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(*c*) The Treatment of the Disease

A DISCUSSION

OPENED BY

SIR HENRY MORRIS, BT., F.R.C.S.

NORMAN MOORE, M.D.

D'ARCY POWER, F.R.C.S.

AND

F. W. MOTT, M.D., F.R.S.

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The Royal Society of Medicine.

June 10, 1912.

Sir Henry Morris, Bt., President, in the Chair.

A Discussion on Syphilis, with special reference to (*a*) its Prevalence and Intensity in the Past and at the Present Day; (*b*) its Relation to Public Health, including Congenital Syphilis; (*c*) the Treatment of the Disease.

INTRODUCTORY REMARKS BY THE PRESIDENT.

At a meeting on November 6, 1911, of the Special Committee appointed by the Council to consider and report on the desirability of having during the session 1912 a general discussion, I ventured to suggest that the subject to be chosen should be the following:—

> "*The ultimate causes of the rise and decline of epidemic diseases; why such diseases are at one time quiescent, at another time vehement and universal. What determines the great cycles of plague, cholera, enteric fever, small-pox, scarlet fever, measles, diphtheria, and other infectious and contagious diseases?*"

It was unanimously agreed that this would form an excellent subject for discussion; but on consideration it was thought that the scope was too wide and would require too large a number of séances. Sir Francis Champneys thereupon suggested that the different diseases might be chosen *seriatim* in different years, and that in this way a series of volumes might be formed of great value. I might also mention that the Council

considered the possibility of holding in a succession of years a series of discussions, of a similar character to that now about to commence.

The subject of the present debate is Syphilis, the disease which that fine old surgeon Richard Wiseman, Serjeant-Chirurgeon to King Charles II, wrote upon under the name "Lues Venerea," and which he defined as "*a venemous contagious disease gotten either Immediately or Mediately from an impure coition.*" Wiseman adds: "*I say Immediately or Mediately, because it is very manifest, that not only the Persons so copulating are infected, but also the children derived from such Parents, and Nurses that suckle those children, and any other child that sucks upon those Nurses, and so forward.*" Then, Wiseman continues: "*It is frequent to mention other secundary ways of the propagation of it; as lying in the same Bed with an infected Person, as lying in the same sheets after them, or wearing their cloaths. . . . Drinking with one so diseased, or sitting on the close-stool after them, are likewise numbered amongst the Causes of Infection.*" And, with a touch of kindly humour, he concludes: "*These are all such convenient excuses for the more Shy and Coy Patients who will not otherwise be brought to confess their distempers, that it is Pity to discountenance them.*"

Syphilis having been selected as the subject of discussion, it was decided *first* that the debate should be arranged with special reference to (*a*) the prevalence and intensity of the disease in the past and at the present day; (*b*) its relation to public health, including congenital syphilis; (*c*) the treatment of the disease. *Secondly*, that at the first meeting separate speakers should open the debate under these three headings respectively, and that each of these speakers should be allowed from half to three-quarters of an hour for his speech or paper. *Thirdly*, that every subsequent speaker (except those who re-open the debate after each adjournment, each of whom will be allowed thirty minutes) be limited to fifteen minutes, and be permitted to treat of the subject at large, but that, as far as possible, he should group his remarks, separately, under the three different headings; and, *fourthly*, that an attempt should be made to arrange the speakers, so that the second day's discussion shall be devoted chiefly to the consideration of treatment, and the third day's discussion mainly concerned with points relating to the disease in its bearing on public health.

Dr. Norman Moore has undertaken to open the "Debate on the History of Syphilis," Dr. Mott on "Syphilis in Relation to Public Health," and Mr. D'Arcy Power on "The Treatment of Syphilis."

From Dr. Norman Moore, with his great bibliographic knowledge,

his recondite acquaintance with old books, pamphlets, and manuscripts, we may expect to hear much that will be interesting respecting the first appearance of syphilis. He will perhaps tell us what evidence, if any, there is that the disease prevailed among the Jews, Greeks, and Romans prior to the Christian Era, and if there is any good ground for the opinion that it was well known on the continent of Europe in the early centuries after the beginning of this era.

Is it certain that the same disease which we know as syphilis, with symptoms of constitutional infection, had existed in various parts of the ancient world?; and, if so, was there a long period of several centuries during which the disease was in complete abeyance, or but slightly, if at all, in evidence? Must we assume a continuity of the virus from very early times, or was there a great development or re-development at the end of the fifteenth century?

Is there anything to support the assertion that syphilis was first imported from the East into Europe on the return of the Crusaders in either the eleventh, twelfth, or thirteenth century?; or are we warranted in believing that it only came to Europe on the return of Columbus, after his first expedition to America and the West Indies, on March 15, 1493? Was the malady which was so destructive to the French army under Charles VIII, before Naples, really syphilis?; and if so, did the disease break out originally in Italy during the siege of Naples, the fall of which was brought about in 1495?; or, on the contrary, was syphilis prevalent in Paris in 1494 and in the few years before that date?

If syphilis existed in very ancient times, was Egypt specially exempt from it? If not, how is it that no trace of its ravages was found in any one of the 10,000 skeletons referred to by Professor Elliot Smith in his communication to the Pathological Society of Manchester, entitled "Disease in Ancient Egypt"?[1]

Another question arising in connexion with the antiquity of syphilis is whether the ancients confounded it with leprosy; whether, as Sebastianus Aquilanus has endeavoured to prove from Galen, Avicen, and Pliny, &c., the pox is only one species of the leprosy?; and whether, as Jacobus Cataneus, a writer almost as early as the rise of the name pox, tells us was possible, transitions from leprosy into pox and from pox into leprosy could and did occur?[2]

[1] *Lancet*, 1909, ii, pp. 1596-7.

[2] Becket, *Phil. Trans.*, 1720-21, xxxi, p. 55.

There is ample evidence that during the Tudor and the Stuart and Commonwealth Periods of English history syphilis was rampant in this country as well as in France and Italy. It is sufficient for proof to quote Shakespeare in regard to the first, and Wiseman in reference to the latter periods.

The word pox reminds us of the frequent use Shakespeare made of it. It occurs at least four or five and twenty times collectively, in fifteen of his plays. He used it as a curse, or an imprecation of impatience or evil. Thus, Iago says to Roderigo, who talked of drowning himself: "A pox on drowning thyself." Sir Andrew in "Twelfth Night," referring to a certain knight who was a celebrated fencer, says: "Pox on't, I'll not meddle with him." In "Measure for Measure," Barnardine in his prison exclaims:—

"A pox on your throats! Who makes that noise there?"

In "Love's Labour's Lost" we find even ladies of quality—ladies in attendance on the Princess of France—making similar exclamations, such as, "A pox of that jest!" In "All's Well that Ends Well" a French lord in a camp near Florence says of a soldier: "Let him fetch off his drum"; and he is anwered by another French lord:—

"A pox on't, let it go, 'tis but a drum."

In "Two Gentlemen of Verona" the servant of one of the gentlemen says to him of the other: "A pox of your love letters." In "Henry IV," in "Hamlet," in "Cymbeline," in "The Tempest," and other plays, there is similar employment of the word, which is equivalent to the "Damn," or "Damn it," of the present day.

This use of the word seems to prove conclusively that syphilis was very common in Shakespeare's day, and that the constitutional and local symptoms of the disease must have been quite familiar to the man in the street and to the ordinary person in society. It is quite obvious from the context of several of the passages in which the word occurs that it was the great-pox and not the small-pox which had given it currency, and to which allusion was made. For example, in "Pericles, Prince of Tyre" the virtuous Marina, the daughter of Pericles, who had been taken captive by pirates and sold to a brothel keeper, is cursed in the following manner by a Pander of the Bawd, for not yielding her honour on the solicitation of the customers: "Now the pox upon her green-sickness for me!"; and the Bawd replies to him: "Faith, there's no way to be rid on't but by way to the pox." In the scene in

the brothel, Lysimachus, the Governor of Mitylene, inquires, "Have you that a man may deal withal, and defy the surgeon"; and in her interview with Lysimachus, Marina speaks of herself as being within a

> "Loathsome stie
> Where, since I came, diseases have been sold
> Dearer than physic."

In "Henry IV," Falstaff says: "A man can no more separate age and covetousness than he can part young limbs and lechery; but the gout galls one, and the pox pinches the other." And lastly, in "Timon of Athens" there abound convincing proofs that Shakespeare knew thoroughly the ætiology, the symptoms of the later stages, and the then prevalent treatment of syphilis. This noble Athenian misanthrope, addressing Alcibiades, says:—

> "This fell whore of thine
> Hath in her more destruction than thy sword,
> For all her cherubin look."

Phrynia hearing this said of her, savagely replies to Timon, "Thy lips rot off"; and Timon retorts, "I will not kiss thee, then the rot returns to thine own lips again." Timon means, "I will not take the rot from thy lips by kissing them"; for, as Dr. Johnson has pointed out, "In former times there was a general impression that the venereal disease, transmitted to another, left the infector free." Further on in the same scene Timon says:—

> "Be a whore still! They love thee not that use thee;
> Give them diseases, leaving with thee their lust.
> Make use of the salt hours; season the slaves
> For tubs, and baths; bring down rose-cheeked youth
> To the tub-fast, and the diet."

The dramatist is here alluding to the practice of treating syphilis at that time either by guaiacum or mercurial inunction. With each method great care was taken to keep the patient warm and to sweat and diet him. Wiseman, about seventy years later than Shakespeare, tells us that in England a hot bath in an ordinary tub was used to make the patient sweat; abroad, a stove, an oven, a cave, or dungeon was resorted to during the guaiacum treatment. Hot baths, Wiseman says, promoted and hastened the effect of inunctions to cause salivation. During the whole period of treatment the strictest regulation in diet, amounting

almost to abstinence, was insisted upon. Hence we see the point and meaning of Shakespeare's reference "To the tub-fast, and the diet." Shakespeare was quite alive to the pains of periosteal nodes, to tendon gummata, to ozæna, to the loss of hair, to the voice changed by syphilitic laryngitis, and to the sallow, withered look of the skin of the face in late syphilis. He speaks of "a pox of wrinkles," and he makes Timon tell Phrynia and Timandra, in language which shows a considerable knowledge of the characters of secondary and tertiary syphilis:—

> "Consumption sow
> In hollow bones of man; strike their sharp shins,
> And mar men's spurring. Crack the lawyer's voice.
> . . . . . down with the nose;
> Down with it flat; take the bridge quite away
> Of him, that his particular to foresee
> Smells from the general weal; make curl'd-pate ruffians bald;
> And let the unscarred braggarts of the war
> Derive some pain from you. Plague all;
> That your activity may defeat and quell
> The source of all erection."

The only passage I know of in any of his plays from which it could be inferred that Shakespeare was referring to the small-pox is the one from "Love's Labour's Lost," which I have previously quoted. In this scene Rosalind says: "O that your face were not so full of O's!" (meaning, I suppose, the circular pits or depressions which are caused equally by syphilis and small-pox); to which Katherine replies, "A pox of that jest."

Shakespeare was not the only dramatist of his period who used the expressions "Pox" and "Pox on it." They are to be met with in Ben Jonson's plays, as, for instance, in "Every Man in His Humour." A century later than Ben Jonson and Shakespeare the same words were still used in the same way by Colley Cibber in "The Careless Husband," a play which Horace Walpole described as "worthy of Immortality."

Wiseman refers to the opinions of Fernelius (1497-1558), who wrote vehemently against the use of mercury. He also quotes from the writings of medical men who were contemporaries of Shakespeare (1564-1616)—Sennertus (1572-1637), Palmarius (1520-1588), Fallopius (1523-1562)—and gives his own personal experience. His notes of the symptoms and treatment of a very large number of cases under his own care, and his comments on them, stamp him as a remarkably careful observer, and a very able clinician, and prove how common the disease must have been, and how familiar Wiseman (1625-1686) was with it in its various aspects, both in its acquired and congenital forms.

To Dr. Mott we look for much important information, and for valuable suggestions respecting syphilis in relation to public health and eugenics, as well as for additional light on the subject of congenital syphilis. Dr. Mott's special experience in neurology and psychiatry will doubtless enable him to add to our knowledge about the insanity due to syphilis. Perhaps he will be able to explain why the syphilitic virus —the spirochætes and their toxins—has such a selective influence upon certain parts of the nervous system, in producing those progressive degenerations which (1) affecting the different conducting tracts of the spinal cord, result in locomotor ataxy; and (2) affecting the frontal and central convolutions of the cerebral hemispheres, cause general paralysis of the insane.

Why is it that the symptom known as Argyll-Robertson pupil is found almost, if not quite, exclusively in persons affected with acquired or inherited syphilis, and as a rule in them only; and are we justified in inferring from this fact that the syphilitic poison is the cause of locomotor ataxy and general paralysis of the insane, in the great majority of instances?

Does the syphilitic virus, as distinct from the soil it infects, vary in such a way that one variety of it is more likely than another to cause tabes and general paralysis of the insane?

In the syphilis of the offspring, are we justified in attributing a certain class of pathological states, such, for example, as the erroneous growth of bone at the epiphysial lines of the long bones, and on the surfaces of the membrane-bones of the skull, to the general intra-uterine malnutrition, due to placental syphilis of the mother?; and in associating another set of pathological conditions, such as skin rashes and fissures, and snuffles, &c., to the specific inherited qualities and proclivities conveyed directly in the sperm-elements, or in the ovum?

As a syphilitic fœtus produces syphilization of the mother, what is the consequence when this same mother bears children to another man who is not himself syphilitic? Will not the children of such a union also be syphilized?

What degree of tendency, if any, is there for the children of syphilitic parents to be affected with acquired syphilis? Or, in other words, is there an absence of susceptibility to acquired syphilis in healthy persons born of syphilitic parents in whom the disease had well-nigh worn itself out before the offspring had been conceived?

Does present-day experience still go to prove that when an infant with a congenital syphilitic history is properly vaccinated, whilst its

skin is clear of eruption, normal vaccinal vesicles develop and take a normal course to their termination?; and does a healthy child born of non-syphilitic parents, if properly vaccinated from the lymph taken from such correct vesicles of a syphilitic infant, entirely escape syphilis?

Is information forthcoming to explain the variations in the frequency and severity of venereal diseases in the armies of the different countries of Europe and elsewhere?

These are some of the problems which have presented themselves to me and which perhaps may be demonstrated and settled by the opener of the debate in this Section, or by some of the subsequent speakers on "Congenital Syphilis" and on "The Relation of Syphilis to Public Health and Eugenics."

To Mr. D'Arcy Power has been entrusted the opening address on the "Treatment of Syphilis." Mr. Power's extensive knowledge of medical and general literature will no doubt lead him, if he should so think fit, to speak concisely, yet comprehensively, on the old remedies and method of treatment; whilst the special arrangements he has made at his hospital for the close observation of patients undergoing the new treatment, together with his discriminating and unbiased judgment of the results, will doubtless enable him to give valuable information upon a subject of absorbing interest at the present time.

That the three factors of the new treatment of syphilis were all discovered between 1905 and 1909,[1] and were made known at intervals of two years of each other, are facts which have given a fresh and profound interest to an old disease of considerable, if undefined, antiquity; and a new hope in the study of the various extensions and ramifications of the disease, which are the outcome of the researches of the last decade or so.

I have thrown together these suggestions and ideas since I was told a few days ago that I should be expected to make some general introductory remarks to-day; but I feel that I should indeed be inflicting an injustice upon the gentlemen who are here to open the debate, and a great unkindness upon all the rest of you, were I to detain you any longer by any words of my own. I will therefore say no more, except to ask for your forgiveness if you think I have trespassed already too long upon your patience.

I now call upon Dr. Norman Moore.

[1] Schaudinn's discovery of the spirochæte in 1905; Wassermann's test in 1907; and Ehrilch's "606" in 1909.

OPENING ADDRESS, WITH SPECIAL REFERENCE TO THE PREVALENCE AND INTENSITY OF THE DISEASE IN THE PAST AND AT THE PRESENT DAY.

DR. NORMAN MOORE: The poem of Hieronymus Fracastorius which has given its name to the group of diseases due to a specific infection which the Society has decided to discuss, was published at Verona in 1530. There was a copy of this rare book in the library of Dr. Mead in Great Ormond Street, where the Hospital for Sick Children now stands, and he one day showed it to Charles Peters, of Christ Church, afterwards Radcliffe Travelling Fellow and Physician to St. George's Hospital, to whom he had previously commended the study of the poem. Peters in 1720 published a handsome reprint of the poem, with a dedication to Mead.

Fracastorius was a physician of Verona, of large practice and great learning, highly esteemed in his own time for his knowledge, both of medicine and of literature.

Lucretius had first shown to the Romans that poetry might set forth a complete system of philosophy, and that the whole order of Nature might be thoroughly and splendidly discussed in verse. He saw the difficulty of the task—yet accomplished it :—

> "Nec me animi fallit Graiorum obscura reperta
> Difficile inlustrare Latinis versibus esse."

Virgil, following him and meditating on his achievement, applied poetry to a simpler purpose—the exposition of the husbandman's art—and, without losing sight of its details, showed their poetical as well as their practical aspect, and thus did he—

> "angustis hunc addere rebus honorem."

When the revival of learning came and all men were eager to show the goodness of their Latin, nothing seemed more natural than to write on every art and science as nearly in the manner of Virgil as was possible.

Dr. Samuel Parr, whom our great-grandfathers believed to have a good knowledge of Latin, thought the "Syphilis sive Morbus Gallicus" of Fracastorius next in merit to the Georgics among such poems of the Arts and Sciences. The poem is in three books and contains 1,344 lines.

Its first lines sum up the generally received history of the origin of the disease :—

" Qui casus rerum varii, qua semina morbum
Insuetum, nec longa ulli per secula visum
Attulerint: nostra qui tempestate per omnem
Europam, partimque Asiæ, Libyæque per urbes
Sæviit, in Latium vero per tristia bella
Gallorum irrupit nomenque a gente recepit."

The disease was unknown before, says the poet; nothing like it had been seen. In his own time it had raged through all Europe and part of Asia and the cities of Africa, and had come into Italy through the grievous French wars, and so received its name from that nation.

