirated into the syringe; this, armed with the needle, is placed on a table close to the operator; it rests on a sterilised compress, or simply on the edge of the table in such a way as to avoid contact with any non-sterilised object. The table should by preference be to the right of the operator.

He places the patient opposite to him, seated on a chair, or sits down beside the bed in the exceptional cases in which the patient cannot get up. The patient's arm, bare to the middle of the biceps, rests either on the knee of the operator, on the edge of the table, or, more preferably, is held by the operator's left hand. The rubber tourniquet is applied at the junction of the middle and lower third of the patient's arm, stretching it before encircling the arm. If the operator is alone, he clips the band by means of pressure forceps, taking care not to catch up the skin. If he has an assistant, the latter holds the tourniquet

the water has been boiled, interposing a tampon of wool, which has also been boiled, and aspirating slowly; the wadding acts as a filter, which the fluid is compelled to pass through in order to penetrate into the syringe.

A glass tube, open at the end, can also be immersed in the receptacle while the water is boiling; for example, the body of a large-sized syringe, at the bottom of which a tampon of wool has been carefully placed: the water passes through the wool filter before flowing perfectly clear into the upper part of the tube, or it can be aspirated with the needle.

tight until the needle has been inserted into the vein.

At the same time, if the veins are not very prominent, the patient is told to close the fist or flex and extend the fingers, so as to make the veins swell. The operator, or his assistant, rubs alcohol or ether over the bend of the elbow.

The next step is to select the vein into which the injection is to be made ; all veins at the bend of the elbow, of the lower part of the arm, and upper part of the forearm, may be utilised. With the majority

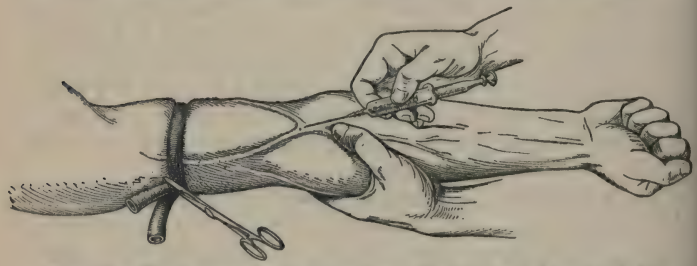

FIG. 2.—*First stage of the injection.*—Position of fingers of the right hand holding the syringe. Position of left thumb holding the vein. The syringe is directed in the axis of the vein and almost parallel to the surface of the limbs.

of vigorous men, all veins are equally apparent and may be used with equal propriety ; with patients who have already had injections, there may be venous indurations, which limit the extent of utilisable vessels. The operator chooses preferably not from amongst the most visible and most distended veins, but from those which are most swollen and most perceptible to the touch. In patients whose veins are but slightly apparent, or in whom the development of subcutaneous adipose tissue is similar to that of a woman, the veins can be felt by palpation.

The operator then takes the syringe armed with the needle in his right hand, holding it between the thumb

and fingers, the little finger being left free to act as a support on the patient's arm. He traces the vein with the index finger of the left hand ; then, having clearly determined its position and direction, grasps the patient's arm with the left hand in the following manner : the palm and four last fingers are applied to the posterior surface, while the thumb, placed on the anterior surface, draws down the skin along the selected vein, so as to fix it and prevent its slipping from under the needle (see Fig. 2, page 154).

The needle is held with its bevel turned up at an

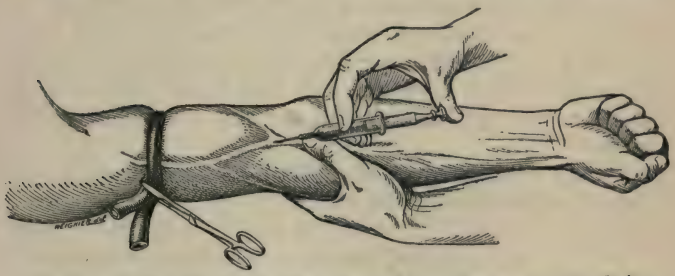

FIG. 3.—The needle has been inserted into the vein, while being held parallel to the skin. Blood has flowed into the body of the syringe. New position of the fingers of right hand : the thumb holds the extremity of the syringe before injecting the solution. The left thumb has not been moved.

acute angle almost parallel to the surface of the limb. The operator introduces it in the direction of the vein, puncturing the skin, then pressing forward almost immediately to penetrate the vein ; in this second movement it is necessary to further reduce the angle of the needle with the skin and direct the needle almost parallel with it (see Fig. 3).

The penetration of the needle into the vein is signalled at the same time by a feeling of void at its extremity, and by the penetration of blood into the body of the syringe. Sometimes, however, blood does not at once flow into the syringe, although one is convinced

that the syringe is in the vein ; it is only necessary to make slight traction on the piston with the left hand to see blood flow into the syringe.

If the needle has not penetrated the vein at the first attempt, it should be withdrawn gently and a fresh attempt made to introduce it. In the case of failure, make a fresh puncture of the skin at a different place, where the position of the vein appears more favourable. Care must be taken, however, in the event of the puncture of the skin having drawn blood, to make the fresh attempt on the other arm.

It sometimes happens that the needle is blocked by a small clot of blood, which prevents the blood from flowing into the syringe ; therefore, before attempting to make a fresh injection, it is well to convince oneself of the permeability of the needle, by pressing the piston.

When the operator is certain that the needle has penetrated the vein, the rubber tourniquet is loosened. He now has only to push the contents of the syringe into the vein ; for that he exercises continuous pressure on the piston, either by means of the right thumb, the syringe being held in position between the index and second and third fingers, the little finger still serving as a support (see Fig. 4, page 157), or by means of the left hand.

At this stage it is necessary to be certain that the fluid is flowing into the vein, and has not been introduced either into its wall or into the perivenous cellular tissue. The penetration of fluid into the tissues causes immediate pain, both with cyanide of mercury and novarsenobenzol ; directly the patient experiences any pain other than the very slight one of piercing the skin—which moreover is caused at the beginning and not during the course of the injection itself—the operation must be stopped at once, an attempt made to place the needle more correctly, or, better still, recommence the injection at another place.

Another indication of this escape of fluid is the production of œdema at the seat of puncture. The operator must keep his eye on the operative zone during the whole course of the injection : at the slightest swelling of this region he must suspend all pressure of the piston.

Any abnormal resistance of the piston to the thumb must give rise to fear that the fluid has passed into the venous wall. When this is felt the piston must be gently withdrawn ; if the needle is in a good position, blood flows into the syringe ; if it does not, the needle must be immediately withdrawn.

FIG. 4.—The tourniquet has been removed. The right thumb pushes the injection into the vein. The left hand supports the forearm.

If a little air has got into the syringe, it is best to stop the injection before the piston has got to the end of its course, although the introduction of air into the veins is not so dangerous as was formerly supposed.

Once the injection has been made, it is well to draw back the piston and withdraw a few drops of blood, to relieve the extremity of the needle from the caustic fluid which, by drying on the venous wall or in the cellular tissue, might cause an inflammatory reaction.

It only remains to withdraw the needle and put a tampon of wool soaked in alcohol, or, better, in tincture of iodine, on the puncture.

After the injection is finished the patient may go

back to his work, except after injections of novarsenobenzol, when he must rest for a while.

If a few drops of blood issue from the little wound, this hæmorrhage can be easily overcome by putting a tampon of wool on the puncture and telling the patient to flex his elbow strongly for some minutes.

After the injection, the syringe must always be carefully washed in cold water, and the needle must be syringed through several times to prevent any blood remaining and coagulating. If a steel needle is used, it must be dried by air, injected with vaseline and greased with the latter.

Intravenous injection, despite the minute technicalities I have just described, is nearly always a simple and easy operation which can be performed by any careful and fairly skilful surgeon. After a few days' practice it can be made very rapidly, in fact, quite as quickly as a simple subcutaneous injection. In my hospital clinic, with one assistant compressing the arm, and another cleaning the syringes and needles, and having them boiled, my pupils succeed in making sixty injections in an hour, including the time necessary for charging the syringes. I have even seen pupils make as many as thirty injections, without accident, in a quarter of an hour. It is, therefore, not difficult in a venereological section on active service to treat the majority of patients by this process, on condition that the assistants are intelligent, careful, and well trained.