The poet asks the Muse of Astronomy, as the goddess best versed in the effects of the stars and other physical forces, how the disease has arisen :—

" Dic Dea, quæ causæ nobis post secula tanta
Insolitam peperere luem? Num tempore ab illo
Vecta mari occiduo nostrum pervenit in orbem.
Ex quo lecta manus solvens de littore Ibero
Ausa fretum tentare, vagique; incognita ponti est
Aequora, et orbe alio positas perquirere terras?
Illic nanque ferunt æterna labe per omnes,
Id morbi regnare urbes, passimque vagari
Perpetuo cœli vitio, atque ignoscere paucis."

What is the cause of this before unknown plague? Was it borne to our world across the western sea, when from the Spanish shore men dared to cross the ocean and to seek for lands in another world? For there this disease is said to be endemic so that few escape it.

The poet enlarges on the obscurity of the origin of disease in fine hexameters, but in a way that reminds one of Johnson's remark on a passage in Milton's "Lycidas": "How one god asks another god what is become of Lycidas, and how neither god can tell."

The second book deals with the treatment of the disease. The third contains the incident which gives it its name. Siphilus, a shepherd, proud of the flocks of King Alcithous which he is feeding, blasphemes the sun god, and the sun god in revenge darts this disease forth, which attacks the shepherd. He was to be sacrificed, but is saved by the intervention of Juno. The poem ends with lines in praise of Guaiacum and of Peter Bembo, to whom the three books are dedicated by the learned and observant Fracastorius. The poem is contemporary evidence of the prevalence in its time of the hypothesis of the then recent origin of syphilis. It was believed, as Dr. Freind points out in his "History of Physic,"[1] to have been imported by Columbus from

[1] "History of Physic," ii, p. 337.

the West Indies in 1492, and to have first attracted attention at the siege of Naples in 1493-4, when it became diffused in the French army.

Is this account true? Does it show that syphilis was unknown in Europe before the end of the fifteenth century? That it was imported from America cannot be asserted without much more evidence than is generally set forth, and the statement may probably be an inference from the date of the supposed first appearance of the disease in the Old World. On this point I may quote a letter which I received from Dr. Elliot Smith on June 3, 1912:—

"Since last I saw you I have seen Dr. Alěs Hrdlička, Anthropologist to the Smithsonian Institution in Washington, and its delegate to the Americanist Congress in London. His evidence concerning syphilis in America is so nearly similar to my experience in Egypt, that I send you notes upon his statements which he gives full permission for you to use as you may think fit. Many thousands of skeletons from all parts of America (North and South) have passed through his hands, but he has not seen a single case of syphilis (or lesion which competent pathologists will admit to be syphilitic) in any one bone which is certainly pre-Columbian. That there was no immunity to the disease is shown by the fearful havoc worked by it among Indians in post-Columbian times. One Indian cemetery (probably early eighteenth century) in Kentucky had over 70 per cent. of the skeletons severely damaged by undoubted syphilis. Moreover, the Indians (who have remedies for all their own diseases and an intimate knowledge of their symptoms) have no remedy for syphilis and are terrified by it in their impotence to deal with it."

The examination of mediaeval and classical writers on medicine has hitherto yielded very indefinite results. The endeavour, for example, of Francisco Lopez de Villalobos in 1498, to identify syphilis with the condition named Saphati by Avicenna in the fourth book of the Kanûn, is altogether unconvincing, and the same may be said of the many other comparisons collected by Dr. Iwan Bloch, of Berlin, in his "Ursprung der Syphilis" (Jena, 1901).

One difficulty of the identification, of course, is that of distinguishing in words some of the commonest lesions of syphilis from those belonging to other diseases. Most of us have known cases in which the rash of small-pox has been mistaken for a specific eruption and the patient remitted to the skin department of a general hospital; and I can easily believe that patients whose rash is due to syphilis may sometimes arrive at the admission room of a small-pox hospital. The very terms *la grosse vérole* and *la petite vérole* and their English equivalents sufficiently

indicate these resemblances, and show how difficult must be the precise discovery of syphilis among the vast collections of phrases of the mediaeval writers, whether European or Oriental. The same applies to the classical authors, both of medicine and of general literature.

No objection on the score of propriety would have deterred Petronius in the time of Nero from mentioning the subject. More than one dialogue of Lucian might have contained some informing allusion as to other parts of the Roman Empire in the time of Galen. The subjects of the "De XII Cæsaribus" of Suetonius might easily have given one or more examples of the disease, while the VIII Satire of Juvenal, "Stemata quid faciunt?" would almost certainly have contained some allusion to physical deformity or heredity connected with syphilis had the disease been well known in his time. To go to more remote times, Terence, if syphilis had existed in Rome under the Republic, would probably have introduced into the dissolute scenes which his spectators enjoyed, some allusions such as those which pleased English playgoers in the Restoration period. No certain references to syphilis are to be found in the general Greek or Latin literature.

To turn from the descriptions of books to the remains of men, Egypt offers a wide field of observation in which indications of the presence of syphilis in the ancient world might be discoverable. By the kindness of Professor Elliot Smith and of Professor Wahby, I was allowed, in two visits to Egypt, to look at the large collection of partly broken-up mummies and of separate bones in the rooms adjoining the museum of the Egyptian Medical School in Cairo; and, being familiar with the fine collection of bones at St. Bartholomew's Hospital, I was not incompetent to make observations on the subject of the presence or absence of syphilitic lesions. I did not see one specimen. In the *Lancet* of August 22, 1908, Professor Elliot Smith,[1] whose opportunities of observation in Egypt have far exceeded those of all other men, and who has made the fullest use of those opportunities, stated that in no case had he seen in bones, teeth, or soft parts of the many thousands of ancient Egyptians he had examined any lesions at all resembling syphilis. He mentioned that all the cases described as syphilis in ancient Egyptian bones up to August 22, 1908, were examples of the destructive work of necrophilous beetles which had attacked the bones in the grave, long after burial. In a letter which he was so good as to write to me on May 14, 1912, and which he permits me to quote, Professor Elliot Smith says:—

[1] *Lancet*, 1908, ii, pp. 521-24.

"Last year I received from Nubia a skeleton of the Middle Empire period (circa 2000 B.C.) with extensive lesions of the humerus, scapula, sternum, and spinal column, which I submitted to Strangeways in Cambridge. He has made a detailed examination (with the help of Dr. Emily Morris) and written a full report for our final Nubian report, from which I quote (and you are welcome to make any use of these quotations): 'Adult Nubian woman (circa 2000 B.C.). Left humerus: Changes in the shaft present all the appearances of a syphilitic node, but might equally well have been produced by any local inflammatory condition of periosteum. Changes in humerus and scapula closely resemble those found in syphilis, but the change in the sternum and spinal column are rather those of a severe chronic suppuration.' Although the node on the humerus closely resembles a syphilitic node and *would in a recent specimen almost certainly be diagnosed as such*, remembering that syphilis is unknown in bones of Egyptians of this date, it would be unwise to suggest that the changes are due to this disease. Last week Strangeways received another suspicious specimen from me (Egyptian: Ancient Empire from Giza Pyramids); if he cares to commit himself, you are at liberty to use the information he supplies."

In a later letter Professor Elliot Smith adds: "I have seen Strangeways, who tells me that the last specimens I sent him are almost certainly *not* syphilitic."

Thus it is clear that no undoubted syphilitic lesions have been discovered in the vast collection of human remains belonging to several thousand years which have come under the observation of so learned and accomplished an anatomist as Professor Elliot Smith.

Three most learned men have considered the question of whether there are any passages in the Greek and Latin writers of antiquity which prove syphilis to have existed in their times. Jean Astruc, Professor at Montpellier, was of opinion that in the classical writings there was not the least syllable that could properly be applied to it.[1] Dr. John Freind, in his "History of Physic,"[2] discusses some passages in mediaeval writers with the learning which he always shows, and concludes that they do not describe appearances really due to syphilis. His remarks are the more valuable because he had read the whole of the mediaeval authors and was thus familiar with the way in which the same passage, with slight verbal alterations, again and again appears in the pages of one, taken from those of another without the least acknowledgment. He was also deeply read in the classical authors, and thus his conclusion

[1] "De Morbis Venereis," Paris, 1740.
[2] "History of Physic," London, 1725.

that this group of diseases was not observed in mediaeval or classical times is an authoritative opinion. The third physician who has discussed the question with great learning, especially in the classical writings, is Van Swieten. He has considered all that Astruc and Freind have said, and has himself studied the ancient authors, and arrives at the same conclusion as Astruc and Freind, that no passages exist which can prove the Greeks, Romans, or Arabians to have been acquainted with syphilis. The subject affords so many opportunities of illustration that it seems unlikely that the greatest linguistic attainments in Greek, Latin and Oriental languages could do much more to discover the early prevalence of syphilis than the reading of Astruc, Freind and Van Swieten.

Our knowledge of the results of this infection has greatly increased in our own times. Thus since the last meeting of the International Medical Congress in London in 1881 the opinion has slowly been established that general paralysis and locomotor ataxy are always to be counted among the manifestations of syphilis. This conclusion seems to open a new possibility of inquiry into the possible occurrence of syphilis in ancient times. If Galen, practising in Imperial Rome, observed or had heard of the mental delusions of general paralysis, or if in any passage he had described the gait of locomotor ataxy or the sudden falling down of its subjects when they entered dark passages, or otherwise ceased to see their feet, then the opinion that syphilis did not exist in early times would have to be altered, and those passages in classical medical writers capable of interpretation in the direction of syphilis, though insufficiently clear to be taken alone as descriptions of its symptoms, must be reconsidered, and might, some of them, become additional evidence in favour of the early prevalence of syphilis. On the other hand, if none of the characteristic nervous affections of syphilis are discoverable in Galen, the opinion that the disease did not exist in Imperial Rome or in early times will be confirmed.

It was the desire to draw attention to this line of investigation which made me willing to accede to the request of the Council of our Society to open this discussion on syphilis with special reference to the history of the prevalence of the disease in the past. The late Henry Pelham, Professor of Ancient History at Oxford, used often to dwell in conversation on the usefulness of the study of Galen in relation to the life of Rome in the time of Marcus Aurelius, and if a scholar should arise capable of the widest illustration of Galen then the question of whether these two most prominent nervous diseases of syphilis or any others of the same origin existed in his time may probably be finally decided.

Taking without criticism the Galenic writings as they were received in the time of Linacre, I may make some few and imperfect suggestions towards such an inquiry. Charles Victor Daremberg, who afterwards made so many contributions to the history of medicine, wrote his thesis for the degree of M.D. in Paris on "Galen's Knowledge of the Anatomy, Physiology, and the Pathology of the Nervous System."[1] Daremberg first states what Galen knew of the nervous centres, how he dissected the brain, what he knew of its membranes, and of the cerebral surface, of the brain itself, of the pituitary body, the brain substance, and the spinal cord. He then shows how far Galen was acquainted with the cranial nerves, the spinal nerves, and the nerves of the limbs. Some notes follow on Galen's physiological notions and on his experiments. The pathological part of the thesis is the least full, but Daremberg dwells upon one interesting case which Galen mentions in three separate treatises. A sophist had loss of sensation in his two last fingers and in half of his middle finger. Galen asked if he had received any blow or wound of the arm. The sophist answered that he had not. Galen then examined his spine and elicited that he had fallen from a vehicle upon a rugged stone and received the blow between the shoulders, and that a violent pain followed, which in time went away, and was followed by a loss of sensation which grew more and more profound as time went on. Galen thought the effect due to injury of the spinal cord, applied remedies over it, and adds: "I obtained the cure of my patient."[2] The patient was interested in his own case and raised a violent discussion between some physicians who did not belong to the Hippocratic School and who had seen him before, and Galen. The patient wanted to know how a paralysis of sensation only could occur. Galen answered that movement being active it required much force to effect it and a severe injury to abolish it, while, on the other hand, sensation being passive it disappeared under the influence of the slightest cause. They were completely satisfied with Galen's answer, but the physician and philosopher wished to put them to confusion, and asked them how they could explain a loss of the power of movement only. They were not able to do so. Galen explained that there are nerves which belong to the muscles and others which go to the skin. That when the former nerves are affected, motion is abolished, when the latter, sensation. Galen demonstrates that it is

[1] "Exposition des connaissances de Galien sur l'Anatomie, la Physiologie et la Pathologie du Système Nerveux," Paris, 1841.

[2] "De locis affectis," i, p. 6.

possible to determine what part of the spinal cord is affected and which nerve. The case shows very well what close attention he had paid to the anatomy and physiology of the nervous system, and that he had made some progress in those observations which indicate its morbid conditions.

I may proceed to interrogate further Galen himself. His treatise on muscular movement shows that he had investigated and considered all the movements of several muscles, while that "De differentiis morborum" shows close observation of the movements of the limbs. The treatise addressed to Thrasybulus on exercise dwells upon the uses of gymnastics. These three books are perhaps sufficient to show that had Galen seen many men walking in the streets of Rome with well-marked symptoms of locomotor ataxy, he could hardly have failed to mention their kind of gait as an abnormal condition. It may be added that the book "De symptomatum causis," which Linacre translated, shows that Galen had seen cases of spinal injury, and had noticed insensibility and immobility below the seat of such injuries, and that their area depended upon the level of the injury. Tremor and palpitation, general convulsion and paralysis of the whole body after an apoplectic fit—all these he had noticed. He had carefully observed the trembling due to old age, and that produced by wine, and that which we should classify under the term rigor. All these may be mentioned as showing how competent he was to observe so marked a peculiarity of movement as that of locomotor ataxy.

In the treatise on the diseases of the mind and their cure, in which he gives so interesting an account of his own education, Galen deals rather with moral affections than with what we commonly call insanity, yet in the chapter on avoiding insatiability he might easily have mentioned magnificent delusions. He dwells upon the folly of luxury and of the unnecessary multiplication of riches, of garments, and of ornaments, but mentions no delusions in relation to them. The six books of commentaries on Hippocrates' "De morbis vulgaribus" do not contain any allusions to nervous diseases of possible syphilitic origin, but the six books "De locis affectis," besides the case already mentioned, contain other allusions to conditions of the nervous system, and full discussions as to the causes and seat of pain. In these general and complicated discussions as to pain, and its meaning in relation to diagnosis, are there any words indicating the observation of the lightning pains of locomotor ataxy? No distinct mention of them is made. Galen had not observed them, while his observations and commentaries

are so often acute that had such pains been common in the patients of his time it is unlikely he would have overlooked them altogether, though he might perhaps have not distinguished them from the periosteal pains with which the sixteenth, seventeenth and eighteenth century observers probably confused them. The interesting discussions in the third book of the "De locis affectis" on affections of the brain, on convulsions, on epilepsy, and vertigo, on hemicrania, on apoplexy, and on affections of the spinal cord, still further show Galen's attention to nervous disease, and suggest that he is unlikely to have seen any of the prominent nervous affections due to syphilis. When, again, he was considering the pulse of paralytics in his treatise on pulses for beginners he had another opportunity of noticing cases of ataxia had they come into his practice. The sixteen books on the pulse contain some remarks bearing on the nervous system, such as the passage on the pulse of paralytics[1] and that on the effect of meningitis of the dura mater on the pulse,[2] but nothing pointing to a knowledge of syphilitic nervous disease. Nor do the books "De crisibus" and "De diebus decretoriis," nor the fourteen books translated by Linacre, "De medendi methodo."

I have perhaps pursued the subject sufficiently far to show that Galen is not likely to have been familiar with any of the nervous diseases most certainly due to syphilis. The conclusion I would venture to draw, if a critical investigation of all his writings should arrive at the same result, is that syphilis did not exist in Ancient Rome, if no nervous diseases due to it were seen by a physician of such keen observation and such wide experience in practice as Galen. If this be so, it is credible that the period of the first appearance of the disease in Europe was in reality as has been so often asserted, the end of the fifteenth century. That the original habitat of spirochæta remains to be discovered is no objection to this view, since at present very little is known of the history of the geographical distribution of such organisms. I hope the Society will forgive me for drawing attention in so superficial a manner to the desirability of investigating thoroughly all the remarks of Galen on nervous diseases, with a view to the consideration of whether the non-existence of locomotor ataxy and general paralysis in his time may not be taken as a strong confirmation of the Egyptian evidence against the existence of syphilis in ancient times in the countries surrounding the Mediterranean.

[1] "De causis pulsuum," Book IV.

[2] "De præsagitione ex pulsibus," Book IV.

OPENING ADDRESS, WITH SPECIAL REFERENCE TO THE TREATMENT OF THE DISEASE.

Mr. D'Arcy Power: I think the Royal Society of Medicine is to be congratulated upon choosing the subject of "Syphilis" for the first general debate in this its New House which was opened on May 21, under those auspicious circumstances which we all beheld.

Syphilis has been so much discussed and its cause and pathology have been made so clear within the last ten years that the treatment has been revolutionized, and it has become necessary to focus our newly acquired knowledge, avoiding rash generalizations on the one hand and an undue conservatism on the other. The field is already so large that it cannot be surveyed satisfactorily by any single observer, and the Royal Society of Medicine has done wisely, therefore, in choosing several Fellows to open this discussion and in allotting to each of them a separate plot. To me has fallen the consideration of modern methods of treatment, partly, perhaps, because I am engaged in general surgery, and so have no special bias towards any particular plan of treatment, partly because, for some years past, I have kept one or two beds in my male and female wards at St. Bartholomew's Hospital for the special purpose of comparing the relative value of the new methods of treatment.

My colleagues at the Hospital have placed me under an obligation by allowing Mr. J. E. H. Roberts to collate the results of the cases of syphilis which they have treated, whilst Mr. Roberts himself has done excellent service in bringing forward the cases upon the present occasion. The Pathological Department of the Hospital, too, under the able superintendence of Dr. F. W. Andrewes and Dr. Mervyn H. Gordon, has given unstinted help in determining the Wassermann reaction in the patients sent to them, so that we have been able to assure ourselves that every patient who was treated really had syphilis, a point of considerable importance and less easy to determine than might appear at first sight.

The modern treatment of syphilis dates from the years 1905-1909. In 1905 Schaudinn discovered the spirochæte; in 1907 Wassermann published his test; in 1909 Ehrlich issued his remedy "606." It is necessary to remember these dates, for they show how recent is our knowledge and how tentative must be the results in a disease which has such long-continued and far-reaching results as syphilis. It is still much too early to arrive at any final conclusion, and for many years to come it will be necessary to reconsider the results, and perhaps to abandon

many of those points which we now consider to be of the greatest importance.

The first advance towards a scientific method of treating syphilis was made when Schaudinn discovered the spirochæte and brought the disease into line with other diseases of microbic origin. Schaudinn was a skilled biologist, the advances of modern tropical medicine were well known to him, and the weight of his authority was sufficient to stamp the value of the discovery, to fix the position of the micro-organism in the animal kingdom, and to point out by analogy the most likely methods of destroying its virulence.

The second step in the treatment of syphilis was also purely scientific. It was made when Wassermann gave a test founded upon the broad principles of pathology. At first, I fear that I was somewhat sceptical as to the value of the Wassermann reaction, and exactly in those cases where I now know that it is of the very greatest help. It was difficult to believe that a young man, seemingly in perfect health and without a blemish, was suffering from a spirochæte infection simply on a pathological report. I had been brought up in the old school which required some clinical evidence of syphilis before a patient is placed upon a mercurial course. I knew and had taught for years that syphilis was a deceitful disease, the signs and symptoms being intermittent, because periods of apparently perfect health are intercalated with other periods when the manifestations are plain, but it was difficult to rely upon a test made by another person, however skilful and assured he might be. Two or three cases, however, convinced me. In these cases the absence of symptoms, with a very doubtful history of a sore, led me to give too sanguine a prognosis and decided me to await further evidence although the Wassermann reaction was positive. Mercury had to be given in each of these cases, and I now have faith in Wassermann's test, especially in the very difficult cases where it is necessary to obtain evidence of syphilis apart from the ordinary clinical signs. We must recognize, however, that the test has its limitations. The reaction is not given by every patient even when there are obvious signs of syphilis; it is not usually positive until five to eight weeks after infection, when the disease has ceased to be local and has become generalized in the body; it is positive in 95 per cent. of cases of "secondary" syphilis and in 75 per cent. of "tertiary" syphilis, whilst it is said to be positive in only 50 per cent. when the disease is latent. Moreover, it labours under the disadvantage of being a laboratory test requiring a skilled worker to carry out the technique. In the future this may be overcome in one or two ways: either the test will be simplified, or we shall educate the next generation

to become more skilled pathologists than we are ourselves. For the present it is necessary to rely upon the report of another person, and this is somewhat repugnant to my surgical instinct.

Knowing the cause and being provided with a test, it is possible to employ a course of rational treatment in a disease, and this is what has happened in the case of syphilis within the last few years. Mercury even in our own times was administered in all cases of venereal disease associated with a sore. The more cautious, indeed, awaited the appearance of "secondary" symptoms: the bolder gave mercury at once if there was a "hard sore" or "Hunterian chancre." But the drug was given for the most part without any system and without any very clear idea of what was to be expected from its use. Too often it was given merely for the relief of syphilitic manifestations and its administration was stopped as soon as these signs disappeared. Little was known of visceral syphilis; still less of syphilis of the nervous system. It is no wonder, therefore, that syphilis was looked upon as incurable, and it actually was so when mercury was given in this haphazard fashion. The remedy further fell somewhat into disrepute, because it was recognized that many syphilitic manifestations disappeared spontaneously whether or not mercury was given. A school arose, therefore, which maintained that guaiacum, iodide of potassium, arsenic, and other drugs were just as efficacious. It was difficult to gainsay these statements so long as the cause of the disease was unknown and there was a prevailing ignorance of its natural history. We know now that all these drugs may be useful adjuvants but that they do not cure, that is to say, they do not destroy the causal micro-organism in the same thorough manner as is done by mercury.

In this country the rational administration of mercury with a view to cure syphilis, and not merely to relieve the signs of syphilis, is due largely to the teaching and practice of Sir Jonathan Hutchinson. We have learnt from him that small doses of the less irritating forms of mercury administered for long periods of time, whether or not signs are present, are more serviceable than large doses given irregularly and for short periods. But as the cause of syphilis was unknown, Sir Jonathan had only his own acumen and experience to guide him, and it was impossible for him to communicate his knowledge personally to any very large number of medical men. His methods, however, came into general use, and even before the discovery of the spirochæte it was admitted that syphilis was curable by those who were prepared to take an infinitude of time and trouble about their disease. There was, however, no test upon which reliance could be placed as to whether or not a patient was cured,

and the answer to the question had to depend upon time and circumstances. It was impossible, therefore, to lay down any definite rule as to the duration of a mercurial course, or when it might safely be stopped. The length of a course was dependent upon the presence or absence of symptoms after the administration of mercury had been stopped for a longer or shorter period. It resolved itself eventually into the administration of mercury with regulated intervals for about two years. If at the end of this period no fresh symptoms appeared within the next three months the patient was thought to be cured. It is needless to say that this empirical method often led to disappointment, and sometimes to disaster. It became clear, too, as our physicians learnt to associate some of the commoner diseases of the brain and spinal cord with imperfectly treated syphilis, that very many cases of the disease were never really cured, although there had been no external signs for many years after treatment had been discontinued. The Wassermann reaction seems to give us the necessary clue to the process of cure, and syphilis can only be said to be cured, in the light of our present knowledge, when the test is negative and the patient remains without symptoms for at least a year after the use of mercury has been discontinued.

The first variation from the methodical and routine administration of mercury by the mouth or by inunction was the use of intramuscular injections. Experience soon taught that it was especially serviceable in those terrible forms to which the term "malignant syphilis" is applied, when mercury was not well tolerated by the digestive tract, and when the patient could not be trusted to follow out his orders. The method of intramuscular injection was reduced to a system by the late Colonel F. J. Lambkin, A.M.S., whose recent untimely death in South Africa we all deplore. The creams of calomel and metallic mercury which he invented give excellent results. Less pain attends their use than when other formulæ are employed, and in no case in my own wards was their administration followed by troublesome symptoms when care was taken to avoid the nerves and blood-vessels of the part where the injections were made. We learnt that it was better to have the creams dispensed in single doses, each in an hermetically sealed tube, rather than to fill the syringe from a larger supply which had been repeatedly heated to render it fluid. It was necessary also to sterilize the syringe by boiling it in olive oil immediately before use. The cream and the oil then mix readily, whereas bubbles are formed when the cream is drawn up into a syringe which has been boiled in water. The routine treatment was identical with that recommended by Colonel Lambkin, viz :—

(1) Four injections of calomel cream delivered deeply into the gluteal region. Each injection consists of 10 minims of cream, the dose containing ½ gr. of calomel. The cream is made according to the formula :—

℞	Calomel		5 grm.
	Creosote		
	Camphoric acid	āā	20 c.c.
	Palmitin basis		100 c.c.

(2) The injections are made at intervals of a week, and at the end of a month they are replaced by a cream containing 1 gr. of metallic mercury in every 10 minims. The composition of this mercurial cream is :—

℞	Metallic mercury		10 grm.
	Creosote		
	Camphoric acid	āā	20 c.c.
	Palmitin basis		100 c.c.

Two weekly injections of this metallic mercurial cream are given.

(3) No injections are given for two months after these six doses have been administered.

(4) An injection of metallic mercurial cream is then given every fortnight for two months—i.e., four injections.

(5) No injections are given for four months.

(6) An injection of metallic mercurial cream is given every fortnight for two months—i.e., four injections.

(7) No injections for six months.

(8) An injection of metallic mercurial cream is given every fortnight for two months—i.e., four injections.

(9) No injections for one month.

(10) An injection of metallic mercurial cream every fortnight for two months.

Colonel Lambkin's method marks a distinct advance in the treatment of syphilis. He regarded mercury as a curative agent and gave it systematically to that end. It is well adapted for the Army and Navy, and it can be employed advantageously in hospital practice if the patient can be interested in his cure and will attend once a week for the injection. It is less fitted for private practice, where the mere mention of a needle prick is often sufficient to frighten a patient, whilst the needle itself is necessarily longer and stouter than that of a hypodermic syringe. Unskilful technique, too, has caused hæmatomata, painful indurations, and, occasionally, deep-seated abscesses. The knowledge that such accidents have happened has also had some effect in limiting the more extensive use of a valuable method.

In private practice, therefore, when a patient has declined to be treated by intramuscular injection, and recourse has been had to perchloride of mercury and iodide of potassium, I have tried to make the mixture somewhat less nauseous than that usually prescribed. I applied to Mr. Langford Moore and Mr. S. Tweedie, the dispensers at St. Bartholomew's Hospital, who recommended the following formulæ after making a large number of experiments. In both prescriptions the metallic flavour of the mercury and the acridity of the iodide of potassium are successfully masked. The first prescription is for those who like sweet tastes; the second is for those who prefer bitters.

(A) ℞ Liq. hyd. perchlor. ... ... ℥i
Potassii iodidi ... ... ℥i
Syrupi ... ... ℥i
Mucilag. tragacanth. ... ... ℥ii
Ol. amygdal. essent. (sine HCN)... ... ... ♏ii
Ol. cinnamomi ... ... ♏ii
Aq. chloroform. ... ... ad. ℥viii

M. Fiat mist. Sig., take an eighth part three times daily.

(B) ℞ Liq. hyd. perchlor. ... ... ℥i
Potassii iodidi ... ... ℥i
Tinct. chirettæ ... ... ℥iss.
Elixir glucidi ... ... ♏xl
Infusi. gentianæ ... ... ad. ℥viii

M. Fiat mist. Sig., take an eighth part three times daily.

I cannot speak from personal experience of the value of the arylarsonates and soamin. The accounts of these remedies did not appear to be very satisfactory, and before I had made up my mind to employ them they had been replaced by "606."

"606," or salvarsan, has been extensively employed in my wards, and I think highly of it as a remedy for syphilitic manifestations, although we have not yet sufficient evidence to prove that it cures the disease. I have always used it, therefore, as an adjuvant to mercury and never by itself or in place of mercury. The present working hypotheses are that salvarsan kills adult and free spirochætes, whilst it has but little effect upon those which do not lie in close relation with the blood and lymph paths, upon the immature forms, or upon those which are in an intracellular stage. Whether or not we choose to employ one of these hypotheses two great facts stand out in connexion with the action of salvarsan in syphilis—it cures the symptoms of syphilis in a shorter time than mercury, and it can be employed as a test for syphilis, because in many cases when salvarsan is given to a syphilitic patient whose Wassermann test is negative the first effect of the injection is to

render the reaction positive, although in a short time it again becomes negative. Salvarsan promises, therefore, to be useful as a test for the cure of syphilis effected by other means.

Much benefit is derived undoubtedly from the use of salvarsan, but it is useless to expect miraculous effects from a single injection. It is necessary to use salvarsan methodically if the best results are to be obtained, and the injections must be repeated at intervals of a fortnight to a month. If they are given too near together time is not allowed for the large dose of arsenic to be eliminated, and the symptoms attending the second dose may be more severe than the first.

The net outcome of our experience with salvarsan has been that it serves as an excellent adjuvant to mercury in the treatment of syphilitic lesions. It has proved especially useful in cases of chronic superficial glossitis, in active syphilitic periostitis, and in ulcerating syphilides of the skin. It has been less serviceable in cranio-tabes, and in cases of osteitis associated with the formation of sequestra, because in these conditions the pyogenic organisms are more important than the syphilitic infection; neither have the results been very satisfactory in cases of syphilitic arthritis, doubtless because many of these inflammations are also associated with a tuberculous infection.

So far as we have been able to ascertain no serious accident has occurred in our cases. We have recognized that we were dealing with a powerful arsenical compound and we have endeavoured to eliminate the more obvious risks. Personally I have not hesitated to use it in private when the patient desired it, and in one case of parasyphilis I administered it—against my own wish, but at the earnest desire of the patient himself—to a gentleman who had suffered for many years from tabes. He had a definite Wassermann reaction, he was nearly blind, and he was unable to walk more than a short distance. I assured him that there was very little probability, on pathological grounds, of his obtaining any good from salvarsan and that he might be made worse. He decided, however, to take all risks, and felt so much relief from the first injection that he determined to have a second. The first injection was given on July 5, 1911, the second on October 4—0·5 grm. each time. He writes on May 8, 1912: "I can now hold my water unless the bladder is overfull from drinking three cups of tea or taking a little sherry, and then I pass it more easily than I used to do before treatment. I have improved in balance since the last injection, as I can stand up on my toes without touching anything; my hearing has remained almost normal since December—that has improved more than anything else—my sight has improved a little. I can see light more strongly, but it is

very little better. My knee-jerks are no better, and my memory, I think, is not so good for names of people and places." To this his wife adds: "His memory is quite as good or better. I am very pleased to tell you what I think of the treatment you gave my husband last year. It has done him a great deal of good and his life is more worth living, though the cure is, of course, not complete. To give you details: Before the treatment I always had to wait for a favourable opportunity. Now his mind is clear and he can grasp and discuss serious affairs at any time. Formerly he could not be left alone at any time. He could not remember to sit still and he could not cross a room without help. His balance is now so much better that he can walk anywhere in the house and garden by himself. He is safe not to fall. I am to tell you he can stand up straight alone and put on his coat by way of proving that the balance is good. His hearing is very much improved. The control of the bowels returned, but I regret to say that since January it has failed, and it appears to be weaker than during the previous six months. The bladder remains as before. Now and then he can pass water without the catheter, but with no regularity. As regards distance: Leaning heavily and distressing himself considerably, he could walk two miles. He can now walk the same distance with ease and not leaning on anyone—simply being guided—and will probably walk another mile later in the day. His eyesight is not improved." This patient seems on the whole to have received benefit from salvarsan, and it will be interesting to discover from similar cases how far this was due to the drug and to what extent it was the result of a firm belief in its efficacy. The positive Wassermann reaction proves that the spirochæte infection was still active, though it was many years since he contracted the disease. The results seem to show that—as might have been predicted—his cerebral functions have improved whilst his spinal nervous system remains unaltered.

The routine of our technique for administering salvarsan has always been the same. It has been given by intravenous injection and the patient has been kept in bed for twelve or fourteen hours previously. The skin has been prepared by sterilizing it with a 2½ per cent. solution of iodine in rectified spirit. The veins are rendered prominent by the application of a fillet and when the veins at the bend of the elbow have been used the patient has been made to grasp a ruler or a staff as in the days of blood-letting. The needle used is that recommended by Mr. J. E. R. McDonagh, which is bevelled to a point on the upper surface instead of beneath, as is usual, and it is provided with a slightly concave plate of metal to allow it to rest more securely on the skin—two small

modifications which make the operation of puncture of the vein much easier. It is unnecessary to give either a local or a general anæsthetic when the veins can be made prominent, as is usually the case. A skin incision is unnecessary, and with a well-directed and sharp needle the pain is momentary and infinitesimal. The syringe and needle are filled with freshly prepared and sterilized salt solution and the vein is punctured obliquely upwards. The fillet is then relaxed and the contents of the syringe are emptied into the vein. This will show whether the vein has been fairly entered, for if it has been missed or transfixed the salt solution will form a bulla owing to the extravasation of fluid into the surrounding tissues. If the salt solution enters the vein freely the syringe is filled with salvarsan solution, which is then injected by syringefuls at a time until the whole pint has been introduced. When all the salvarsan solution has been introduced a syringeful of salt solution is injected to wash out the needle and to free the tissues from any salvarsan which might be adherent to them. Both the salvarsan and the salt solution are kept at a temperature of 105° F. The needle is then withdrawn, a pad and bandage is applied over the prick, the arm is kept in a sling for a few hours, and the patient is allowed to get up when he feels inclined to do so. The salvarsan solution is made by dissolving 0·6 grm. of salvarsan in a pint of sterilized salt solution made from freshly prepared distilled water. The solution is neutralized or rendered faintly alkaline by the addition of a 1 per cent. solution of sodium hydrate. It is necessary to have everything sterile, and it adds greatly to the ease of the operation if the rubber junctions connected with the three-way tap of the syringe are made of such thick rubber with so small a bore as to make it difficult to fit it on to the tap, because the ordinary thin rubber tubing is apt to slip off or become flattened if it kinks whilst suction is being made. When the needle is once fairly introduced care must be taken that it does not slip out of the vein. It is therefore handed over to the sole care of the patient if he is competent to look after it, or, if he is nervous, it must be given in charge of a nurse. If the needle slips out or if the vein is not punctured fairly at the beginning of the operation it is much better to employ another vein rather than to attempt any rectification in the one first chosen.

Our chief difficulties have been to find a suitable vein. Many of the men have been so self-indulgent as to become fat with lax tissues, whilst in women it is by no means easy to make the veins of the arm prominent. In some cases we have used the internal saphenous, in others it has been necessary to give a general anæsthetic and dissect out the vein at leisure.

The sequelæ have been trivial—headache, a rise of temperature to 103° to 104° F., with or without a rigor, vomiting, diarrhœa and stomach-ache, but they have caused no anxiety and the patient has always been well on the following day. In the majority of cases the patients felt no inconvenience at all. Two bad results have come under my observation, and in both an intramuscular injection of salvarsan had been made. In one case there was extensive sloughing of the tissues at the seat of the injection; in the other an œdematous and painful swelling occurred just below the angle of the left scapula where salvarsan had been injected. The swelling suppurated, was laid open, and in due course healed; but it was a long time before the œdema disappeared.

It seems, therefore, that salvarsan is a useful remedy if its limitations be recognized. How far it is useful in the initial stage of syphilis I do not know from personal experience. It is said that primary sores heal much more quickly if salvarsan is given than if it is not given, but the glands which enlarge as the result of the infection remain harder than normal although they have returned to their natural size. The drug is very useful in the secondary and tertiary stages in those cases where the lesions are due more to syphilis than to pyogenic micro-organisms. It is servicable, too, in some cases of parasyphilis, but to what extent and under what conditions I am again ignorant from want of personal experience. We still need more information about the treatment of heredo-syphilis with salvarsan, whether it is best to treat the child through the mother, by means of an intermediary, as a goat or cow, or directly—i.e., the child itself.