It must be recognised, however, that with certain subjects an intravenous injection presents certain difficulties. This is rarely the case with vigorous adult men, with whom alone we have to deal here. Sometimes, however, the veins at the bend of the elbow are small, buried in adipose subcutaneous tissue, and difficult to find, even on palpation. If none can be felt in this region, the injection must be made in the forearm, where it is rare not to find a sufficiently

large vein on the outer side ; the position the patient is obliged to assume to present it to the operator is uncomfortable for both, but the injection is possible. It is only as a last resource that an injection should be made in a vein of the lower limbs, because, owing to the frequency of varicose veins, infection is easier and more serious than in the upper limbs.

One difficulty may arise, not from the smallness, but from the mobility of the veins, which sometimes causes inconvenience to beginners : the vein slips away and cannot be perforated by the needle. To prevent this, the best method consists in holding the vein in position by means of the left thumb, in the way I have recommended above. It has also been proposed that, instead of piercing the vein in its prominent part, it should be approached laterally, by introducing the needle into the skin a little outside the vessel, and then pushing it slowly towards the vein ; the limit of its elasticity is soon reached, it ceases to escape from the point, and can be perforated by the needle ; when penetrated, the vein becomes distended and resumes its normal position.

Operative Accidents

The only operative accidents which may result from an intravenous injection are the introduction of the injected fluid into the venous wall, and its penetration into the perivenous cellular tissue.

Intraparietal penetration may occur when the orifice of the needle is too elongated. It may happen that the orifice is partly in the internal tunica of the vein and partly communicates with the lumen ; when the operator aspirates the syringe, blood flows into it, and the operator consequently believes that he is in the lumen of the vein, but the remainder of the orifice of the needle draws the injection fluid into the vascular wall itself. This causes immediate pain,

followed by an inflammatory reaction with painful induration which persists for several weeks, and may hinder the continuation of treatment.

The penetration of the fluid into the perivenous cellular tissue may occur either from the side or front of the vein, or behind, when the needle has been introduced roughly or at too wide an angle, and has passed through the vein from one side to the other. This penetration, as I have already stated, may be avoided or arrested at once, if care is taken to watch closely the injection zone, and the patient is advised to at once report any unusual pain. With cyanide of mercury and novarsenobenzol, which are very irritating substances, there is acute pain, the production of a more or less extensive inflammatory nodule, and often an eschar which may attain the dimension of a shilling, become detached slowly, leave a loss of substance, and ultimately an adherent cicatrix.

When this accident is observed, the intensity of inflammation and subsequent dimensions of the eschar may be notably reduced by immediately performing massage of the region, so as to cause reflux of the greatest possible quantity of noxious fluid by the track of the needle. Further, compresses soaked in fresh water should be applied at once and renewed frequently.

It is not rare, even after an injection which has been properly performed, for a subcutaneous ecchymosis to appear, due to infiltration of blood from the passage of the needle into the cellular tissue : this is an incident of no importance.

Some patients complain of acute pain the moment the skin is pierced, which persists for some minutes extending down the forearm. This occurs when a nerve filament has been injured by the needle, but this pain never lasts long.

Finally, with the exception of eschars, which may be avoided almost entirely, given careful technique,

there are never any accidents of importance caused as the result of intravenous injections. I do not know of a single case of subsequent embolism, even if venous indurations have developed.

Precautions to be taken after Intravenous Injections of Cyanide of Mercury

Mercury, injected into the veins in the form of cyanide, is absorbed very rapidly, much more so than with any other form of mercurialisation. This is one of the advantages of the method, but it may result in the possibility of an accident, which must be recognised and warned against—mercurial colitis.

Certain subjects, the majority having previously suffered from digestive disorders, some hours, or perhaps even within an hour, of the intravenous injection of cyanide of mercury, are suddenly seized with acute pain in the region of the colon, violent rectal tenesmus, more or less copious diarrhœa, with first sanguinolent, than hæmorrhagic stools. These symptoms may last one, two, or three days, and, owing to the loss of blood, cause pronounced anæmia. Treatment consists in the internal use of opium in adequate doses, the administration of emollient enemas, and application on the abdomen of wool soaked in laudanum or large linseed poultices with laudanum.

These accidents may be prevented almost certainly if, at the time of injection, the patient is given an opium pill of two or five centigrammes, as I have made a rule of doing in my hospital clinic.

It may be mentioned that these accidents are produced almost exclusively after the first or second injection of cyanide. With subjects who seem predisposed to intestinal troubles and with elderly or exhausted patients, I have, therefore, made it a rule to give the first injection of cyanide in a dose of half

a centigramme, or even of a quarter, and increase this gradually.

When the patient has had an attack of colitis after the first injection of cyanide, treatment may be resumed with this method later, after waiting a few days and recommencing with small doses of cyanide.

Injections of cyanide of mercury must also be used with circumspection in the case of albuminuric patients. Some patients have a recrudescence of their albuminuria after the injections, resulting from the irritative action of mercury on the kidneys. Treatment must not be continued with these patients. With others, no disturbing effects at all are noticed, but both urine and diet must be under constant supervision.

As with all mercurial treatment, the teeth and gums must be examined before giving cyanide of mercury injections, and kept under observation during treatment. However, owing to the rapid elimination of the drug, stomatitis is rare in patients treated by this method.

All the same, if only by way of precaution and to accustom the patients to take the necessary care of their mouth and teeth during mercurial treatment, they must be ordered to wash out the mouth twice daily with white soap or with a tooth-powder containing a sufficient proportion of soap.

Precautions to be taken after Intravenous Injections of Novarsenobenzol

As I have shown above, the after-effects of arsenobenzol injections are generally mild. Especially with the method of concentrated injections, these are nearly always reduced, when they do occur, to transient rise of temperature, of which the patient has sometimes no knowledge.

But, in order to obtain this result, it is necessary that the patient should have only had light food, not

less than three hours before the injection, and that, afterwards, he should keep quiet and be dieted.

For hospital patients, rest in bed immediately after the injection, and for the whole day, is the rule.

When patients only come into hospital for the injection, they can return home at once on foot, if they live near, otherwise drive, and go to bed for the day. They can resume their ordinary work the following day.

During the day following the injection, they must be kept on a strict diet ; water and liquids are alone permitted ; at most they may be allowed some soup or an egg five hours at least after the injection.

I have seen patients seized with rigors, intense fever, profuse sweating, and repeated vomiting, after having disobeyed these orders and taken even a light meal.

CHAPTER VII

HYGIENE OF SYPHILITIC SOLDIERS

HYGIENIC measures, although often neglected, are of the utmost importance in syphilis.

A considerable number of these measures are superfluous, or impracticable, in the case of soldiers. There is no need, in the Army, to recommend rest, fresh air, moderate exercise and no late hours, such as are prescribed for civilians.

Useful advice, which can be put into practice when the men are in camp or at the base, is to keep the body clean, especially the genital organs, by means of washing, baths, or douches ; these are precautions all soldiers should take whenever they have the opportunity.

The following advice is specially suitable for syphilitics.

(1) *Suppression of Tobacco.*—This should be proscribed for all syphilitics, at any rate during the first year of the disease. Tobacco, no matter under what form, pipe, cigarette, cigar, or quid, is the principal exciting cause of buccal mucous plaques. A syphilitic, who is well treated, and neither smokes nor chews, is almost certain to escape them. In hospital, the doctor must insist upon total abstinence from tobacco for all syphilitics.

When the man has returned to his unit he often ignores this prescription ; it is the duty of the medical man to remind him of it. When a patient has had

numerous recurrences of buccal mucous plaques, and continues to smoke despite repeated orders to the contrary, he should be threatened with military punishment.

(2) *Hygiene of the Mouth.*—After the use of mercury, stomatitis often develops in patients whose buccal mucous membrane is not in good condition, especially in the region of the gums and teeth. It is indispensable that all syphilitics should take particular care of the mouth.

The patient's teeth must be examined before treatment is commenced, and, if necessary, they must be cleaned by a dentist, and all bad teeth stopped. During mercurial treatment this examination should be repeated.

Further, every day during mercurial treatment, the teeth and gums should be cleansed twice or even thrice with a brush, soap and water, or with a powder containing soap.