Broadly, I do not think that syphilitic lesions are more completely cured by salvarsan than they are by mercury, but the result is certainly brought about more speedily; and as the administration of salvarsan does not prevent the simultaneous employment of mercury, the two remedies may be serviceably used together. But until we have much more evidence and have proved its efficacy in a very large number of cases for a period of several years we shall not be justified in saying that salvarsan cures syphilis.

It is necessary to ask, what are the contra-indications for the use of salvarsan? About twenty-three fatal cases have been recorded, but several of these were moribund at the time of administration, some were associated with a faulty technique, and in others it was clear that the drug should not have been employed. It seems from the evidence at present available that the intravenous injection of salvarsan is a safe method of procedure if care be taken to administer it in a rational

manner and to reasonably healthy persons. The further question then arises, at what period in syphilis should salvarsan be given? The working hypothesis is that the drug destroys the active spirochætes with which it is brought into contact. If this hypothesis is correct the sooner a dose is given after infection the more likely it will be to answer its purpose, for we must assume that the microbes are localized at first to the seat of inoculation and to the neighbouring lymphatics and glands. We should also like to know how often salvarsan must be given and at what intervals, remembering that it is desirable to give as few injections as is consistent with a due regard to complete destruction of the spirochætes. I hope that these points will be emphasized and that we shall obtain answers from those who will take part in the discussion with a larger and more special knowledge than I possess.

What is the best treatment for syphilis in the present state of our knowledge of the disease? Taking for the sake of example the case of a surgeon or of a nurse who is inoculated in the course of professional duty, the wound should be well washed under running water, like a wound obtained in the post-mortem room. It should then be dried and covered with an ointment consisting of 10 grm. of calomel in 30 grm. of lanoline. This mercurial ointment should be gently rubbed into the wound for five minutes and a dose of salvarsan (0·6 grm.) should be given intravenously. The prophylactic action of the mercurial ointment appears to end—at any rate experimentally—within twenty-four hours of inoculation; the salvarsan is said to be serviceable in checking the generalization of the disease even when the seat of inoculation has become characteristically indurated and the lymphatic glands are enlarged. The fact, however, that the lymphatic glands do not return wholly to their natural condition after the administration of salvarsan in early syphilis rather inclines me to distrust the drug as a sole remedy, and should lead one to give mercury in some form or another as soon as possible.

A Wassermann test should be made at an early period after inoculation, although it will probably be negative in the very earliest stages, for as has been stated already, our present knowledge shows that it is usually positive in five to eight weeks after infection; it is positive in 95 per cent. of cases during the secondary stage, and in 75 per cent. during tertiary manifestation, but it is only positive in 50 per cent. of cases where syphilis is latent. Mercury should be given at once when the infection is undoubted, but in the more difficult cases, where the diagnosis is doubtful, it may be withheld until a positive Wassermann's reaction has been obtained.

Preferably the mercury should be given by intramuscular injection, and Colonel Lambkin's formulæ are quite satisfactory so far as I have used them. If, for any reason, the intramuscular method cannot be employed inunction may be employed. But when, as in ordinary private practice, the drug has to be given medicinally, I think the perchloride is better than the grey powder which has been used in England for a long time past. It seems to me that so long as mercury is given in small doses, systematically, and for long periods of time, the exact preparation used does not matter very much. The mercury should be given with regulated periods of rest and a Wassermann's test should be made at the end of each period just before the mercury is recommenced. If the test is negative an intravenous injection of salvarsan may be given with a view to elicit a positive result. If the test still remains negative after this injection the mercury may be discontinued for a further period so long as there are no signs of syphilis, and at the end of a further period of two months the test should be again employed. Marriage may be permitted under these conditions when the Wassermann test has remained negative and there have been no syphilitic symptoms for at least a year.

In this manner we shall avoid giving mercury for a longer time than is absolutely necessary, whilst the drug will be continued until the syphilis is cured, even when the absence of symptoms might seem to make a further mercurial course unnecessary. We shall also have taken a step in advance of Colonel Lambkin, who was obliged to take a time limit with absence of symptoms as a guide for discontinuing a mercurial course because the scientific test had not yet become available.

There are two objections to the use of Wassermann's test as an answer to the question whether or not an individual is cured of syphilis. In the first place, it is purely a laboratory test, and we are consequently at the mercy of the pathologist who makes this examination. This objection is easily surmounted by always employing the same pathologist. The second objection is much more serious. It involves the fallacy that Wassermann's test is an absolute proof of the presence or absence of spirochæte infection, and even in the light of our present knowledge it is certain that we are not justified in making such an assumption, for the figures given above show that the test remains negative in a certain percentage of cases in every stage of syphilis. Clinical experience and the caution begotten of it must still guide our advice therefore, but recent advances in the treatment of syphilis have been so great that we need not despair of obtaining some reliable test even in the immediate future.

OPENING ADDRESS, WITH SPECIAL REFERENCE TO THE RELATION OF THE DISEASE TO PUBLIC HEALTH, INCLUDING CONGENITAL SYPHILIS.

Dr. F. W. Mott, F.R.S.: Allow me to thank you for the honour you have done me in asking me to open the discussion on "Syphilis in Relation to Public Health." If I confine my remarks more particularly to the effects of syphilis upon the nervous system, it is not because I do not recognize the great importance of affection of other systems, particularly the heart and great vessels, in relation to public health, but because others will take part in this discussion who are more competent by experience and knowledge to deal fully with these matters, of which I have had far less experience.

There are no reliable statistics to show whether syphilitic infection is more prevalent at the present time than formerly; however, it is my conviction that severe bone diseases, skin diseases, and visceral diseases, due to syphilis, are not nearly so prevalent as they were when I was a student. But this did not prove that fewer people *pro rata* are infected (although it may be so); for the cause of diminution of severe lesions may be due to an increase of latent syphilis.

It is certain that with the conversion of the rural into an urban population, the more ready mingling of the town and country population, the short military service, and the frequency with which soldiers were syphilized by service in India, and other causes incidental to life in large cities with their armies of professional prostitutes and clandestine prostitutes, the possibilities of a general and widespread syphilization of the race has occurred, since the development of the railway system in England.

The struggle for existence is falling more and more upon the nervous system, and thus it becomes the *locus minoris resistentiæ;* consequently functional neuroses and psychoses are more prevalent. The conditions which favour cerebral and spinal neurasthenia, combined with an acquired widespread racial immunity to severe forms of lesions, due to the reaction of the cells of the body to the syphilitic virus, appear to me to have had a determining influence in the increased production of the late syphilitic manifestations of disease of the nervous system which are usually termed parasyphilis or metasyphilis. They are generally looked upon as degenerative processes of the nervous

system; they are insidious in origin, progressive in character, and comparatively true syphilitic diseases of the nervous system, uninfluenced by antisyphilitic treatment.

It is impossible in England to arrive at any definite conclusions regarding the prevalence of syphilitic infection among the population; likewise it is impossible to arrive at any conclusions relating to the frequency of the incidence of disease of the nervous system caused directly or indirectly by syphilis; still, the experience of general practitioners, general physicians, or nerve specialists, is to the effect that syphilis is by far the most important cause of disease of the nervous system. With the present system of relief at special hospitals, general hospitals, asylums, and infirmaries, a process of selection occurs which interferes with the preparation of reliable statistics regarding the percentage of cases of syphilis that develop syphilitic disease of the nervous system. Yet the importance of the subject is great from the public health point of view, for if the virus attacks the nervous system it is rarely that a complete and permanent cure results even with efficient treatment. I am of opinion that when the roseolar rash occurs, or a secondary eruption indicating spirochætes in the blood, a similar infection of the membranes may occur which may lead to disease of the nervous system. Some degree of paralysis, feeble-mindedness, or functional defect will be left in consequence of syphilitic disease of the nervous system in the great majority of cases, even if they are treated; in many instances in spite of treatment the patient is left with an invalid brain rendering him more or less helpless.

I collected a large number of cases (over forty) in my own experience of syphilitic cord and brain disease about fifteen years ago, and I then expressed the opinion that many of these cases had been cured by efficient treatment. Subsequent experience has taught me to modify my views. The majority of these cases have since died from the disease, or complications arising from the disease, after having been paralysed, and this in spite of treatment.

Statistics have been made on the Continent relative to the incidence of nervous disease occurring in syphilitic subjects. Hjelmann found fifteen to twenty-five cases of disease of the nervous system per 1,000 persons infected with syphilis, excluding general paralysis and tabes. Reumont gives 8·5 per cent., including tabes, and Engelstedt 5 per cent. White and Melville, in the *Lancet* of December 9, 1911,[1] "Venereal Disease, its Present and Future," state: "Dr. Blaschko gives as his

[1] *Lancet*, 1911, ii, p. 1618.

opinion that in Berlin every man who reaches the age of 30 has (on an average) had gonorrhœa twice, and every fourth or fifth man has had syphilis."

In Scandinavian countries, where syphilis has for a long time been a notifiable disease, recognition of the association of general paralysis and syphilis took place long ago; as it was first called attention to by Kjellberg and Jessen. In countries where there is a State control of the hospitals and where everybody must pay for treatment, or if he or his friends are not able to pay, the village or town where he lives must, more reliable data are possible than in this country, especially the Metropolis, where there is no system or organization. When the Insurance Act is brought into force there will be an excellent opportunity of ascertaining the prevalence of venereal disease. I understand that venereal diseases will not be a bar to medical benefits; consequently reliable statistical records can be prepared of a large proportion of the population. Such statistics will give approximately reliable information regarding the prevalence of gonorrhœa and syphilis.

Douglas and Melville point to the fact that the number of recruits annually rejected from the Army for venereal diseases shows a great and steady decrease in syphilis, from the appalling figure of 16 per 1,000 to 1·5; whereas there is a steady persistence of other venereal diseases at the level of about 2 per 1,000 for the last forty years, rising in the last five years to 3·5, and still apparently increasing. By these figures they conclude "a decrease of all venereal diseases to a quarter of its former bulk, the whole decrease having occurred in syphilis. Syphilis," they say, then, "from being a deadly pestilence has become of manageable dimensions, while the inroads of gonorrhœa are increasing." In my opinion this statement, however, requires some qualification, or a false conclusion will be arrived at.

Let us first consider gonorrhœa and syphilis as regards (1) the individual; (2) racial immunity.

An attack of gonorrhœa does not give immunity, and several, even many, infections may occur. The chances of cure are greater, but its re-infection can happen; the opportunities of acquiring it from prostitutes are much greater than in the case of syphilis, for although the influence of the virus remains in the body, it is rarely communicable to others after three or four years have elapsed, even though the infected individual may be suffering from serious symptoms. Gonorrhœa sterilizes, male and female, by inflammatory lesions; it has no influence on the developing ovum; one attack does not give an immunity the same as syphilis.

ATTENUATION OF THE VIRUS OF SYPHILIS AND RACIAL IMMUNITY.

(*a*) A widespread deadly disease produces immunity by killing off all those most susceptible to it, leaving those who are less susceptible or immune to propagate; this presupposes that the body tissues can set up a defensive reaction to the multiplication of the specific organism. Sooner or later the virulence of the disease dies down because there are increasing numbers of the population who either have it in a mild form, a latent atypical form, or possess a complete immunity. Whether a father who has had syphilis and has not communicated it to the mother is able to transmit any immunity to the offspring is a moot point, for it implies the transmission of an acquired character, which to many scientists is a biological heresy. However, there are reasons for supposing that pathological variations of the germ-plasm may result from nutritional disturbances of the sexual cells, occasioned by prolonged toxic conditions of the blood.

(*b*) The more systematic and universal reliance placed upon mercury and less upon iodide for treatment in the primary and secondary stages than formerly, and the continuance of the treatment for several years. This has greatly diminished the virulence of the organism in the body, and may have so modified its virulence that when it passes into the body of another person it produces a less virulent reaction. Experimental observations upon trypanosomes suggest that this inference is justifiable. Thus mercury by its widespread use may have attenuated the virulence of the spirochæte generally in this country.

(*c*) Antisepsis and asepsis, by destroying or withholding the influence of secondary microbial infection, have been largely instrumental in averting some of the serious skin, bone, and visceral lesions, and have aided greatly the defensive reaction of the body against the specific organism.

(*d*) The less consumption of alcohol and diminished prevalence of drunkenness have increased the defensive reaction of the tissues as well as rendered people less liable to infection.

As I have said before, the stress of modern life falls especially upon the nervous system, rendering it more susceptible to pathological, especially degenerative, conditions, and an important question to answer is this: are the late parasyphilitic (Fournier), metasyphilitic (Möbius), quaternary syphilitic affections (Bosc and Hirschl) more prevalent now than formerly? If so, is it due to the widespread existence of racial immunity and latent syphilis? Seeing that both tabes and general

paralysis are incurable diseases and affect especially male adults of civic worth, it is a matter of great social and economical importance to the race to know whether these diseases are on the increase or not. Of 2,000 post-mortem examinations made at Claybury, 500 were general paralytics. About 40 per cent. of the male deaths are due to general paralysis. The riddle is still unsolved, why only a small percentage relatively, possibly 3 to 4 per cent., of persons infected with syphilis should suffer with one of these degenerations termed parasyphilis, but only 15 per cent. of persons suffering with diphtheria develop diphtheritic paralysis. These are frequently cases in which the local infective process was mild, or even unobserved; in that respect, therefore, like parasyphilitic affections, which much more often than not follow mild and even unrecognized primary infections and secondary symptoms.

I have been astonished by the fact that in spite of the promiscuous sexual life led by a number of general paralytics I have never seen a primary sore, nor do I remember to have seen a secondary eruption. Of the 500 cases on the post-mortem table I was struck by the fact that the evidence of severe syphilitic lesions, with the exception of nodular fibrosis of the aorta, was very scanty; in fact, cases diagnosed as general paralysis with marked signs of gummatous lesions on the body or evidence of coarse paralysis, nearly always turned out to be pseudo-general paralysis due to multiple syphilitic lesions affecting the membranes and vessels, involving secondarily the brain. Again, the experience of Krafft-Ebing so strongly supported the view that if there were no syphilis there would be no general paralysis, that he caused to be inoculated with the virus of a hard chancre nine persons suffering from this disease, who had never shown any signs and gave no history; not one of these were infected, for they showed no signs although they were watched for a considerable time. It was concluded they had an acquired immunity. Why is this? Is it because the virus is attenuated or modified and thereby has acquired a special neurotoxic action? Or is there a particular form of spirochæte analogous to the trypanosome of sleeping sickness which causes affection of the nervous system? Or is it because in a small percentage of individuals the cells of the body, *including the cells of the nervous system (normally protected against reactions)*, offer a hypersensitive reaction to the virus? There are many facts which suggest the possibility of a certain form of virus with a neurotoxic action. Thus Babinski remarks that it seems possible that a syphilitic virus may sometimes be endowed with a particular aptitude for attacking the nervous system, and instances have been cited

which show that infection by a particular woman has led to several or even more men, with whom she cohabited, suffering later with parasyphilis. Probably the most striking example supporting this theory of a special neurotoxic virus has been afforded by Brosius, who relates that seven glass-blowers suffered with chancre of the lip, and out of five who came under observation ten years later four suffered with either tabes or general paralysis.

The specific agent, the spirochæte, may exist in some modified form, or it is conceivable that there may be varieties of this protozoal organism, as there is of the malarial parasite or trypanosome. Again, the organism may become modified by the widespread use of mercury. It may thus happen that the virus may vary in different cases of infection. This, however, is speculative, and not only is not supported but also is to some degree contradicted by experiments on animals. We are therefore probably on more certain grounds in attributing the variations of the effects which follow infection not to the variation of the virus, but to the defensive reaction of the individual himself, and we may represent this in the form of an equation :—

$$\text{Symptoms } X = \frac{V}{R} = \frac{\text{Virus}}{\text{Resistance}}$$

If the virus is constant, the resistance must vary according to conditions which lead to racial immunity, family immunity, acquired immunity, and general bodily health.

It appears to me that a race long syphilized is, on account of a racial immunity, more liable to suffer with the late degenerative forms. The interesting description given by Colonel Lambkin of the syphilization of the natives of Uganda shows how severely a race previously free from this disease suffers from malignant skin, bone, and visceral disease. He also points out that parasyphilitic affections are rare; the reason being that the disease has not existed in the country for a sufficiently long time to allow of their frequent occurrence. According to von Halban, tabes is more common in Abyssinia than it is in Vienna; but then syphilis has been in existence in this Christian country for a long time past.

Congenital Syphilis in the Offspring.

It is often asserted that early marriages lead to degeneracy in the offspring. In studying the pedigrees of congenital syphilis I was struck by the fact that the man was very frequently quite young when he

married. The sexual instinct had lead to his acquiring syphilis when young, and he married young and infected his young wife, with the usual result, miscarriages, stillbirths, children dying in infancy of convulsions, meningitis, and hydrocephalus, followed later by children who lived but suffered in various ways physically and mentally. This, to the lay mind, would be all put down to the early marriage and imperfect development of the reproductive organs; but Nature does not make the mistake of exciting an instinct prematurely. I shall now show pedigrees illustrating this fact and others in connexion with congenital syphilis.

My inquiries regarding the results of conceptions in syphilitic parents illustrate the following points: The usual history is either complete sterility, or miscarriages, abortions, stillbirths, children dying in infancy of convulsions, marasmus, meningitis, or hydrocephalus; then there may follow children who are *apparently* healthy, but who in later life develop *syphilis hereditaria tarda*, manifested often by interstitial keratitis, nerve-deafness, bone, skin, and visceral lesions. The children may be stunted in growth and show obvious stigmata of congenital syphilis, in the form of Hutchinsonian teeth, saddle-shaped nose, and linear scarring around the angles of the mouth. At puberty it may be noticed that the genital organs remain infantile in development, and microscopic observations which I have made on the sexual glands in such cases show atrophy or degeneration of the germ-cells; in the case of the male organ an absence of the spermatozoa; in the case of the female a failure of development of the ova and a great diminution in numbers. This infantilism is frequently associated with various grades of idiocy or imbecility. Congenital syphilitic children presenting those well-determined stigmata may subsequently develop juvenile general paralysis, tabo-paralysis, tabes, primary optic atrophy, epilepsy, chorea, hysteria, and meningitis. But it is more common to find *apparently healthy* children born of syphilitic parents subsequently, about puberty or adolescence, developing the various nervous affections mentioned above. It seems as if the virus, as it becomes attenuated, is delayed in its destructive effects, and numbers of family histories I can cite show, as a general rule, but by no means invariably, that as the virus becomes attenuated the conceptions may result eventually in healthy children, who in later life manifest no visible signs or symptoms of the disease. But, as Fournier remarks, the birth of healthy children is "no free pass" for future offspring, and the following cases illustrate this fact:—

F. C., aged 11, suffering with blindness since he was aged 7, was

brought by his mother to Charing Cross Hospital; she said the child had had snuffles at birth. There was no family history of nervous disorder or insanity (fig. 1). Three years elapsed after marriage before a seven months stillbirth occurred, then (1) a girl was born who died with fits at 1 year 9 months; (2) a girl, living, quite healthy; (3) a girl, living, quite healthy; (4) *the patient;* (5) *boy, aged* 9, with paralysis; (6) *boy,* who suffers with fits. The patient when brought to me exhibited no external signs of syphilis on the body and no evidence of visceral disease. There was slight evidence of paresis of the lower face muscles of the right side, and the tongue on protrusion deviated to the right. There was optic atrophy in both eyes, also cycloplegia and iridoplegia. The fifth was a boy, aged 9, and I found him to be suffering with left facial nerve paralysis; the paralysis came on when he was

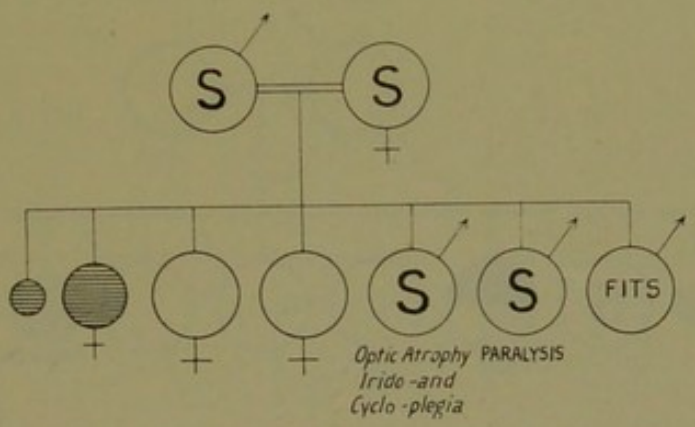

Fig. 1.

aged 6 months. The eye could not be closed, nor the forehead wrinkled; the mouth was drawn to the right, but not markedly. There was no deafness; he could hear a watch equally well in either ear and at a normal distance. This was probably due to a syphilitic affection of the facial nerve. The sight was now becoming defective in the left eye, the disk being pale with a sharp edge, and probably he will become blind like his brother. The practitioner who sent this patient to me treated the mother for acquired syphilis. The history seems to point to the fact that the treatment by mercury for some time led to the birth of two healthy children (2 and 3); it was then suspended, and three children, including patient, were then born, all of whom were seriously affected.

In the following case (fig. 2) there was no history of the mother having been treated for syphilis.

Girl, aged 14, was admitted to Claybury Asylum suffering with juvenile general paralysis, with well-marked signs of congenital syphilis —viz., notched teeth, rhagades around mouth, saddle-shaped nose. History: No insanity, direct or collateral. Father died of an accident, aged 46. History from mother: Mother was married at 20, father at 22. There were twelve children, as follows: (1) dead, 5 months fœtus; (2) dead, 5 or 6 months fœtus; (3) dead, 6 or 7 months fœtus; (4) dead, 7 months fœtus, lived eight hours: (5) born alive, very frail and delicate, ulcers on legs, inflammation of eyes; (6) patient; (7) girl, living, well, aged 16; (8) boy, living, well, aged 14; (9) boy, living, well, aged 12; (10) boy, died of *convulsions*, aged 11 months; (11) girl, died at 8 months of *brain disease* and *club-foot;* (12) boy, living, well (fig. 2). The patient was an intelligent girl and passed the seventh

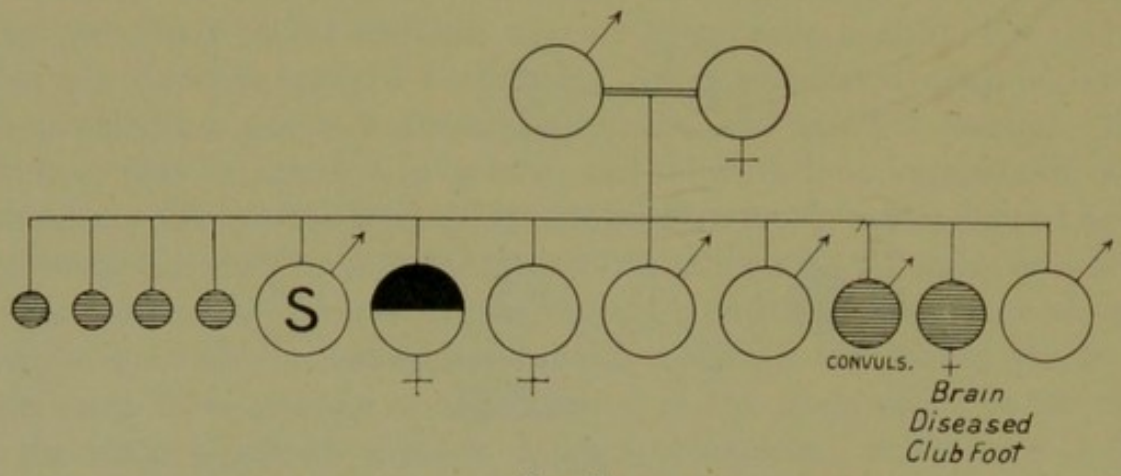

Fig. 2.

standard at 12 years old; developed signs of general paralysis and progressive dementia at 14, and died three years later of this disease. It will be seen that 7, 8, 9 are living and well, then follow two children with nervous affections and death.

As a contrast to the above two cases I may mention the following case, which shows that the defensive reaction of the body apart from treatment plays an important part in subsequent developments (fig. 3).

R. D., a carpet planner, was admitted into Charing Cross Hospital under my care, suffering with well-marked signs and symptoms of tabes. He gave the following history of conceptions following his marriage at 22, which was just two years after he had contracted syphilis with a hard chancre, for which he was treated with mercury for only two months. The first child was born within one year of marriage and is alive and well; he has had six healthy living children,

one of whom died, aged 9; there were also twins. Why was the wife not infected? Had she inherited immunity? These are questions which might well be asked in respect to this case. Healthy children are occasionally born between diseased children; as we have seen above, this may be sometimes accounted for by treatment of the mother.

Hochsinger throws doubts upon a healthy child slipping in between diseased children. Until the introduction of the serum reaction we had no means of knowing whether a child of syphilitic parents was free from taint, for although we are unable to see any external signs of disease yet the internal organs may be extensively diseased, and the following case illustrates this fact most conclusively:—

A. R., male, aged 22, was admitted to Claybury Asylum. He was an able-bodied seaman, but had been invalided on account of fits. There were no external signs of syphilis on the body. There was a

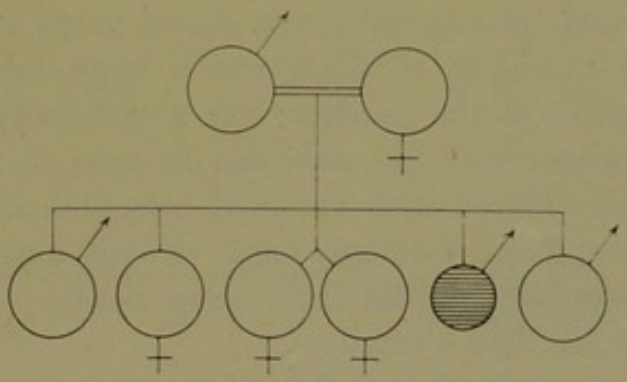

Fig. 3.

history of his father having died of general paralysis in Banstead Asylum, and of a brother, a weak-minded imbecile, being at that time in Caterham Asylum. Whereas the patient, A. R., presented no external signs of syphilis, his imbecile brother had the characteristic nose and teeth. A few days after admission to Claybury Asylum he had a succession of epileptiform seizures; his temperature rose to 108·2° F.; the temperature was reduced by cold sponging, but he never regained consciousness, although the convulsions ceased upon the administration of chloral. The case turned out post mortem to be a typical case of general paralysis. Although there were no external signs of syphilis, the liver showed an extraordinary condition; it weighed 1,200 grm.; the left lobe consisted almost entirely of nodules varying in size from a pea to a marble united to one another by dense bands of fibrous tissue. The right lobe was also nodular in places, and the capsule was here and

there thickened, so that portions of the organ were partially separated. Microscopic examination showed peri-hepatitis and extension of the dense fibrous tissue along the vessels and bile-ducts. There was nodular fibrosis of the aorta, otherwise no signs of visceral syphilis were discovered.

Max Nonne believes that it is not impossible for a healthy child to slip in between two unhealthy ones. He states that within the last few years a large amount of material precisely controlled and obtained from the Engel Reimer division of the Hamburg Hospital (St. Georg) has shown that not infrequently such a thing happens.

I have met with numerous cases in which the mother has had a series of healthy children, followed by miscarriages, stillbirths, and children dying in infancy, followed by syphilitic and parasyphilitic children. These cases often show the necessity of a systematic inquiry of the results of every conception, for the following case of juvenile general paralysis and optic atrophy was shown to me as a case in which syphilis could be excluded, as there was a large, healthy family and no history of syphilis of the parents; yet a systematic inquiry showed clearly that the reverse was the case, and in spite of the denial of the father that he had suffered with venereal infection, and of the mother that she had ever suffered with any signs or symptoms which could be associated with acquired syphilis, the history clearly points to maternal infection after she had had a family.

A. B. was a bright, intelligent girl, who passed the sixth standard of the Board School and gained several prizes. She left school at the age of 13; her periods never came on, and this was the assigned cause of her complaint in the notes received from the infirmary, where she was diagnosed as an imbecile due to congenital brain disease (fig. 4). I took the following notes on the case: She is now aged over 15; she is completely blind in both eyes, she is quite childish, but will talk and answer questions, but in the manner of a little girl aged 6 or 7. She has no delusions or hallucinations, is obedient and now takes her food, although on admission to the asylum she was noisy, crying, and troublesome. She was sent as an epileptic, but she has had no fits while in the asylum. Apparently, from what the mother tells me, she had several fits (like fainting attacks) while in the infirmary. She sits in a chair all day; the legs are rigid and semiflexed, the knee-jerks are not obtainable. She continually fidgets with her hands. I observe only slight tremor of the lips and tongue. The pupils are of medium size and do not react to light. There is primary optic atrophy on both sides. She has never

complained of headache, and there has been no vomiting. She does not respond to the calls of Nature and passes urine and fæces unheeded. She recognizes her friends when they come to see her and talks to them affectionately. Her palate is high and narrow; the teeth show no signs of congenital syphilis, nor were there any stigmata on the body observed by the medical officer on examination; syphilis was not therefore suspected. I interviewed the father and mother. Both said there was no insanity or nervous disease on either side. The mother informed me that she had had fourteen pregnancies. The patient was the next to the youngest living child. Prior to the birth of the patient she had had eight children, all of whom are now alive and grown up and some are married; then she had *two miscarriages followed by twins born dead*, followed by the patient, who had snuffles and a rash on the bottom soon after birth, for which she took her to St. George's Hospital, where they

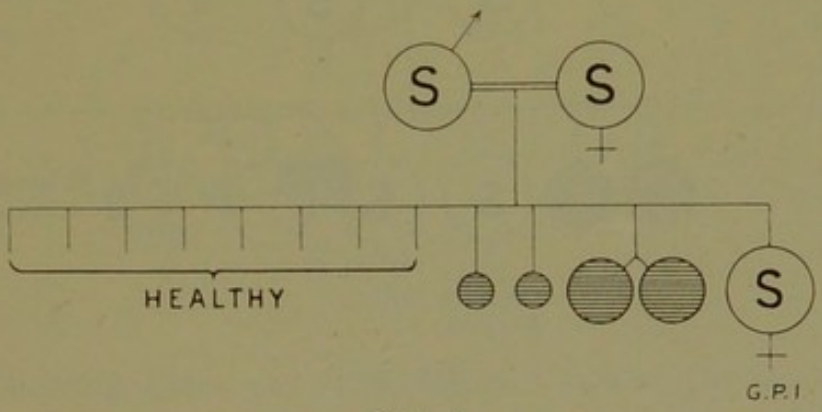

Fig. 4.

gave her grey powders; she did not continue the treatment long. The dementia and paralysis are progressing. This is in all probability one of those cases of the husband acquiring syphilis during the pregnancy of the wife and subsequently communicating the disease to her, with the usual result as regards further conceptions.

Again, a long mercurial treatment of the father, although usually protecting the offspring from congenital syphilis, does not give a positively certain voucher of freedom from taint, as the following case shows: An intelligent professional man acquired syphilis; was treated by eminent authorities with mercury for several years; four years after the primary sore he consulted an eminent specialist as to the advisability of marriage: he was assured that there was no danger to his wife or offspring. He waited a year and married, with the following results: The first two children were born alive but died within a day or two of

birth; the third developed keratitis and otitis with deafness; this child was seen by specialists, who pronounced the affection to be syphilitic; the fourth developed general paralysis and died with characteristic lesions at one of the London asylums; the last two are now bright and healthy children (fig. 5). The microscopical investigation of this case was ably carried out in the laboratory by Dr. Rondoni. The clinical notes and results of this investigation were published in the *Proceedings*.[1]

As an explanation it may be surmised that either he infected his wife by his sperm or that this was a case of spermatic infection by the male without the wife being infected. She had no signs or symptoms of syphilis, but that proves nothing. It is probable that the spirochæte had taken up its abode in the lymphatics of his testicles and had not

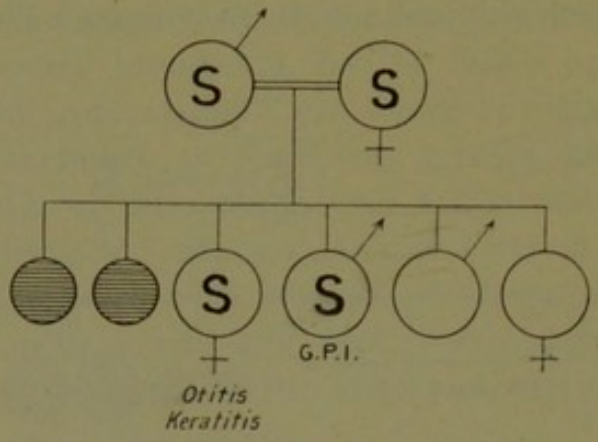

Fig. 5.

been destroyed in spite of the adequate treatment he had received for several years.

Sir Jonathan Hutchinson asserts that "a large experience on this point has led to the conclusion that a man rarely becomes the father of a syphilitic child if an interval of two years has elapsed since the disease was acquired." Now we have reason to believe that the specific cause of infection is a living organism and that the testis is not an unusual location of it; moreover, the living organism may remain latent for a long time, consequently the sperm may be infected long after the primary infection, and this may explain the case referred to; likewise if the ovaries are infected it may explain the fact that although the law of gradual diminution of virulence and risk of transmission holds good, yet exceptions may occur, as the following remarkable case reported by Molénes shows: "A woman, aged 44, was married at the age of 21 to

[1] *Proc. Roy. Soc. Med.*, 1909, ii (Path. Sect.), pp. 101-08.

her first husband, by whom, after the birth of a still living child, she was infected by syphilis. An energetic treatment of husband and wife with mercury and iodide was adopted. In the course of the following years she had six children who all died at ages from 18 to 20 months from symptoms of meningitis. Six years after the death of the husband she married a healthy widower, father of two healthy children aged respectively 16 and 19. She now manifested a recurring syphilitic psoriasis for which she received courses of treatment. Twenty-two years after the primary infection and by her healthy husband she gave birth to a child. This child, just as the former ones, died at the age of 18 months with symptoms of meningitis (convulsions, vomiting, and coma)." (Max Nonne.)

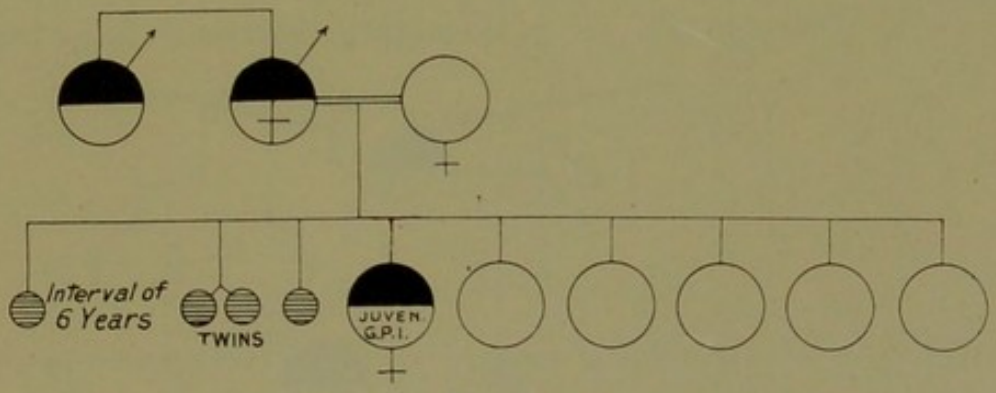

Fig. 6.