Salol, frequently recommended for cleansing the mouth, has an irritant action on the skin, and often causes eczema of the labial commissures ; any preparations containing it should be severely avoided.

Many medical men prescribe mouth washes of chlorate of potash for their syphilitic patients. This solution has merely a detergent action and has no advantage over simple boiled water. As a prophylactic measure against mercurial stomatitis, it is far inferior to a soap-wash. Hence, I see no reason for recommending it.

(3) *Drinks.*—Syphilitics must avoid the abuse of alcohol, take wine moderately, and refrain from all liqueurs and spirits.

(4) *Clothing.*—Mercury easily induces diarrhœa; syphilitic patients should, therefore, avoid getting cold in the abdomen, and a flannel cummerbund is recommended.

(5) *Sexual Relations.*—Syphilitics should refrain from

sexual intercourse during the first months, even where no contagious lesion is to be found on the genital organs. As a matter of fact, the blood is contagious at this period, and there is always risk of an excoriation being produced during the sexual act.

The patient must be advised as to the dangers of contagion, of the lengthy period during which it may exercise its influence, and of the necessity for consulting a medical man before marriage, or, in the case of married men, of resuming marital relations.

CHAPTER VIII

PROPHYLAXIS

THE prophylaxis of syphilis concerns not only the military, but also the civil population, more than any other contagious disease which may attack the Army, owing to its conditions of transmission. It constitutes a social danger, against which every competent and authorised effort should be directed, for it can only be combated by measures carried out by the combined action of the military and civil authorities.

These measures, of unequal importance and variable scope, should be carried out with vigilance, energy, and perseverance if satisfactory results are to be obtained. They concern men who are infected with syphilis, men who are not infected, and women who may contract and transmit the disease. They may be classified in two main groups :

1. Measures intended to prevent infected men from transmitting syphilis ;

2. Measures intended to prevent healthy men from contracting syphilis.

NECESSARY PRECAUTIONS FOR PREVENTING THE TRANSMISSION OF SYPHILIS BY INFECTED MEN

These measures are all within the province of the military authorities ; they are given in simple rules or circulars emanating from headquarters, and can be easily applied.

The majority of these measures were already in

force in peace time; the increased frequency of syphilis as the result of the war renders their execution much more urgent: the circulars of the Under-Secretary of State of the Army Medical Service, dated January 5th and September 25th, 1916, set these out officially.

The carrying out of these measures really depends less on the officer in command than upon the doctor, whose duty it is to see that they are performed in each particular case.

Isolation of Syphilitic Carriers of Contagious Lesions

Syphilis is transmitted exclusively by direct contact of the secretion product from one of the lesions. Thus, it can only be transmitted by *open* syphilitic lesions, and then only during the early stages; later ulcerative lesions are only exceptionally contagious.*

On the other hand, these open lesions become cicatrised, either spontaneously, or under the influence of treatment in a relatively short time. As regards treatment, I have shown that the cicatrisation of a chancre, or of mucous plaques, subjected to energetic medication at once is a question of fifteen to twenty days at the utmost.

Therefore, to prevent a syphilitic patient from doing any harm, it is necessary, and in all probability sufficient, to isolate him during fifteen to twenty days, both in the case of infective chancre, and mucous plaques of the genital organs, anus, mouth, or pharynx.

As a rule, these symptoms attract the attention of the patient sufficiently to induce him to consult the doctor.

All the same, it is imperative that all syphilitic patients should be examined by the medical officers of their company: many pay little attention to a

* Transmission by blood does exist, but it is so rare that it need not be taken into account in prophylactic practice.

small, painless sore, causing no inconvenience, of which they suspect neither the nature nor danger, especially if it be a dwarf chancre or single mucous plaque. Some are afraid of being sent to hospital, or deprived of leave, if they complain of a lesion of the genital organs, while others, again, dread treatment or fear to divulge their malady.

In short, despite the recommendations and good intentions of the medical officers, many syphilitics escape examination and remain in the regiments, unless the doctors have permission to search for them and succeed in running them to earth.

Medical Inspection

Even in times of peace, regimental orders provide for the *medical inspection* of the men, especially as regards venereal disease, at the time of enlisting, and when going on leave and returning.

These visits include examination of the genital organs, anus, and buccal cavity. In order to be really efficacious in the discovery of the great majority, if not of the total number, of syphilitics, the medical man must bring to bear on the case careful attention, and genuine knowledge of syphilitic disturbances of the skin and mucous membranes.

Two conditions are demanded, which are not always forthcoming :

(1) Sufficient time for the examination of each man, which is not possible in many circumstances, especially at the departure for, and return from, leave.

(2) Proper lighting arrangements and instruments necessary for the effective examination of the patients. These requirements are far from being satisfactorily fulfilled in a hut or tent where the light is often bad. As to instruments, these are nearly always rudimentary, and the doctor has to make the most strenuous efforts to see the different parts of the buccal cavity.

It is hardly necessary to mention that all men should be compelled to attend the visit of inspection. Control by the commanding officer and supervision by the non-commissioned officers are indispensable, when certain men who, knowing they are syphilitic, try all they can to evade detection.

The order which, in time of peace, releases non-commissioned officers from medical inspection, does not hold good during war, and should be abolished. It is necessary owing to the conditions of common life in camp, the fact of N.C.O.'s being often younger than their men, and especially on account of the great frequency of syphilis.

It seems difficult, but should be legitimate nevertheless, to compel officers to submit to medical inspection : it is due to medical men attached to the Army to use their influence with officers, and persuade them to consult them on the slightest suspicious manifestation.

The ministerial circular of April 7th, 1912, advises monthly medical visits of inspection. This periodicity is inadequate. The circular issued on September 25th, 1916, was right in advising that they should be made twice a month. To be really efficacious the visit should be a surprise one.

Regulations order the medical inspection of all men starting on leave and forbid that any soldier carrying contagious symptoms should be allowed to go, and another inspection when the men return from furlough. I doubt whether this second order, which is quite rational, is often put into practice.

The visits are made in the *companies of the regiment*, the depots, and the majority of the services in a more or less regular manner, and too much pressure cannot be brought to bear on the doctors as to their importance. In any case, it is imperative that they should also be made in munition works and on all *mobilised workmen*, whether French or belonging to Colonial contingents,

who are working there. These men are under military control, but have more opportunities and facilities than soldiers at the front for contracting and disseminating syphilis, and do not neglect them ; moreover, they are very often infected, and in a higher proportion than occurs in soldiers at the front. They should, therefore, be compelled to submit to medical inspection, which should be as rigorous as that of the latter. It would be easy for some arrangement to be made between the medical men and managers of munition works, in order that the inspection could be made at an hour when it would not interfere with work.

Similarly, in the *medical centres* inspection should be made of men who, while under treatment, are given leave to go out, even if only for a few hours. In small localities, as in large towns, a great number of them contract syphilis. The majority, whose manifestations are very evident, cannot dissimulate their condition to the doctor in charge, who takes the necessary precautions ; but a certain number of them escape medical control and treatment. Very justly, the circular of September 25th, 1916, prescribes that all wounded under treatment at the different centres should be subjected to bi-monthly inspection, and, in case of venereal infection, treated whenever possible like the men in the depots. I have reason to believe that this inspection is often neglected ; it would be invaluable in places where the wounded are kept long, but have frequent leave, particularly in physio-therapeutic, mechano-therapeutic, and neurological centres.

Syphilitics and Hospital Treatment

Every syphilitic patient, who is a recognised carrier of one or more contagious manifestations, should be sent to hospital, at any rate until these symptoms disappear. This is the absolute rule laid down in the circular of

September 25th, 1916, which orders that any patients suffering from chancre or the slightest suspicious erosion must be sent to a venereal hospital. No exception can be allowed, at any rate as concerns soldiers and non-commissioned officers, no matter what their position or employment.

The same rule should be established for officers, but it might be difficult to get it accepted : it is due to the medical officer to decide in each particular case what is best to be done, having regard to the usefulness of the officer in his position, and the precautions he is able to take against disseminating the disease. If hospital treatment is necessary, the medical officer should assert his authority, in order to get this effected ; otherwise, he must carry out energetic treatment himself.