The following cases are some selected from sixty cases of juvenile general paralysis, and each presents some interesting feature in the clinical case or history:—

E. E. G., aged 19, single, no occupation, was admitted to Hanwell for juvenile general paralysis. The patient's father was a soldier for seven years, then a carpenter. The mother was aged 24 when married. She said he was a loose-living, drunken man. She was pregnant ten times. The first was born dead at six months. Before her second there was an interval of six years; then a premature birth of twins; the next was born dead at the fifth month. After this the patient was born at full time, and the birth was natural and uncomplicated. She was delicate and had snuffles, but there was no rash on the buttocks. She was a mental defective who could neither be taught to read or write. At 12 years of age she had her first fit. She never menstruated. She became progressively demented and paralysed, exhibiting the characteristic features of the disease in the adult form, except that she exhibited none of the characteristic delusions (fig. 6). A full account

of this case, and the microscopical and other features of the brain, were published in the *Archives of Neurology*.[1]

Probably some or even all of the apparently healthy children who follow this paralytic child would give a positive Wassermann reaction, and have an acquired immunity against the disease. We do not know what proportion of the population may have such an acquired immunity from this cause; it is possible that a very considerable proportion may.

In the next pedigree we have again an example of healthy children being no free pass to the future offspring, as we have a juvenile paralytic developing after the birth of five children who grew up and were apparently healthy. These again may really have an acquired immunity, and would, if they had been tested, have yielded a positive Wassermann reaction.

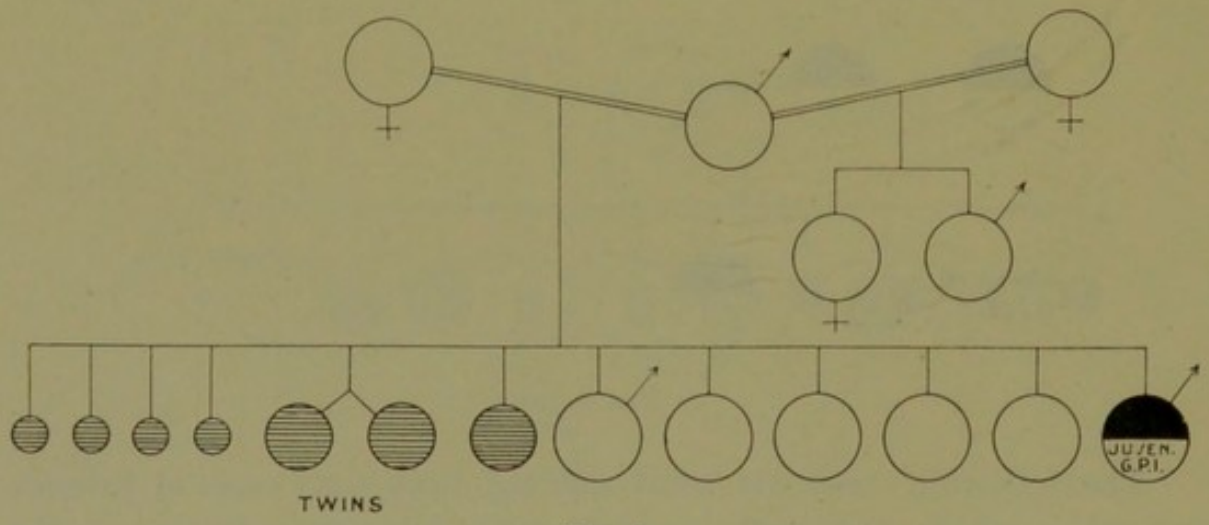

Fig. 7.

F. P. C., admitted to Claybury Asylum suffering from juvenile general paralysis. He is aged 17, but looks like 12. There is an absence of development of the secondary sexual characters (infantilism). The history was that at first he got on well at school and passed the sixth standard. He had no fits, and went to work at a wine merchant's when he left school. Then his memory became bad and he occasionally began to have lapses of consciousness. Subsequently he was admitted to Claybury Asylum, where he became progressively weaker and more demented; he died, and the brain showed all the signs of general paralysis.

I am indebted to Dr. Henry Head for the family history taken at the London Hospital; it is indicated in the accompanying figure (fig. 7). The first four children died in infancy; then came twins who died in

[1] *Arch. of Neurol.*, 1899, i, pp. 250 *et seq.*

infancy; the seventh, eighth, ninth, tenth, and eleventh, living and healthy; the twelfth is the patient. Father married a second wife; there are two children, both living.

M. T., female, age at the onset of disease, 14; died, aged 23, of general paralysis. Family history (from the mother): Parents married at the ages of 28 (father) and 23 (mother). Father was alcoholic and died of general paralysis of the insane; mother has marked tertiary syphilitic sores. Patient was the elder child; she was born three years after marriage. The next pregnancy resulted in a miscarriage at three months. The next and last child is apparently healthy (fig. 8).

T. C., male, age at the onset of the disease, 14; died at the age of 19 of general paralysis of the insane. Family history: Father is in Claybury Asylum suffering with insanity and a history of heavy drinking. Paternal and maternal grandmother of the patient, T. C., were

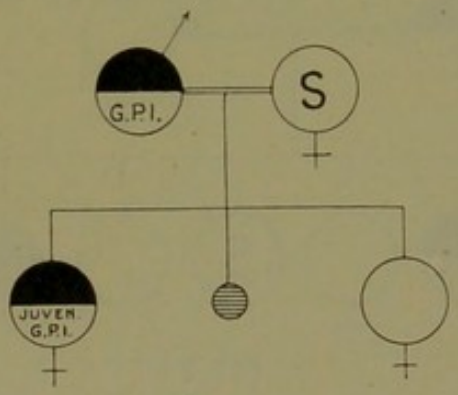

FIG. 8.

drunkards, as are all the father's brothers and sisters. There were eight children in the family; no miscarriages. (1) Died at the age of 2½ months—the doctor said that if it had lived it would have been blind and an idiot; (2) the patient, who was a mental defective of stunted growth; (3) a healthy girl; (4) a boy, aged 14, of stunted growth with typical signs of congenital syphilis—nose, teeth, rhagades; (5) a boy, aged 11½, now healthy; (6) a girl, died of bronchitis when 1 year old; (7) a boy, aged 8, now healthy; (8) a boy, aged 6, not strong (fig. 9). This shows how unevenly the children may be affected by the syphilis of the parents.

E. N., aged 19, was admitted into Caterham Asylum in January, 1897, for general paralysis of the insane and from which he subsequently died. The history of this case points to infection of the husband after marriage and communication to the wife, with the result that syphilitic offspring follow healthy offspring. The mother

gave the following history: Daughter, alive, aged 27; son, alive, aged 24; then followed four miscarriages in succession; an infant which lived only three months; an infant which lived six months; then the patient who, at the age of 14, was able to earn eight shillings a week, so must have been fairly intelligent; a daughter who is now aged 12; then a miscarriage; lastly a frail little girl, aged 8 (fig. 10). No insanity, paralysis, or fits on either side in the family. It is probable that the two last surviving children, if they have not actually suffered from specific disease, have suffered in vital energy.

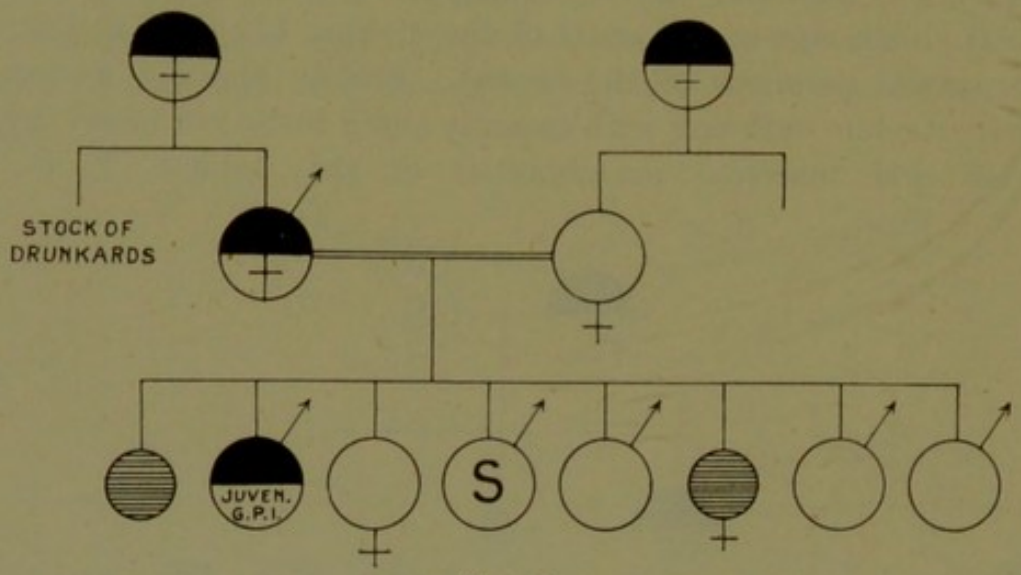

Fig. 9.

E. B., female, aged 14, was admitted to Darenth Asylum for Idiots. History from mother: The child was born at full time; labour normal. The father died of phthisis. The mother is alive, aged 34. Parents married when aged 20. Symptoms of mental disorder first noticed when the patient was aged 12½. She became progressively helpless and demented. The following pregnancies occurred: (1) Miscarriage; (2) miscarriage; (3) child born at full time, lived 15 months and died in convulsions: (4) patient, labour natural; (5) girl who has become blind (fig. 11).

This illustrates the effects of early marriage in relation to syphilitic infection. If the man marries at an early age he, having acquired syphilis, generally infects his wife, because a sufficient length of time has not elapsed for the disease not to be communicable.

The following is not an uncommon cause of congenital syphilis. A great many instances have occurred within my knowledge of married men going to South Africa during the war getting infected; returning

home, they have infected their wives and produced syphilitic offspring. This case shows the same thing: A married man has a healthy son, contracts syphilis while away on a voyage. On his return he infected his wife who did not suffer in any way beyond three miscarriages and giving birth to a dead child, followed by apparently healthy children, although it is probable that all these children would have given a positive serum reaction and have an acquired immunity or partial immunity.

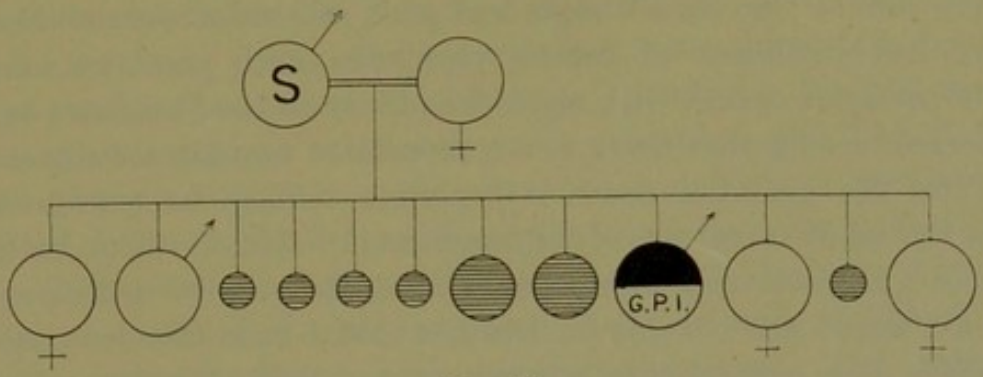

Fig. 10.

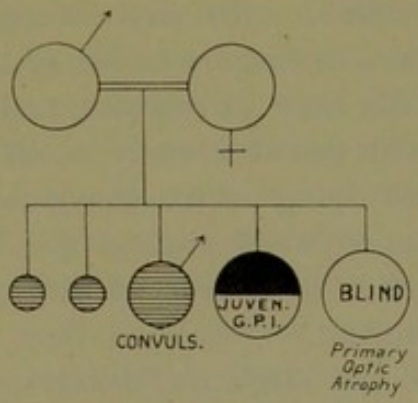

Fig. 11.

General Paralysis in Parents and Offspring.—In about 20 per cent. of the cases of juvenile general paralysis I have found that the father has died in an asylum of general paralysis: seeing that there are a large number of female paralytics (the proportion in the asylums being three males to one female), it is rather remarkable that in sixty cases of juvenile general paralysis I have not met with an instance in which the mother has died of general paralysis. Yet we see that similarity of the mental disease occurs in 20 per cent. of the instances, and according to my experience the father is the parent almost invariably affected. In other forms of insanity due to the neuropathic taint the mother transmits twice as frequently as the father, and daughters are affected twice as

frequently as sons. The difference is this: that general paralysis is an acquired disease due to the late effects of the syphilitic virus, and hereditary neuropathic tendency plays relatively only a small part in the production of this organic brain disease. Now while I do not say that instances may not occur of the mother suffering with general paralysis, and one or more offspring dying later of the same disease, I am of the opinion that as I have not met with them they must be very rare indeed. How can this extreme rarity be accounted for? Clearly neuropathic tendency cannot play an all-important part, otherwise we should expect to have had instances of female paralytics with paralytic offspring; juvenile paralysis occurs with equal frequency in the two sexes as might be expected, seeing that there is a comparative numerical balance of the sexes, and the essential cause is syphilis; unlike the conditions met with in the adult form, the syphilitic virus is liable to affect both sexes equally. The fact that women acquire syphilis much less frequently than men would not account for the fact that I have found no instances of mothers with general paralysis having paralytic offspring. How can the fact be accounted for? Most of the mothers of paralytic offspring have not apparently suffered with any severe symptoms; they have been immunized. Again, a large number of the paralytic women in asylums have undoubtedly been prostitutes, and have therefore become sterile; in connexion with this it may be mentioned that 50 per cent. of the female paralytics dying at Claybury Asylum were found, post mortem, to have suffered with old salpingitis. Moreover, a woman who had been infected and afterwards suffered with general paralysis is less liable to have living offspring.

Congenital Syphilis and General Paralysis in Later Life.—In my Croonian Lectures upon the "Degeneration of the Neurone" (1900), I remarked that it is very probable that some of the cases occurring in adults, in which acquired syphilis can be excluded with certainty, may still owe the disease to congenital syphilis. It is not even necessary, as quite one-half of the cases show, that they should exhibit any external signs of congenital syphilis, for many juvenile patients can be proved beyond doubt, as the following cases I have collected show, to have been born of syphilitic parents. Although themselves manifesting no external signs of syphilis, yet the history of miscarriages, stillbirths, and children dying in infancy of meningitis, hydrocephalus, or of brothers and sisters with well-marked stigmata or evidence of *syphilis hereditaria tarda*, disclosed the necessary proof of the congenital taint. Sometimes no history may be obtainable and there

may be no signs of syphilis on the body; even in some of these cases a definite proof of the possibility of congenital syphilis may be forthcoming by a little investigation. Thus, I was asked to see a patient at Cane Hill Asylum, who was suffering from advanced general paralysis. He was almost speechless, had great difficulty of swallowing, his saliva dribbled from the angles of the mouth, all four limbs were in a condition of spastic contracture, and there was loss of control of the sphincters. There were no signs of syphilis on the body, and the only information obtainable was that he had had a fit at the age of 18; he had married when young, and his wife had given birth to a dead child, and had left him because of his "strange" conduct. He had more fits, and became slowly and insidiously more demented, and died at the age of 28. At the autopsy the most advanced condition of paralytic brain degeneration was found. I subsequently found that his father had died eight years previously of general paralysis in Claybury Asylum. I have once or twice met with instances of father and son being in the asylum together suffering with general paralysis. The case above referred to was one of juvenile general paralysis, commencing in adolescence, but running a slow course. Doubtless the fit at the age of 18 was the commencement of the brain decay, and had lumbar puncture been performed and the cerebrospinal fluid been examined, a lymphocytosis and a positive Wassermann reaction would have been obtained. Just as in the cases of acquired syphilis the onset of general paralysis may in rare cases be greatly delayed, so in the juvenile form there may be great delay in the onset of the parasyphilitic affection. Thus a patient with general paralysis died at Banstead Asylum who had previously been under Dr. Percy Smith at Bethlem Hospital. This woman had characteristic signs of congenital syphilis, but she did not manifest symptoms of paralytic dementia until she was aged 30. She was an unmarried woman, and there was no evidence to show that she could have acquired the disease. Recently Christian Müller has put forward the same hypothesis to explain parasyphilitic disease affecting patients in whom no history of acquired syphilis can be obtained. He described two cases of women (virgins) who were the subjects of well-marked signs of congenital syphilis, and who died of general paralysis at the ages of 42 and 43. The symptoms were not noticeable until a year or two before death.

Tabo-paralysis and Optic Atrophy.—The following case of tabo-paralysis is of interest, as gastric crises at the age of 9 were the first symptoms that brought the patient under observation. P. C., aged 9,

was admitted to Charing Cross Hospital suffering with attacks of vomiting and occasionally diarrhœa. She had well-marked obtrusive stigmata of congenital syphilis, in the form of Hutchinsonian teeth and rhagades. I ascertained that the father had died some years previously at Banstead Asylum of general paralysis; his notes gave no history or signs of syphilis, although the fact of his having had syphilis was clearly demonstrated in his offspring—a not unusual occurrence. The mother had not suffered with any sign or symptoms, but prior to the birth of the patient she had had one miscarriage and two children born dead. The paroxysmal attacks of vomiting had commenced at 7 years of age. She had become progressively enfeebled mentally, and was sent to Darenth, where I again saw her. She still suffered with vomiting and lightning pains; the pupils were unequal, inactive to light and accommodation; the knee-jerks were absent. Both eyes showed

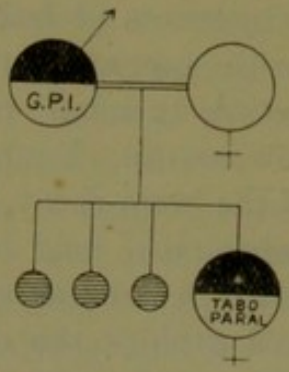

Fig. 12.

well-marked choroido-retinitis and optic atrophy. There was anæsthesia of the chest to light tactile impressions from the third to the sixth rib inclusive. Beyond childish mental enfeeblement there was nothing in her mental condition; there were no delusions, illusions, or hallucinations. Later she suffered with a sudden painless swelling of one knee, and a dorsal dislocation of the head of the right femur. There were no teeth in the lower jaw, and the alveolus was so much absorbed as to resemble the jaw of an old woman. Then she began to have fits and lapses of consciousness, sometimes biting her tongue and passing her urine and fæces under her. She died, after some years' residence in the asylum, of tabo-paralysis, the brain and spinal cord presenting the usual appearances met with in that condition (fig. 12).

Two brothers, sons of a dissolute but clever father, who deserted his wife, came under my notice at Hanwell. The mother gave a history of miscarriages, then two boys were born apparently healthy. One became

blind at the age of 7; the other at the age of 11. They were at the Normal School for the Blind, but were sent away on account of fits. Believed at first to be epileptics, they were treated as such, but a progressive dementia brought them to the asylum, where they subsequently died of general paralysis.

According to my experience optic atrophy in juvenile general paralysis is commoner than in the adult form. A certain proportion of these cases are probably not true optic atrophy, but are the result of syphilitic brain disease.

Syphilitic Lesions of the Nervous System.

True syphilitic diseases of the nervous system in congenital syphilis are nearly always combined; thus we find a generalized leptomeningitis and pachymeningitis, small and large gummata, gummatous neuritis and endarteritis associated in varying degrees. A certain number of such cases have been recorded—e.g., Sir T. Barlow recorded the case of a male infant, aged 15 months, who had weakness of facial muscles and nystagmus. At the post-mortem examination small conical tumours were found in the fourth, fifth, sixth, seventh, and eighth nerves, at their point of exit from the brain stem; these appeared to be of a gummatous nature. There was an associated endarteritis; the basilar and all the vessels of the circle of Willis were extensively diseased; these were opaque, dirty-white in colour, and almost cartilaginous in consistence; the lumen was greatly narrowed by thickening of the interior, and the small arterioles of the pia mater were similarly affected. N. Chiari has recorded a case of endo-, meso- and peri-arteritis syphilitica in an infant, aged 15 months, and Bury, Money, Jürgens, and many others have published similar cases. The following case, which was published in full detail in the "Morison Lectures,"[1] is of great interest, for it illustrates the fact that a typical congenital syphilitic child may attain a fair degree of intelligence, and then, owing to a latent virus becoming active, at puberty suffer from a universal and progressive gummatous meningitis and endarteritis.

E. M. A., female, aged 16, admitted to Claybury Asylum on August 30, 1905; died July 8, 1906. Her mother had three miscarriages, then five children born alive and well, of which the patient was the last (fig. 13). She was delicate from birth; she had snuffles and coryza, and was treated with grey powder; she was undersized, looking about 11 years of age, and had well-marked Hutchinsonian teeth; she must have been fairly

[1] *Arch. of Neurol. and Psychiatry*, 1909, iv, p. 58.

intelligent, as she was in the sixth standard at the Board School. On admission she was thought to be a congenital imbecile suffering from mania. Her conduct had changed; she sang snatches of music-hall songs, and played with dolls like a child aged 6. Although easily excited, she was liked and spoiled by the other patients, who treated her quite as a child. The diagnosis was juvenile general paralysis. For three months before death she had stiffness and rigidity of the neck; she became drowsy and helpless, and there was an internal strabismus of the right eye. At the autopsy a generalized cerebrospinal gummatous meningitis and universal perivascularitis and endarteritis were found; all the arteries of the circle of Willis showed a profound peri-arteritis and obliterative endarteritis; the perivascular and neoplasmic infiltration was universal, it corresponded entirely in its histological characters with a gummatous meningo-encephalitis. At the upper part of the spinal cord the roots

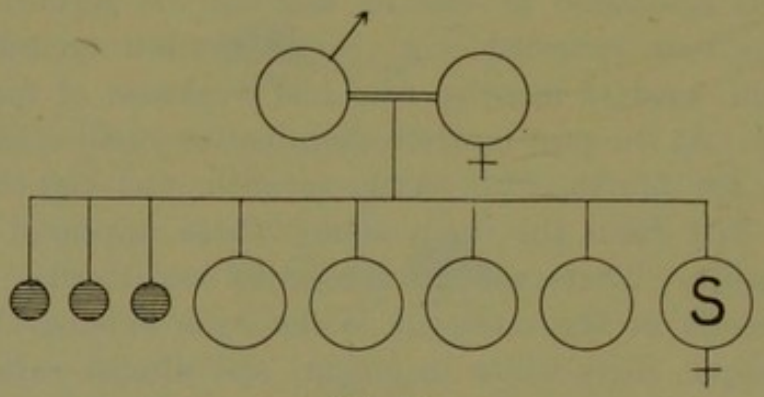

Fig. 13.

were surrounded by an infiltrating exudation quite 3 mm. in thickness. The neoplastic formation consisted of proliferated, branched, and spindle-shaped connective tissue cells, and round or oval cells forming all stages between lymphocytes and plasma cells; there were also macrophages, but polymorphonuclears were conspicuous by their absence; large numbers of the cells were undergoing a granulo-aqueous degeneration. Considering the universal vascular change and perivascular infiltration affecting the vessels of the brain and spinal cord, including the roots, it was astonishing how little had been the destruction of nerve cells and fibres.

Another case of *syphilis hereditaria tarda*, which occurred at Claybury Asylum, has been investigated by Dr. Rondoni. The patient, a girl, was healthy until aged 14; she afterwards became dull and apathetic; suffered with fits (apoplectic), coarse tremor of arms, nystagmus, exaggeration of the knee-jerks, and inequality of the pupils. The family

history obtained was two miscarriages; one boy who lived only 7 months; a boy who lived 15 months; then the patient, who died at the age of 23; then came a healthy living girl; and lastly a girl who lived only 16 months (fig. 14). Rondoni found an old diffuse endarteritis syphilitica with numerous small aneurysmal dilatations, especially of the arteries of the basal ganglia. The arteritis was evidently of long standing, for many of the small vessels in the basal ganglia showed calcareous infiltration and patches of old softening, which can be correlated with the apoplectic fits. The small veins are also affected. Rondoni considers this to be a case of *syphilis hereditaria tarda* of the nervous system similar to the cases of Homén and La Chapelle. The cases of Homén differ only because they were familial (five brothers and sisters). In Homén's cases there were diffuse degenerative changes in the cortical cells without granulation in the ependyma, arterial lesions and softenings in the

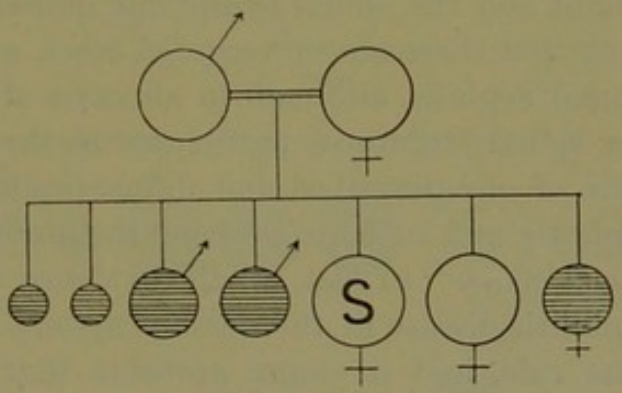

Fig. 14.

basal ganglia, little proliferation of glia, and only a slight perivascular infiltration. Homén's cases were as follows: At the ages of 20, 12, and 20, the disease manifested itself by phenomena of vertigo, headache, disturbances of general well-being, diminished intelligence and weakness of memory, diffuse vague pains in the legs, oscillating gait, and difficulty of speech; the intellectual loss proceeded to an actual dementia; the speech disturbance was rather inability to initiate than to articulate. Spastic conditions in the legs came on, also in the arms; in both situations it progressed to actual contractures. Pupil phenomena and anæsthesia were absent. In all three sisters a certain degree of infantilism occurred.

In both the cases I have related the patients showed a marked degree of infantilism of the generative organs. In view of the results obtained by Kretschner, who has shown that *syphilis hereditaria tarda* is associated with a lymphocytosis of the cerebrospinal fluid, it would

have been interesting if lumbar puncture had been performed in these cases.

Cases have been recorded of syphilitic disease of the brain, the spinal cord, their cavities and vessels (Dowse, Siemerling, Bury, Böttiger, Pick, Hutchinson, and others). The nervous disease of the child began in the case reported by Dowse at the age of 10, Siemerling's at the age of 6, and Bury's at the age of 8. An especially large single gummatous tumour situated in the occipital lobe which had led to erosion of the cranium has been recorded by Hutchinson in a girl aged 16. Hutchinson looked upon the case as one of *syphilis hereditaria tarda.*

As in acquired syphilis so in the congenital form, cases of so-called syphilitic meningitis or meningo-myelitis are in reality not localized to the spinal cord, but affect also the base of the brain and its stem; they are really cases of cerebrospinal meningitis in which the cerebral symptoms are slight and the spinal symptoms obtrusive; consequently, it is not surprising that there are no recorded cases, so far as I can find, of congenital spinal syphilis, although in all cases of diffuse meningitis and arteritis the spinal structures participate in the form of disease of arteries and veins, of circumscribed and diffuse infiltrating gummatous neoplasms, meningitis and neuritis affecting the anterior, and especially the posterior spinal roots. In fact, all the evidence tends to prove that in congenital syphilitic disease of the nervous system multiple combined affections are the rule, and it seems probable that tissues which are undergoing development afford a more congenial soil for the specific organism to grow and multiply in; consequently infection of the central nervous system is especially liable to lead to severe disturbances and loss of function and early death when it is not immediately fatal. Moreover, although other etiological factors—e.g., alcoholism and mental stress—do not directly play a part, yet it is probable that alcoholism, and particularly a neuropathic or psychopathic taint in progenitors, play an important part as contributory factors in the later development of general paralysis, optic atrophy and tabes, also epilepsy, hysteria, and other neuroses of congenital syphilitic children.

Can Syphilis be transmitted to the Third Generation? — The following case lends probability to the assumption that it can. E. H., aged 34, came to Charing Cross Hospital, accompanied by her elder sister. She complains of pains in the limbs; she is very deaf, especially on the left side. She has typical Hutchinsonian teeth. Her sister also has typical notched, peg-top-shaped central incisors, and old keratitis. The sister, a married woman, gives the following history: Her mother

had three premature births, then two children born dead, then one which lived 16 months. She came next, and the patient, E. H., was born a year later. The married sister also informed me that she herself had had but one child, which was a delicate infant; it had snuffles and died at the age of 6 weeks (fig. 15). The patient, E. H., has been paralysed in the left side since early infancy. It was discovered only by her not being able to walk or use the hand. When quite an infant she had a rash on the skin, and the eyebrows came out. Later in life it was noticed she was deaf in the left ear. The left arm and leg are wasted, and the bones smaller. She has no contracture. There is a triceps contraction and marked patellar clonus, but no ankle clonus. This was

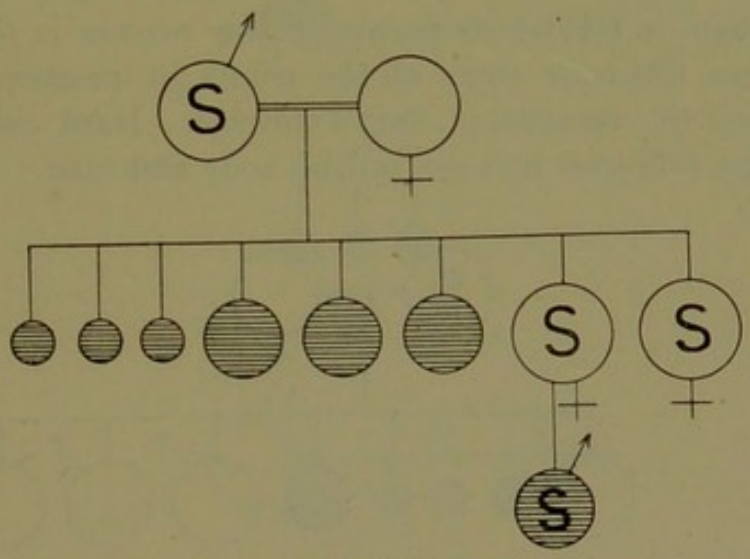

Fig. 15.

undoubtedly a case of congenital syphilitic brain disease causing hemiplegia. The mother came to see me and said that she had never ailed in any way, and I could find no evidence of syphilis on the body. The family history is the specially interesting feature in this case, as showing the effects of acquired syphilis upon the offspring, and also the possibility of transmission to the third generation.

Seeing that Levaditi, Bab, and others have seen spirochætes in the ova, it is possible that the syphilitic contagion may remain in a resting intracellular stage; but when the ovum escapes and is fertilized the syphilitic virus again becomes active, although its virulence is greatly modified and attenuated. This transmission to a third generation is a mere supposition unless we can be absolutely certain that the father was not syphilitic. I could, however, obtain no history of syphilis from the father in the case above recorded. It is no more physically

impossible to admit infection of the segregated germ-cells of the next generation than infection of the sperm-cell. It may be observed that Sir Jonathan Hutchinson is most sceptical of transmission; he says: "Nor have any facts been placed upon record which are worthy of much attention as supporting the belief referred thereto." An excellent critical summary of cases has been given by Dr. G. Ogilvie. In the light of our modern knowledge of syphilis, the spirochæte, or a resting form of it, might have been present in the maternal tissues, and an invasion of the embryo occurred during its development.

When parasyphilis in the form of general paralysis or tabes affects the male, and the wife is not syphilized, the number of living children is not greatly diminished below the normal average. If, however, a married woman is tabetic or paralytic, the reverse is the case. The following cases illustrate some of the points in question:—

G. P., aged 48; occupation, ship's steward. Hard chancre twenty-five years ago, followed by sores on the body and rash. Treated three

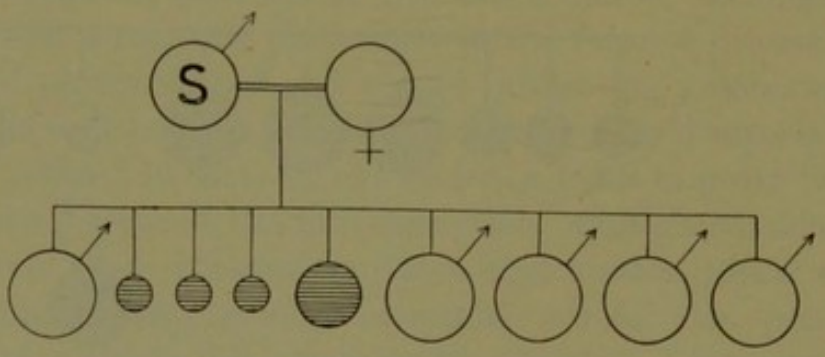

Fig. 16.

months. Married at the time, but away from his wife on a voyage. He acquired syphilis in 1876 and returned home in 1878. His wife, who had had one healthy child, now suffered with a succession of three miscarriages—one in 1878 and two in 1879. In 1880 she became pregnant; child was born dead. A second child was born in 1881 and then followed three more children. All the five living children are grown up and well (fig. 16). The patient, G. P., came under my care for optic atrophy, which came on sixteen years after infection.

B. C., aged 53. A case of tabes with arthropathy and severe gastric crises. She gave the following history: Married at 17; (1) four months after marriage, miscarriage; (2) another miscarriage, six to seven months; (3) a miscarriage, four months (fig. 17). Her husband died of general paralysis, aged 36. She remained a widow four years, married

again, but had no children. She states that she was always in good health till her knee-joint swelled. She was admitted to St. Thomas's Hospital, and owing to the foot beginning to swell, the leg was amputated above the knee.

A. C., aged 57, female with definite syphilitic history, admitted suffering with late arthropathy. Married at 24, no children living, four pregnancies: (1) miscarriage six months after marriage; (2) miscarriage; (3) child born dead; (4) miscarriage (fig. 18). Says she had good health after marriage except for the hair falling out and some fever.

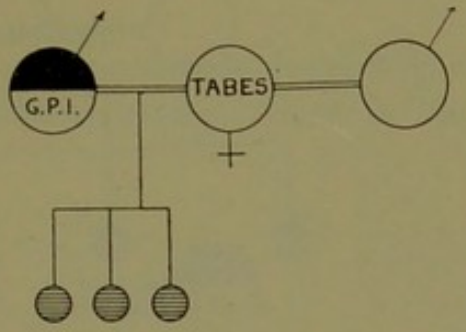

Fig. 17.

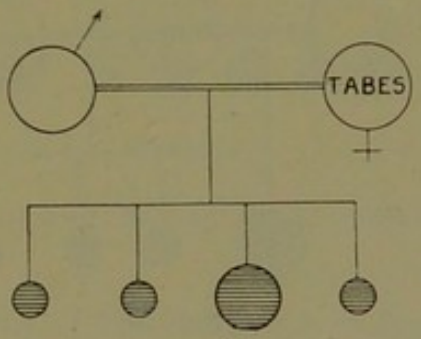

Fig. 18.

E. M., aged 34, widow, charwoman, suffering with tabes. Married at 19, no children, never had any; history of three miscarriages, first being four or five months after marriage (fig. 19). Marks of old syphilitic eruption on the body and a squamous syphilide. Symptoms commenced two years previously with pains in the legs and bladder trouble.

C. A., aged 37, married woman. She was married at 17; an eight months child born lived only two days. She found that her husband suffered with venereal disease. She herself contracted the disease and she had sore throat and her hair fell out; she therefore left him. She married again at 22, had three miscarriages but no living children

(fig. 20). Two years ago the first symptoms of tabes occurred—tight cord round body, rectal crises and bladder troubles, followed by lightning pains.

Many of these "married" women were doubtless unmarried but cohabited with men.