The hospital should be made an absolute rule for all men mobilised in munition works, because they are the most dangerous to the civil population in which they live. Some doctors, in charge of the medical inspection of munition works, when consulted by a workman with chancre, give him a fortnight's rest, so that he may be treated. This practice is deplorable. In the majority of cases, the workman waits some days before going to a hospital, receives a prescription, which is often inadequate, uses it badly, and when the fortnight is over, during which he has rarely failed to contaminate some woman, his chancre has not healed. Every time a mobilised workman has consulted me I have refused to give him a prescription and ambulatory treatment, and have sent him to the doctor of his works with a note indicating the necessity for his being sent to hospital, and I must acknowledge that he has always sent the patient back to me with this object.

Similarly when, from physio-therapeutical or neurological centres, a wounded soldier under treatment has been sent to me with a syphilitic chancre or mucous

plaque, the medical man in charge arranges to send him to me every day, if necessary, for an injection.

Sending a patient to hospital implies really that he will get *active syphilitic treatment* in order to reduce internment to a minimum. I have insisted upon this sufficiently when describing the treatment of syphilis and need not revert to it. The mere fact of being in hospital, in the majority of cases, allows energetic anti-syphilitic therapy. The Under-Secretary of State has insisted upon this very rightly since January 5th, 1916.

In the case of contagious syphilis, the patient, when in hospital, must be isolated; that is to say, during his whole sojourn he must not be allowed to go out, on any pretext whatever. That is evident. In exceptional cases, permission may be given to patients to go out, if their time in hospital has been prolonged by more or less grave general symptoms, or intercurrent diseases; but only on the strict condition that there are no longer any active contagious lesions.*

On leaving hospital, there is no reason for sending syphilitic patients on furlough, as is usually the case with wounded and sick soldiers evacuated from the Front. There is no medical reason why they should not at once go back to duty; their general condition is seldom changed by the disease, and even intensive arsenical medication improves nutrition so much that syphilitics are often in a better condition of health when leaving hospital than they were on admission.

On the other hand also, the concession of leave when discharged from hospital would constitute a sort of premium on the reproduction of syphilitic symptoms, and, if syphilitics are not to be punished

* As refusal of leave is not intended as a disciplinary measure, the remnants of the old-fashioned ideas with regard to "secret" or "shameful" diseases, but merely as a hygienic precaution, it is not well to refuse permission to syphilitics suffering from tertiary lesions, whether ulcerous or not, as there need be no fear of their spreading contagion.

for having contracted the disease, it would be a pity for them to obtain a benefit from it, in the form of leave.

There is justice, therefore, in the circulars of January 5th and September 25th, 1916, having ordained that, on principle, neither leave nor convalescence should be granted to venereal patients when discharged from hospital.

Locality of Hospitalisation for Syphilitics.—As a general rule, they should be sent into hospital as near their military post as possible.

A syphilitic soldier should never be evacuated from the Front to the interior, except in the case of serious complications. It is important to keep him close to his regiment, so that, directly the treatment is finished, he can rejoin ; instructions are positive on this point, and there is no necessity to justify them.

Even in the interior, the patient should be kept as near his centre or depot as possible.

But, along with this rule, another element must be taken into consideration : the necessity of seeing that the patient is given thorough treatment, *i.e.* he should be placed in a medical centre supplied with all requisite resources, not only in material installations, but also as regards a competent medical staff.

No matter what one may think, the diagnosis and treatment of syphilis necessitate an adaptation of material and staff in order to be carried out with a minimum of expense, time, and risk.

The creation of venereological centres, or dermato-syphiligraphic centres, has been realised very happily, in the army zone, as well as in the interior.

There is no doubt that expert medical men, understanding syphilis and its treatment, may be found in all the centres, and I am acquainted with a fair number of doctors attached to regiments, ambulances, and temporary hospitals, who are capable of guaranteeing the treatment and recovery of their syphilitic patients

under the best conditions, and in whom one may have confidence. In certain cases, there may be an advantage in not removing the patient from his unit and centre, but this is applicable only in particular cases. The general rule, to which one must bow in the majority of cases, is to send syphilitic patients to hospital, or to a centre specialised for the treatment of syphilis : in the army zone, to a hospital placed in an important medical centre ; in the interior, to a special hospital clinic, or dermato-syphiligraphic centre of the region. The number of these clinics and centres cannot and should not be very considerable ; it must vary according to the regions, and may even vary at different periods, increasing if the number of syphilitics suddenly becomes visibly augmented. They should be situated in the neighbourhood of large military and hospital agglomerations, so as to reduce simultaneously the number and length of movements of the patients. Their position, however, has been judiciously settled by the military authorities, who have created subcentres of varying number, where they appeared to be necessary.

Beyond the fact that the creation of centres and special services permits of the utilisation of competent medical men, reduces the number of similar installations and, consequently, enables them to be endowed with the material necessary for the diagnosis and treatment of syphilis, these clinics and centres have the advantage of grouping together syphilitic patients. They facilitate supervision, which must be more active than for ordinary patients, on account of the contagiousness of the disease, as well as the suppression of leave and interdiction of tobacco. In all respects, they give a far superior curative and prophylactic result than that obtained when syphilitic patients are placed in an ordinary hospital. I may add that, owing to their position near the principal places of the region, the venereological centres are able more

rapidly and completely to enlighten the medical officer of health and the commanding officer as to the variations of syphilis, the foci of contagion, and precautions to be taken in conjunction with the civil authorities for arresting their progress.

Advice to be given to Syphilitic Patients in Hospital.—The time in hospital must serve, not only for treating the patient, but also for educating him with regard to his disease and its after-effects, on the precautions he must take while in the Army and on his return to civil life.

The discussions held with the men on venereal diseases from the moment of their admission to the Army are intended to teach them how to avoid venereal diseases and learn what to do when suffering from them; but they are often forgotten when the man has become syphilitic. It is necessary now to complete and develop these, no longer by *ex cathedra* addresses, but by personal conversations with the men: in a few words, the doctor must make the patient realise the real gravity of his disease and the precautions he should take, rectifying false or incomplete ideas, frightening men who are too indifferent, and reassuring those who have got an exaggerated idea of the gravity of syphilis and its after-effects. The medical man in attendance is thus endowed with a duty of the highest importance, both from a humanitarian and social point of view, which belongs to him alone, and in which he can give full play to his concern for the welfare of his patients and of the public.

In order to facilitate this individual instruction, and at the same time impress it upon the patient's memory, the majority of syphilologists have for a long time written and distributed among their patients a short pamphlet, giving the general rules for the treatment of syphilis, and the precautions to be taken to avoid transmission. The circular of September 25th, 1916, advises that these pamphlets should be given to

syphilitics leaving special centres, and discussed with them. They are printed on a sheet of strong paper and can be kept in the pocket-book as a guide for patients. It is my custom to give one to the patient when I examine him for the first or second time; I ask him to read it, and, at a subsequent examination, it is discussed and explained to him either by me or by one of my students.

It is useful, when discharging the patient, to give him a written statement indicating the symptoms from which he has been suffering, the treatment he has received (drugs used and doses), and the dates of admission and discharge. These data may be put on a simple sheet of strong paper, which the patient is asked to keep and show whenever he has to consult a doctor. Further, they ought to be reproduced on his hospital card and on his medical case-sheet.

At the time of leaving hospital the doctor must not fail to remind each patient individually of the necessity of continuing treatment, of reporting to his regimental doctor the moment he notices a symptom of any kind, and, even if there are no symptoms, to consult him from time to time, so that his condition may be overhauled and the necessary drugs given.

The circular of September 25th, 1916, advises, further, that cutaneous patients should be ordered to have ambulatory treatment, which they must follow, and recommends that only drugs should be prescribed which soldiers are certain of obtaining easily, especially at the Front.

Post-hospital Treatment and Supervision

The syphilitic who returns to his unit after hospital treatment must be kept under observation by the regimental doctor.

In order to do this, it is necessary that the latter should have precise knowledge given by the medical

man in attendance. In times of peace, military doctors, instead of giving the diagnosis of syphilis, merely write on the hospital card the number which, in the nomenclature of diseases established by the public health service, corresponds to syphilis (No. 45): 45 *a* primary syphilis; 45 *b* secondary syphilis; 45 *c* tertiary syphilis.

The order given on September 25th, 1916, prescribes that, when leaving any venereal hospital after ambulatory treatment or after a consultation, a sealed copy of the medical report shall be sent to the medical officer of the patient's depot, or of the establishment where he is employed. This must be carefully completed, brought up to date, and classified in the report of the venereal patients of the depot. According to these instructions, the report should follow the patient in his changes of situation, by direct and confidential transmission from one medical officer to another. As far as possible, the hospital letter must bear nothing beyond the indication of a lesional diagnosis, without etiological precision.

These orders answer one of their purposes well, that of respecting medical secrets. Indeed, in the majority of cases, they respond so well that, after the patient has left the hospital, no one has any notion of the malady for which he has been treated, least of all his company doctor. Confidential reports are misleading, and get lost in their multitudinous peregrinations.

I consider that, in the Army, where the commanding officer is responsible for the health of his men, and must take measures to prevent the propagation of venereal diseases, medical secrecy is not opposed to the fact that, at any rate in war-time, the heads of companies should be aware of the cases of venereal disease contracted by their men, and this can only be effected by the hospital card. It is their duty, as with the superintendents of hospitals in times of peace, to take precautions so that their employees shall not

divulge this secret. And, further, is this a secret, having regard to the promiscuity of camp life and of hospitals, where men confide so much to each other ?

Some men at once request the medical men not to inscribe the diagnosis on their cards : there are nearly always men who are trying to disguise their disease, so as not to be deprived of leave, who wish to obtain sick-leave, or escape later from the supervision of their company doctor.

It is indispensable that the regimental doctor should receive the instructions given in the circular of September 25th, 1916, and that no syphilitic should rejoin his company without his being advised of his disease and the treatment already received.

The doctor must, according to the order of September 25th, 1916, make " a special periodical examination of all venereal patients, and specially of those who have recently left hospital, so that contagious symptoms may not pass unnoticed, and the patients may be benefited by continuity of treatment " ; and, at the time of any change of station, the new medical officer should be given information as to all venereal patients, especially the syphilitics.

The instructions do not provide for restrictions as to leave granted to syphilitics. It would be necessary to deprive all syphilitics, especially those who are married, of leave during the whole period when contagious symptoms are most liable to recur, that is to say, during the first six months at least, of syphilis.

Munition workers should be subjected to the same regulations as soldiers in the regiments, as regards the obligation of reporting the fact to the doctor, when they have been under treatment for contagious syphilitic lesions. If there is any difficulty in getting them to submit to this visit outside working hours, it would be quite simple to replace it by a visit to one of the town hospitals or to a venereal centre. Control could easily be established.

Measures for the Purpose of preventing Healthy Men from contracting Syphilis

These measures are intended for the instruction of men on venereal dangers, on the individual precautions to be taken for avoiding contamination; for the installation of establishments for the treatment of civil syphilitic patients, and finally for the supervision of prostitution.

The Instruction of Men with regard to Venereal Danger

Lectures on Venereal Diseases.—"If I had only known that I might contract syphilis, and what it means, I should not have run the risk of catching it!" This is what every medical man has more than once heard a patient say when told that he had syphilis, or who one day showed some grave syphilitic symptom, no matter whether this was an adult who had contracted the disease in some extra-conjugal intercourse, or an adolescent affected the first time he had connection with a woman.

As a result of this ignorance of many men with regard to syphilis and the sources of its infection, anti-venereal prophylactic measures have been urged, to which more and more importance has been attached of recent years. Before the war, army doctors had received instructions to institute periodical lectures for the men, in which venereal diseases, their dangers and precautionary measures, were discussed; it has even been proposed that such lectures should be included in the educational programmes of schools and colleges.

For my own part, I doubt the efficacy of these lectures. I have seen too many men expose themselves to infection and become infected, despite the fact that serious cases of syphilis had come under their notice; I have seen too many young men, who had

been educated in the most judicious manner as regards venereal diseases, contract syphilis or gonorrhœa. Finally, I have seen too many medical students and doctors become syphilitic during their student days, or when in practice, not to be somewhat sceptical as to the results of educating young people on the subject of anti-venereal prophylaxis.

It is a particularly delicate matter to give this instruction. In an audience of young people, even when belonging to a class socially homogeneous, all have not similar ideas on sexual questions, and, in order to be both understood and useful, the teaching should be adapted to the previous knowledge of the subject, as well as to the moral tendencies of each of the audience. In an audience in which some unruly subjects may turn some expression or other of the lecturer into derision during or after the lecture, this is sufficient to destroy entirely the good effect.

Individual sexual instruction, given by a highly conscientious man with sufficient medical knowledge capable of adapting himself to the special conditions of each adolescent, such as is given in certain secondary schools, and which can be given by the father of a family, or the family doctor, is of real value in warning young people against venereal diseases; but this can only be carried out with great reserve, and, no matter how tactfully done, does not always attain its object.

In the Army it is obviously impossible to realise this individual instruction, as it means unlimited leisure on the part of the doctor. Nevertheless, the regimental doctor should interest himself in the matter. I understand, from several young doctors, that they have had the opportunity of discussing venereal diseases with their men, and, having gained their confidence, have been able to impress them with ideas from which they have derived benefit. Amongst the services which a regimental doctor may render to the Army, if he understands his work well

and knows how to mix with the men and gain their confidence, while at the same time keeping up the prestige of his authority and of his science, not the least is the prevention of venereal disease. By means of private conversations, the doctor can increase the efficacy of the lectures given to units, according to regulation orders. Often, too, when talking with subalterns at mess, it will be easy for him to educate them on venereal matters, showing them the dangers and preventive methods, and also how to take care of themselves. Thanks to the confidence he has inspired in them, they may rely on him sufficiently to come to him for treatment at once, should they happen to contract syphilis. Further, he will show them how eminently important it is to take the precautions designed to prevent contamination.

Finally, it is not as a military authority due to his position, but by moral authority, owing to the character of his scientific knowledge, that the doctor must play his part in the individual instruction of the men and the staffs on venereal diseases. This, if I may say so, is in his private capacity.

There remains his part as public instructor. Although, as I have already stated, public lectures on venereal diseases do not seem to me to be as efficacious as is generally supposed, they must be given, nevertheless, because they are according to regulation, and also may have a certain modified influence on the propagation of these diseases. All useful measures, no matter how limited their influence, must be resorted to against the scourge of syphilitic infection.

The object of these lectures, as determined by ministerial instruction, is to show men the dangers of venereal diseases, the means of avoiding them, and the necessity, if contracted, of treating and curing them.

The lecturer must show briefly, but sufficiently clearly that all may understand, the symptoms of venereal disease, their manner of onset, the signs by

which they are recognised, or by which their existence may be suspected, and also their after-effects and later consequences. He must show them that syphilis may bring in its train formidable diseases : tabes, general paralysis, arteriosclerosis, that it affects future generations, kills children before birth, and causes grave degeneration in them.

These diseases are generally transmitted by direct contact, and are nearly always of venereal origin, but they may be due to accidental contagion. Consequently, they would be almost certainly avoided if sexual intercourse were abstained from. Here the lecturer should show, especially if he is addressing recruits, that continence is never the cause of any illness or disorder, and that a man may abstain from sexual relations without any danger, contrary to the general opinion amongst the young.

He must show how dangerous women are who give themselves up to uncontrolled clandestine prostitution, such as waitressses in restaurants, etc., but at the same time he must not guarantee that controlled prostitutes can be absolutely relied upon.

He should also recommend that, no matter what women a man has intercourse with, he should use a rubber protector, or applications of ointments, etc. (see p. 186).

If, in default of these precautions, or even in spite of them, symptoms of venereal disease develop, the soldier must at once consult the regimental doctor. By doing this, he will be certain of not being punished as he would be if he waited until the disease was discovered ; he will also be sure of being properly treated ; whereas, if he follows the advice of a comrade, he runs the risk of being badly looked after, and of suffering all the consequences of the disease ; and if he goes to a quack, or to some pretended anti-venereal institute, he will, at the same time, be badly treated and spend a lot of money.

It is well to add that the treatment of syphilis should be prolonged, in order to avoid evil consequences both for the patient himself and for future generations.

Of course, the lecture must conclude with a patriotic note on the dangers of syphilis for the race, and the soldier should be told that, if he wishes to avoid giving the disease to his wife, or the sweetheart who is waiting to marry him after the war, if he wishes to have a healthy family, whose future is secured by his bravery, he must keep clear of venereal diseases.

Such are the chief points in these lectures. According to the different military centres in which they are held, recruits, units already formed, the territorial army, munition workers, etc., certain paragraphs may be amplified or cut down to suit the occasion.

There can be no question here of giving the medical men appointed for delivering these lectures more than general indications. According to the centre, the intelligence of the audience, and the knowledge he has of any local danger of contamination, the lecturer will know how to vary his effects. He must never forget, above all, that his audience is a very mixed one, completely ignorant of medical terms, and that he must use expressions capable of being understood by all, even if they are defective from a medical point of view, and, if possible, they must be graphic. Without becoming trivial, he must not forget that he must speak the language of the people who are listening to him, to a certain extent; he must call gonorrhœa "clap," and syphilis "pox" or "great pox"—and must not fail to mention that it has nothing in common with small-pox—and should call simple chancre "soft chancre."

If the lecturer can get some drawings, prints, photographs, or models representing the principal forms of venereal disease, he should not miss showing them to his audience. Whenever possible, they should be thrown upon a screen, a mode which specially

impresses the masses. All these illustrations must be very simple, and clear.

The sexual and anti-venereal education of men is not done only by word of mouth. In order that oral instruction remains fixed in the memory, it must be corroborated by some printed matter.

After the lectures, it will be necessary, if this distribution has not already been made, to give to each of the audience a brief account of venereal diseases and their prophylaxis. This should be in the form of a summary of the lectures as much as possible ; it should be enlarged more or less, in the form of a leaflet, which should be typed and copied in the office of the battalion. In default of this summary by the medical lecturer, which has the advantage of being better adapted to the needs of the unit before whom the lectures have been given, some of the pamphlets published on this subject may be distributed.

Distribution to the Troops of Pamphlets on Venereal Diseases.—Since the beginning of the war, pamphlets on contagious diseases have been printed for the use of soldiers.*

These pamphlets, which the men can read at leisure, or ask their officers or doctors to explain to them, are very useful, and the Public Health Authorities have rendered a great service by printing them.

With regard to venereal diseases, one pamphlet has been brought out by the Academy of Medicine, and another printed by the Public Health Service in a small leaflet distributed to the troops at the beginning of 1916. These instructions constitute an important weapon, and their distribution should be encouraged in every way possible. I consider that they form an indispensable complement to the lectures, and may have even a greater influence than the latter on serious

* Following out the same idea, pictorial anti-venereal propaganda are recommended, the tentative efforts already made in France deserving to be encouraged.

men with reasoning power, capable of seeking the explanation of the prophylactic measures, and may aid the doctors as an excuse and subject of conversation with the different men.

In Italy, where the anti-venereal struggle began several months before the declaration of war, and was organised with extreme care, similar notices were distributed on a large scale.* The Committee of Medical Propaganda of Milan caused them to be left in public places, in military refreshment bars at the railway stations, under cover of an envelope bearing this inscription : " Italian soldiers, if your health is dear to you, if you wish for the welfare of your family and country, read, mark, and observe the instructions contained in this envelope."

Personal Precautions

A large number of syphilitic contaminations would be avoided if the men took simple and well-known precautions at the time of sexual intercourse.

The first of these precautions consists in careful examination of the genital organs, so as to be certain that there are no excoriations or sores through which contamination might occur.

The use of a rubber protector of good quality, which is neither perforated nor has been used before, is a very great, if not an absolute, guarantee against syphilitic infection. But it is also essential that there should be neither sore, excoriation from scratching, nor parasite, such as the pediculus pubis, on any of the adjoining regions not covered by the protector (pubis, inside of thighs).

Failing a rubber protector, it is nearly always possible to rub an ointment into the whole of the

* Pasini, " Cio che si fa nella sede del III. Corpo d'armata per la profilassi della malattie veneree" (*Giornale italiano delle malattie veneree e della pelle*, 1915, fasc. v.).

surface of the genital organs, vaseline by preference, which, by preventing direct contact with the virulent secretions, resists contagion to a certain extent.

After coitus, washing with soap and water is a useful prophylactic measure. This should be done as quickly as possible, using plenty of soap, especially over the glans and frenum. Soap is a well-known antiseptic for various kinds of parasites; the treponema of syphilis, which is easily vulnerable, does not seem able to resist it any more than Ducrey's bacillus.*

More or less concentrated alcohol may also serve for sterilising virulent syphilitic products; this is known to be the most certain and practical way of disinfecting a doctor's hands after examining syphilitic patients.

In default of soap and alcohol, continued washing with pure water or with the addition of sublimate may be done.

As the result of experiments on apes, in which inoculation of syphilitic products, followed by energetic friction with calomel ointment, remained negative, Metchnikoff recommended friction with an ointment containing 33% of calomel, as a means of preventing syphilis.

A certain number of patients having developed syphilitic chancres after using this ointment, Metchnikoff's preventive method has been denounced by the majority of medical men. Probably it merited neither this reprobation nor the value attributed to it by Metchnikoff. If used, it should be preceded by wash-

* The experiments of Giovannini ("Tentativi di disinfezione di ferite infette con pus di ulceri veneree per mezzo del sapone comune" (*Gazzetta medica di Torino*, 1898, Nos. 45 and 46) have shown that washing with soap and water acts very energetically on the bacillus of simple chancre: out of twenty-one experiments, a chancre only developed ten times. The most favourable conditions for success in washing are the superficial character of the sore (sore by abrasion) the small quantity of virus on its surface, the short time that has elapsed between infection and soaping, and prolongation of soaping.

ing with soap, of which it strengthens the action and should follow immediately upon suspected coitus.*

Ministerial circulars, dating from September 23rd, 1907, and November 16th, 1907, order that calomel ointment should be supplied to the regimental hospitals.

Creation of Centres for the Treatment of Syphilis amongst the Civil Population

For the last fifteen years, the staffs of special hospitals have treated patients suffering from syphilis as out-patients, without interning them.

In Paris, drugs are distributed on a large scale for the treatment of syphilis by the special hospitals (Saint Louis, Broca, Cochin).

The general use of mercurial injections has greatly facilitated the ambulatory treatment of syphilis. Since 1902, my colleague Brocq and I, at the Broca Hospital, have given out-patient treatment to syphilitic women on a large scale ; since then, nearly all special hospitals have added polyclinics to their departments for syphilitic treatment, by means of mercurial injections.

More recently, the use of arsenical compounds has enabled these polyclinics to render still more help, by realising the energetic treatment of syphilis, especially during the primary periods, without sending the patient to hospital. The dispensaries † attached to certain services consist of the old polyclinics, enlarged, brought up to date, and supplied with a complete staff.

Consultations on a Sunday, as well as in the evening, have made it possible for all patients, especially workmen, to be treated in an efficacious manner.

* Syphilis is not the only venereal disease against which precautions should be taken after coitus. I shall not go into details with regard to gonorrhœa, as I am only concerned with syphilis here.

† Jeanselme and Hudelo, "The Part played by the Dispensaries at the Broca Hospital in the Campaign against Syphilis" (*Bulletin de l'Académie de Médecine*, March 28th, 1916, p. 364).

Alfred Fournier specially recommended the generalisation of these centres for treatment, having demonstrated their share in the prophylaxis of syphilis, and devoted several publications to what he called *Prophylaxis by means of treatment.*

What has been done in Paris has also taken place in the majority of the large centres.

It is certain that the more establishments there are for patients, where they can be treated gratuitously, the more chance is there of their being treated. The better these establishments are organised for treatment, the more rapid will be the cure of contagious syphilitic lesions, and consequently the fewer the number of patients capable of transmitting the disease and the less the chances of contamination.

The polyclinics and dispensaries for patients who cannot, or will not, be treated in hospital, and the hospital services open to syphilitics, especially contagious cases which cannot be treated at home or whose symptoms require special attention, constitute two complementary organisations. The first is recommended, owing to the small expense it incurs, both for public money and for the patients themselves, who can continue work while under treatment ; the second has the great advantage that, while giving more energetic treatment than the first, it withdraws from circulation patients—men and women—during the period they are contagious.

These two can be created by the hospital administration without difficulty or large expense, and without legal intervention. Subjected to the same freedom of action as the hospitals, they receive the patients who come spontaneously, without any coercion from the police.

The difficulties with regard to working them are more trouble to overcome, especially in time of war.

Both military and civil authorities have realised the importance of increasing hospital resources for the

treatment of venereal patients. Their union has been genuinely fruitful, and their combined initiative has given all syphilitics—both men and women—the facility for treatment they desire, and will do so still more in the future.

Under the inspiration of two eminent hygienists, Medical Inspector General Vaillard and M. Brisac, Director of Public Assistance and Hygiene to the Minister of the Interior, M. Malvy, Minister of the Interior, and M. Justin Godart, Under-Secretary of State for the Military Medical Service, came to a perfect agreement, in March 1916, as to the necessary measures to be taken for the creation, extension, and working of the special services and of dermato-venereological consultations.

The Minister of the Interior decided on the creation of special services with dispensaries, called *additional hospital services*, in all the localities where the number of venereal patients rendered it necessary, and where it was possible. These offer all facilities to patients who have contracted these diseases, so that they may be treated gratuitously and with absolute secrecy.

These additional services, established principally in localities depending upon the hospital establishments themselves, are set up in all localities where regional military authority, in conjunction with the local civil authorities, indicate the necessity.

Owing to the paucity of civil surgeons in many localities, the medical service, when necessary, is assisted by military surgeons.

A certain number of additional services were soon organised, and enable one to establish, at the same time, their important part and the conditions of their organisation and working.

By a circular, dated May 21st, 1916, the Minister of the Interior advised the prefects to generalise the creation of these services, and, in conjunction with the Regional Direction of the Medical Service, to use

their authority with the administrative commissions of the hospitals and asylums, so that they should be set up in all necessary localities. As it concerned a service of general interest, it was announced that the State would share in the expense caused by their organisation and working.

The additional services have been created in a large number of localities outside large towns, where they have extended the services of venereology and dermatology of peace times. Their extent and resources vary in accordance with the importance of the civil and military populations.

Their working is carried out nearly everywhere by military doctors, especially by the medical men who are heads of dermato-syphiligraphic centres and subcentres, or by others, not mobilised, in charge of prostitutes.

In some districts, the local authorities offered some opposition to the formation of these dispensaries ; but, as a rule, they have taken an active interest in the Army Medical Service.

The results appear to have been remarkable, the number of consultations having increased rapidly ; thanks to the activity of the doctors, and despite the defectiveness of certain localities, the treatment of syphilis has been installed under good conditions. It is only right here to mention that the zeal of some medical chiefs of centres, amongst whom I have pleasure in citing Dr. Pautrier, Head of the Dermato-syphiligraphic Centre at Bourges, has soon given tone and example to these assistant services.

From experience acquired, in order to facilitate the entrance of patients to the additional dispensaries, it is advisable not to confine them exclusively to venereal diseases, but to use them for both dermatological and venereal cases.

For reasons easy to understand, the additional services must be separated from the localities in

which diseased prostitutes are detained. On the other hand, however, they are suitable for the treatment of women who have given themselves up to clandestine prostitution, and having been arrested and found to be diseased, cannot, under the terms of the present law, be kept under arrest, because they do not live solely by prostitution, but to whom the police are compelled to recommend treatment.

Beyond this recruiting by administrative agency, syphilitics can only be led to the additional dispensaries by persuasion, or attracted there by the reputation of these services. Medical men may institute a useful propaganda by getting their poor patients to go there; but, above all, it is necessary that the civil authorities should make known their existence by discrete publicity; and the managers of workshops and industrial concerns should persuade their workpeople to go there, when attacked by venereal diseases.

These additional services will obtain their recruits by their work; patients who have recovered will gradually tell their fellow-workmen suffering from cutaneous or venereal disease.

It is to be hoped that, after the war, these additional dispensaries, established through necessity, will continue to carry out the treatment of venereal patients in a certain number of towns, outside large centres, where they have been generally neglected, and dissipate certain prejudices with regard to these patients.

The Supervision of Prostitution

Essentially, the additional dispensaries and gratuitous consultations only receive patients who have come voluntarily and nearly always spontaneously. They apply solely to syphilitics who know they are ill and want to be cured; they do not protect society either against syphilitics, who are ignorant of their disease,

nor against those who, knowing they are ill, do not hesitate to transmit their disease, rather than be treated and abandon all sexual intercourse.

The expression prophylaxis by treatment, which has gained renown from Fournier's great authority, is somewhat unfortunate, because it has seemed to some to constitute the only formula of the prophylaxis of syphilis. In reality, *prophylaxis by treatment*, so much praised by Fournier, *is a very incomplete prophylaxis*, realised solely by patients of good intention ; it does not reach those whose intentions are evil or who are weak-willed.

In order that a woman suffering from contagious syphilis will consult a doctor, it is necessary : (1) that she knows she needs treatment and that she can be treated at a hospital or dispensary ; (2) that she is willing to be treated.

Many women who at the present time abandon themselves to prostitution have only the vaguest notions of venereal diseases ; many of those who have gone on to the streets since the beginning of hostilities, or have yielded themselves to men at the back of a shop, have but little idea of what may happen to them in the future.

The majority are ignorant of the dangers they are running and of those they continue to run until the day when, owing to some serious or painful affection, they are unable to continue their business or are accused by one of their clients of having transmitted a disease to him.

Medical men in special hospitals know that it is rare to see an infective chancre in a woman. At the Broca Hospital, where the patients consist of women living a free life, as at the St. Louis Hospital, not one syphilitic woman out of twenty comes for consultation owing to chancre ; most of them do not think of having a doctor unless they have mucous plaques, and sometimes what a quantity of these! On hearing that

even the previous day they have had sexual intercourse, the number of men they may have infected during the last six weeks is terrible.

Despite the circulation among the people of instructions as to venereal diseases, and the multiplicity of places for treatment, the spectacle of our consultations has not changed.

The efforts made by the medical authorities in spreading these ideas and making known the existence and working conditions of these establishments intended for the treatment of venereal diseases, no matter how admirable and energetic they may be, run foul of impossibilities and only succeed in reaching some factory girls.

Therefore, we cannot count absolutely on the goodwill of diseased women with regard to treatment. In order to thoroughly realise the prophylaxis of syphilis by the treatment of syphilitic women, *persuasion, together with the spontaneous entry into hospital, is insufficient.* Something more is necessary.

Since the authorities have considered the subject of the propagation of venereal diseases, they have tried, by means of police measures, to withdraw from circulation women who are affected. From this originated supervision of prostitution, leading to the arrest of prostitutes, to medical inspection, to registration of those known to ply the trade of prostitution, or who, in order to take advantage of certain immunities resulting from registration, ask to have their names inscribed on the register of official prostitution, and finally to the periodical inspection of registered women to see if they are suffering from contagious diseases, in which case they are sent to hospital.

To this must be added the opening of licensed houses, under police supervision, where the occupants are subjected to repeated medical inspection.

These different measures have aroused numerous and diverse protests, in the name of morality, of

individual liberty, often the result of an exaggerated sensitiveness.

There is no doubt that there have been abuses in the repression of prostitution, that the officials charged with the investigations have often made mistakes, and that unjustifiable arrests have sometimes been made. All this, however, is not sufficient to prevent society from protecting itself against a disease which has a disastrous influence upon public health and the race, which has become a social danger, and, at the present time, constitutes a national peril.

It is not a question of confining women who lead an immoral life as a punishment, as if they were lepers, but of treating women who give themselves up to prostitution, and are diseased, and are liable to infect every day the men to whom they yield themselves. It is necessary that prostitutes should be subjected to medical inspection, and that all those found to be diseased should be treated, at least during the contagious stages. After these symptoms have been cured, and they have been shown how to look after themselves, they should be subjected to repeated examinations and again treated, if they are found to have symptoms.

Such, from the medical point of view, is the postulate of the prophylaxis of syphilis.

As Balzer says,* *the supervision of prostitution is the only measure which can give the immediate results* which it is necessary to obtain in the matter of venereal prophylaxis in the Armies.

The *supervision should apply* not only to the women known by the police to practise prostitution, the registered women, but also to *those who solicit in the streets and public places*, and to those who are declared by the soldiers to be the origin of undoubted contaminations.

* "Prophylaxis and Treatment of Venereal Diseases in Time of War" (*Presse médicale*, October 14th, 1915, p. 401).

The Academy of Medicine was justified when, at the meeting on June 13th, 1916, it demanded that there should be police supervision, not only with regard to street prostitution, but also to that in public places.

For a long time there have been rules ordering a soldier to report the woman who has contaminated him. This measure has often been criticised, and the remark has been made that the statements of men are often erroneous, either voluntarily or involuntarily, that sometimes they knowingly denounce women who have nothing to do with their disease. Despite these mistakes, which are less frequent than has been stated, the men's declarations are often most useful in acquainting the police with women who disseminate syphilis. These declarations are made under the control of the regimental doctor, who must himself question the soldiers and specify the disease from which they are suffering, as was again ordered in the circular of September 25th, 1916. They must be transmitted to the local police, who must supervise and, whenever possible, cause the incriminated women to be examined.

In the *army zone* syphilitic contaminations occur, as I have shown, from nearly all classes of women who are there, especially those who trade with the soldiers in some form or another.

To be efficacious, supervision should apply to *all* women who may be suspected of yielding to men. This is the easier because there are but few women living in this zone, and all are known to the military authorities. It is due, not only to the military authorities, but also to the police of the zone, to take the necessary measures, and the medical department must see that they are carried out by the military doctors.

In the *rest zone*, contamination originates with women who live habitually in the country, as well as numbers of others attracted there by the presence of the soldiers. Prophylactic action should apply to one as much as to the others. It is the duty of

both military and civil authorities, and can only be efficacious on condition that there is a close understanding between the two authorities. Here, again, the military doctors are the ones who have most frequently to guarantee the medical part of the service.

At the *base*, the great majority of contaminations are due to women on the streets and servants in restaurants and public-houses. Supervision should be given in the streets, especially around the stations and near the factories when the workmen are leaving; but not only on the large boulevards, as in peace time, and at night-fall, but at all times and in a very large number of streets. This supervision must not be exercised solely on women known to the police.

Borne * says, with regard to police supervision in Paris since the war: "The public authorities have moved, and the prefecture of police has given orders, to arrest girls and their bullies around the stations; but, as figures would be necessary to satisfy public opinion, special brigades have assembled the registered women well known to them. These, according to the authority of the prefecture of police whom we consulted, are contagious in the proportion of 10% only, for the inspection and prophylaxis of licensed women have continued to be enforced rigorously and regularly during the war, so that there are 90% of healthy women subjected to each drive."

Two words only on the question of *licensed houses*.

Although the security they give to their clients is only relative, and syphilitic infection is not rare in them, these establishments, when well supervised, play an important part in the prophylaxis of venereal diseases.

It is necessary that they should be visited frequently and unexpectedly. With the afflux of clients the war

* Borne, "Hygiene of the Soldier on Leave in Paris. Prophylaxis of Contagious Diseases" (*Paris médicale*, August 12th, 1916, p. 133).

brings them, both in the army zone and at the base, these visits must be made daily, as required by the Academy of Medicine. It is imperative that the medical men in charge should have at their disposal a sufficiently lighted place for examination, and the necessary instruments. The co-operation of the military doctors is to be counted on in all localities where the absence of competent civil surgeons renders it useful.

In the Manchurian War the Japanese installed free licensed houses, subjected to regular medical visits, and attributed to this the very small venereal morbidity of their Army; whereas, with the Russians, the number of venereal patients was very high.

In the Italian Army, which was supplied with licensed houses during the Syrian War, the Powers have organised licensed houses even in the localities near the Austro-Italian Front.

To return to *free prostitution*.

When a woman is known to be a regular prostitute, has been arrested several times, and is suffering from contagious lesions, when, above all, these lesions have recurred after a preliminary treatment, or she has not been treated after being warned, she should no longer be advised, but *compelled to have treatment*. In these conditions, according to the custom in Paris, she must have her name inscribed on the list of prostitutes, and be subjected to all the obligations necessitated *by registration*.

Registered women, at their own request, or as an administrative measure, must be subjected to regular and frequent medical examination. In Paris they are expected to present themselves at the Prefecture of Police for a medical inspection twice a month, on dates of their own selection. This periodicity is altogether inadequate: the security given men who have relations with women of this class is never more than relative; it is almost nil with bi-monthly visits.

These should take place at least twice a week if real prophylactic results are to be obtained. Any woman found to be affected when examined should be at once sent to the place where prostitutes are treated, and, as I have already mentioned, this should be independent of the additional hospital services, There she will be treated actively, and not discharged until the contagious symptoms have disappeared.

The "registered" women, known to be syphilitic, are given a card of a special colour in Paris, and obliged to submit, during two years, to a weekly inspection. All facilities for being treated should be given them, by means of consultations at the additional hospitals.

For the execution of such measures, the collaboration of both civil and military authorities is necessary. In all localities where the paucity of civil surgeons does not allow regular examination of prostitutes, instructions were given on September 25th, 1916, ordering the army doctors to participate in this service. In the army zone, by regulation, the commanding officer may order a military doctor to assist in examining the women in question, when this examination is made by a civil surgeon.

In the army zone, the majority of these measures relative to the supervision of prostitutes are carried out, owing to the power vested in the commanding officer.

The same applies to a certain number of inland towns, where the collaboration of a venereal specialist, an energetic medical officer of health, a prefect understanding his hygienic mission, and a municipality stripped of prejudice, has enabled all desirable measures to be taken, and the result, in all these towns, has always been a reduction of venereal contamination. In very many localities in the rest zones and in the interior, there is still much to be done, and it is necessary that measures should be taken.

They can only be effected, at the present time, by

the good-will of the municipalities, who hold the necessary powers for the order and execution of the medical regulations.

Consequently, for local reasons, some municipalities, not having sufficient understanding of the present necessities and of the interest of the whole nation, hesitate or refuse to regulate the supervision of prostitution.

Some have judicial scruples and do not consider that they are authorised to make the necessary arrests. The question of legality appears to be decided by jurisprudence.

As a matter of fact, in February 1915, the Minister of the Interior announced to the prefects and mayors that the Court of Appeal recognised that the municipal authority had the right to enter the names of clandestine prostitutes on the police register and to compel them to submit to medical inspection, including the interdiction of soliciting, or even of gathering around certain public establishments.

The mayors may, therefore, take the most important of the necessary measures ; in default of their initiative, or in the presence of their inertia, the public authorities must not remain disinterested, and it is urgent that, wherever this is necessary, the prefects may take this problem in hand and, with the authority they possess, enforce the necessary regulation.

In Italy,* where for years the relative liberty of prostitution, due to the "Crispi regulations," favoured the considerable extension of syphilis, and where rational measures were taken at the beginning of the campaign, the Minister of the Interior, supported by a decree of the Lieutenant-General of the Kingdom, did

* Balzer, "Anti-venereal Prophylaxis by Civil and Military Administration" (*Presse médicale*, January 13th, 1916, p. 10). Clement Simon, "Report presented to the Minister of the Interior and the Under-Secretary of State for Medical Services on the Anti-venereal Prophylactic Organisation in Italy" (*Annales des maladies vénériennes*, October 1916, p. 577).

not hesitate to write on September 11th, 1915 : " Prefects henceforth may adopt the strictest and most rigorous measures, even sacrifice of the principle of individual liberty, in the public interest."

If administrative authority does not consider itself sufficiently armed for the combat against the propagation of syphilis by repressing prostitution, it is necessary that it should be reinforced.

The superior interest of public health has already caused the intervention of legislation, by ordering anti-variolic vaccination, and, a short time before the war, anti-typhoid inoculation, measures the efficacy of which has been happily demonstrated by the disappearance of small-pox and the considerable diminution of the number of cases of typhoid fever. This interest is no less compromised by the propagation of syphilis, which, as I showed at the beginning of this book, is a present, as well as a future, menace to the country. *It is time that measures were taken to check this propagation.* It is the duty of the public authorities, the legislators if necessary, to take *all* the requisite measures, even should they require, for the benefit of the community, the restriction of individual liberty. The regular supervision of prostitution and its repression are necessities, both at the present time, and after the war. Every one must bear his responsibility in this question, without any regard to secondary considerations, political or otherwise.

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