H. W., aged 26, was admitted to Claybury Asylum suffering with early ataxic general paralysis. She is the subject of syphilis acquired before marriage. She was married seven years ago at the age of 19. The husband states that occasionally she has been drunk, but he is sure

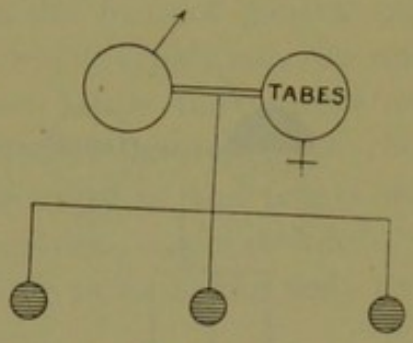

Fig. 19.

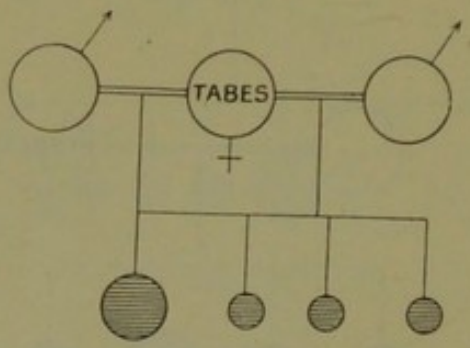

Fig. 20.

her illness was not due to drink. She was an attractive-looking, good and affectionate wife, and came from a very steady, good family. She had suffered with a bad leg, which she always tried to hide from her husband. Scar of a broken-down gumma. The pregnancies are shown in the accompanying figure (fig. 21).

The following cases of two sisters in Hanwell Asylum are of interest as showing the persistence of the Wassermann reaction in congenital syphilis.

L. H. was admitted when aged 26 to Hanwell Asylum in 1889 with congenital syphilis and imbecility. There was evidence of old iritis and depressed bridge of nose. Her sister, A. H., aged 36, was admitted in

1910 to Hanwell Asylum with delusions and aural hallucinations. She has been stone deaf for the past ten years. She has keratitis and iritis. A brother is in an asylum in America. The mother died twenty-seven years ago in Brookwood Asylum of general paralysis.

Twenty-four tabetic women who were married or had cohabited had only 3 living children, 19 born dead and 32 miscarriages. Ten of these 24 were sterile. Now of 54 married male tabetics or tabo-paralytics 151 children were born alive, 75 were born alive and died in infancy, and there were 52 miscarriages or born dead. This shows that a tabetic father does not often infect the wife, and the syphilis from which the male parent suffered has not seriously impaired the number of living offspring.

It is said that women do not nearly so frequently suffer with tabes as men; as in the case of general paralysis there is, however, a correla-

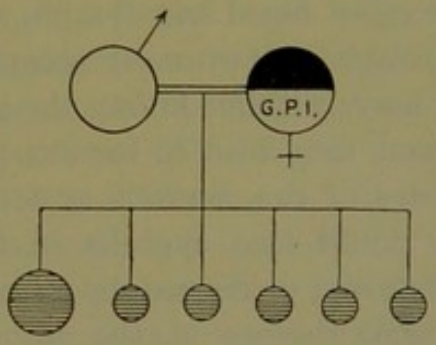

Fig. 21.

A child born dead, followed by five miscarriages.

tion between the frequency of the incidence of syphilis in a class of the population and the incidence of parasyphilitic affections, including tabes. It is said that prostitutes do not suffer with parasyphilis; this is not true. Kron's observations upon 184 public prostitutes showed that 14 per cent. of those syphilitic prostitutes who had reached the age of 25 were tabetic. Although the text-books teach that tabes occurs very much more frequently in men than in women, yet I found on visiting a number of the London infirmaries a large number of women bed-ridden with tabes, and I should estimate that the frequency of occurrence of tabes in women of the poorer classes bore about the same relation as general paralysis—viz., 3 males to 1 female. The reason why such authorities as Erb, who gives 19·5 males to 1 female, and Fournier, 26 males to 1 female, are relatively so high is, I think, due to the fact of

the large private practice they do, so that they draw their data from the upper and middle classes mostly, in which syphilis in women is comparatively rare. Mendel's statistics at his polyclinic in Berlin support this conclusion. Number of patients: 20,539 males, 21,825 females; total, 42,364. Of these there were 725 male tabetics (3·53 per cent.) and 288 female tabetics (1·31 per cent.). There was therefore 1 tabetic woman to 2·7 tabetic men.

Congenital Syphilis and its Effect on the Germ-plasm.

An important question from the racial point of view is this: Does syphilis diminish the vital energy of the germ-plasm prior to conjugation of the male and female germ-cells and cause pathological variations?

It is a known fact that toxins weaken cells, and therefore why not germ-cells? For although segregated in the body, they are of the body and nourished by the same blood and lymph, and there is consequently reason for supposing that the two most potent and prevalent poisons, alcohol and syphilis, may, without killing the germ-cells, diminish their specific vital energy and thus lead to various pathological conditions of the body and especially of the nervous system.

There can be no doubt that syphilis in the parents may lead to infantilism in the offspring, evidenced by arrest of development of the reproductive glands and absence of the secondary sexual characters. A considerable proportion of the male juvenile general paralytics exhibit this manifestation of deficient vital energy of cells without presenting any coarse and obtrusive signs of syphilis. All the cases of juvenile general paralysis and infantilism that I have seen recently give a positive Wassermann reaction.

If syphilis can produce arrest of development of the reproductive organs there is surely no reason why it should not lead to arrest of development of the most highly differentiated and specialized tissues of the body—viz., the cerebral cortex—or cause pathological variations in its structure and functions. Not long ago I was consulted about a pretty, physically well-developed imbecile child. I could ascertain nothing from the family history to account for the condition. Later I saw the father, who was suffering from arrested syphilitic brain disease, and I then ascertained that he had been infected some years before marriage. His wife had had no miscarriages, and there was no evidence to show that she had been infected. This, however, is no proof, I admit, that she had not had latent syphilis.

There is not the slightest question that, if congenital syphilis were not so fatal to infant life, the number of people suffering from brain disease from this cause would be appalling. I have seen but very few cases of syphilitic arteritis, gummata of the brain and meningitis arising from congenital disease as compared with general paralysis, tabo-paralysis, and optic atrophy, pathological conditions which I consider are due to primary neuronic decay. An important question relating to the public health is this: does syphilis contribute to a considerable extent in the production of idiocy? Binswanger, whose statistics have been based upon a large number of idiots, gives 9·5 per cent. as certain and 12·2 per cent. probable of one of the parents. Similar results were obtained by Wildermuth. Ziehen gives 10 per cent. demonstrable, and a further 17 per cent. probable. On the other hand, Bourneville holds that congenital syphilis is an exceeding rare cause of idiocy. Langdon Down found it in only 2 per cent. of cases, and Shuttleworth, among 1,000 idiots at Darenth, only found 1 per cent. of congenital syphilis. Telford Smith found only eight cases with marked evidence of congenital syphilis amongst 580 inmates of the Royal Albert Asylum. Similarly, Brown, in America, only found 1 to 1·5 per cent. of syphilitic origin. An important piece of evidence relating to this question has lately been forthcoming in the examination of the blood serum of idiots by the Wassermann reaction, which tends to confirm the much higher percentage of the German statistics. I observe, however, that Dr. Dean is taking part in this discussion, and I shall leave him to give his researches in the Serological Institute of Berlin, which certainly support his statement that it is reasonable to think that many cases of idiocy should be classed with that form of syphilis which manifests itself alone by a selective toxic action on the nervous system. It is a pity that no opportunity has been afforded for the examination of the blood of the idiots in the English asylums, for I feel convinced that syphilis plays a more important part in the production of idiocy and imbecility than is apparent from the English statistics I have referred to. Dr. Topley has examined the blood and cerebrospinal fluid of a number of clinically syphilitic or parasyphilitic cases of mine at Charing Cross Hospital. All the cases gave a positive reaction of the blood except one, a case of syphilitic arteritis; after a six weeks' treatment with mercury inunction and iodide a well-marked positive reaction was given. This was paradoxical, but Ehrlich has observed this and termed it "reaction provocative." Another case of ophthalmoplegia externa and interna gave a negative reaction, but the whole of the symptoms cleared up under

treatment. Two cases of juvenile general paralysis—one with infantilism, the other with optic atrophy—both gave a positive reaction of the blood and the cerebrospinal fluid, although there were no obvious syphilitic stigmata. The mothers, when interviewed, said they had never suffered in any way, never had a day's illness; both gave a positive reaction in all dilutions, and this leads me to say that I agree with Neisser as regards Colles's law: the women who suckle their syphilitic offspring and yet do not suffer are like these two women, examples of latent syphilis. The mother is *apparently* immune in Colles's law and the child is apparently immune in Profeta's law. The following facts support this conclusion:—

(1) The researches of Bauer, Engelmann and Rietschl show that all mothers of congenital syphilitic children give a positive Wassermann reaction.

(2) The researches of Knopfelmacher and Lehndorf show that those women who have given birth to congenital syphilitic children within four years react positively in the same percentage as latent syphilis. Consequently, in spite of *apparent* health the mothers of congenital syphilitic children are much more frequently syphilitic than has been supposed.

(3) The passage of reaction bodies to a healthy mother can only be a passive one, and the positive reaction would rapidly disappear from the blood of the mother after birth of the syphilitic child if their source were the syphilitic fœtus, but it may persist, as we have seen, in these two cases for fifteen to twenty years.

(4) Bauer, Wechselmann and Neisser have shown that there may be a positive serum reaction in the mother and a negative of the child.

(5) A series of cases have been published by Halberstädter, Müller and Reichel, in which the child at birth showed a negative reaction, and only gave a positive reaction when there were definite objective signs of syphilis. In these cases we can exclude passage of the reaction bodies from fœtus to the mother.

(6) Neisser's researches upon apes and anthropoid apes afford no support to the occurrence of a true immunity in syphilis.

It is nevertheless a remarkable thing that women with latent syphilis often, as in the case of the two I mentioned, give such a marked Wassermann reaction and have no signs of syphilis. Again, it is remarkable that infants only gave a positive reaction when there were definite objective signs of syphilis.

Many people have syphilis and are never treated at all, and yet

get well; they may show in after-life a well-marked positive reaction. Paralytics give a very marked reaction of the blood and cerebrospinal fluid in nearly 100 per cent. of the cases—97 per cent. at least—and yet the signs of antecedent syphilis are usually slight and often entirely absent. May we not reasonably infer that if the Wassermann reaction is not dependent upon an acquired or inherent defensive immunity reaction, it is in some way closely associated with it?

Of the value of the Wassermann reaction in the diagnosis of general paralysis there cannot be the slightest question. Dr. Candler, my assistant, has published two valuable papers proving this fact. The correctness of the results of his work has been proved by the death and post-mortem examination of a large number of the patients who were examined during life. I show here in tabular form a synopsis of the results obtained by my assistants Dr. Candler and Mr. Mann (pp. 85, 86).

An important distinction of parasyphilis from syphilis of the nervous system is, that syphilis of the nervous system does not give a positive Wassermann reaction of the cerebrospinal fluid except in a comparatively few cases, less than 20 per cent.; whereas general paralysis gives it in nearly every case (97 per cent.) and tabes in about 60 per cent. We may, I think, interpret the marked reaction of the blood and cerebrospinal fluid as evidence of the persistence of the reaction long after the specific organism itself has ceased to be present; for no one has ever discovered the spirochæte in the lesions of general paralysis of the insane. Again, no matter how long after the primary infection (which may be ten to thirty years) the onset of the disease occurs, nevertheless the reaction is intense, in spite of the fact that, generally speaking, the symptoms of infection were mild or even absent. What can this mean but an intense reaction on the part of the body to the specific organism, probably due to an acquired congenital and racial immunity. Schäfer's results show that the time between the primary infection and the onset of the disease is on an average ten years, whether the patient has been treated with mercury or not, which I can confirm.; this is a strong support of my contention. Again, we may ask the question whether the metals, arsenic, mercury and antimony, all of which have a specific action in destroying the spirochæte, do not do so by poisoning or weakening the organisms so that they cannot multiply, and thus aid the defensive reactions of the body? But an excessive reaction of the specific organism persisting after energetic treatment with mercury for years suggests an *over-reaction*, a hypersensibility of the cells of the body which will destroy the durability of the complex nerve-cells which

are incapable of regeneration. The probability that the nerve-cells are drawn into this defensive reaction is evidenced by the fact that the cerebrospinal fluid contains the globulin upon which the specific biochemical reaction of Wassermann depends. Normally the brain is protected against nutritional disturbances of the body, causing wasting —e.g., in starvation it hardly loses anything in weight. For this reason I am of opinion that the primary neuronic decay of the nerve-cells in this disease is the outcome of a lack of durability caused by a nutritional disequilibration occasioned by an excessive defensive reaction of the cells of the body in which the nerve-cells participate. If this theory be true, we may expect that those cases of syphilis in which, in spite of all treatment, the reaction persists are more likely to end in general paralysis; particularly if all the additional factors that lead to neurasthenia combine in throwing an extra stress on the maintenance of nutritional equilibrium of the latest and most complex structure in the body, the cerebral cortex. If these premises be accepted as possible, it is to be hoped that the early administration of "606," followed by mercury may in a measure do what mercury alone has in a measure failed to do, as regards averting parasyphilitic affections in later life —viz., it may by rapidly and effectually killing off the spirochætes in the blood and lymph prevent the hypersensitizing of the cells of the body and excessive defensive reaction. It will be of great interest to see how far this hypothesis may be true; at any rate, I expect it will lead to discussion of this important question of latent syphilis and the public health.

I have in conclusion one other proposition to make, and that is the desirability of a Wassermann reaction of all infants born of parents who are syphilitic or who are suspect, whether the infant presents symptoms or not; for we have seen that many die of convulsions, meningitis and hydrocephalus in early life or later develop optic atrophy, deafness, or juvenile general paralysis. Moreover, an estimate of the amount of latent syphilis and its influence in the modification of the effects of syphilis on the race could then be arrived at. The following table gives the results of the Wassermann reaction obtained by Dr. Topley on cases admitted to Charing Cross Hospital under my care recently:—

RESULT OF EXAMINATION OF CEREBROSPINAL FLUIDS.

Case	Diagnosis	Excess of small lympho-cytes	Wasser-mann reaction	CEREBROSPINAL FLUID			
				8 volumes	4 volumes	2 volumes	1 volume
S. H.	Infantile general paralysis of the insane	+	+	+	+	+	+
E. M.	Infantile general paralysis of the insane	Slight	+	+	+	Par	Par
K. C.	General paralysis of the insane	+	+	+	+	+	+
C. H.	General paralysis of the insane	+	+	+	+	Par	Slight
A. W.	General paralysis of the insane	++	+	+	+	Par	–
O. R.	General paralysis of the insane	Slight	+	+	+	Par	–
G. T.	? General paralysis of the insane	–	–	–	–	–	–
R. C.	Syphilitic meningitis	+	–	–	–	–	–
H. H.	Syphilitic meningitis	+	+	+	Slight	–	–
H. H.	Syphilitic meningitis	+	–	–	–	–	–
J. H.	? Syphilitic meningitis... ...	+	+	+	+	–	–
*C. D.	Syphilitic meningo-myelitis ...	+	+	+	+	+	+
J. W.	Syphilitic hemiplegia	+	–	–	–	–	–
†S. W.	Congenital syphilis	+	–	–	–	–	–

* Marked positive result in spite of two doses of "606," followed by mercurial inunction.

† S. W. was the son of A. W. He presented no signs of syphilis, but gave the marked reaction in the blood. It is possible that he may develop general paralysis in later life.

SUMMARY OF RESULTS OF WASSERMANN'S REACTION IN ASYLUM CASES.

Since March 1, 1911, 256 specimens of cerebrospinal fluid (sent from the various London County Asylums for diagnosis) have been submitted to the Wassermann test by Dr. Candler and Mr. Mann. Of these 164 gave a positive result. A number of the patients have died, and including a number of cases that were examined in a previous series of Wassermann tests by Dr. Candler and Dr. Henderson Smith that have also come to autopsy, out of 119 cases we have been able to confirm the result of the Wassermann reaction by autopsy

and microscopical investigation in 116 (or 97·4 per cent.), as shown by the following table:—

CEREBROSPINAL FLUIDS.

		Cases
Positive results confirmed by autopsy and microscopical examination	...	100
Negative „ „ „ „ „	...	17
Negative results on cases found to be general paralysis at autopsy	...	2
Total	..	119

Wassermann's reaction confirmed in 116 (97·4 per cent.) out of 119 cases. No case giving a positive result was found to be other than general paralysis at autopsy. In general paralysis, 100 of 102 cases (98 per cent.) gave a positive reaction.

The Royal Society of Medicine.

June 17, 1912.

Sir Henry Morris, Bt., President, in the Chair.

A Discussion on Syphilis, with special reference to (*a*) its Prevalence and Intensity in the Past and at the Present Day; (*b*) its Relation to Public Health, including Congenital Syphilis; (*c*) the Treatment of the Disease.[1]

Mr. Ernest Lane: In continuing the discussion opened last Monday I do not propose to deal with the prevalence of syphilis in the past, or its relation to public health, but will confine my few remarks to the treatment of the disease. I expressed my views on the treatment of syphilis at a discussion held by the Surgical Section of this Society in 1910,[2] and I also opened a similar discussion at the Annual Meeting of the British Medical Association last year, since which time my opinions have undergone no material change, and before a meeting such as this I would not venture to go over any ground I had so recently traversed. At my former communication to the Surgical Section of this Society in 1910 I gave my experiences of various arsenical compounds known as the arylarsonates, and expressed my opinion that, though their influence on the symptoms of syphilis was most remarkable, yet it was impossible to advocate the continuance of such treatment owing to the idiosyncrasy shown by certain patients against these preparations. I brought forward a certain number of cases in which double optic atrophy and incurable blindness had resulted from this plan of treatment, and consequently I abandoned it as being dangerous and unjustifiable. Still, the results of the treatment were most remarkable, and many patients left the hospital after ten injections administered once a week, entirely free from all symptoms of disease, and did not present themselves again, notwithstanding instructions to attend promptly in case of any relapse. It will

[1] Second meeting (adjourned from June 10).

[2] *Proceedings*, 1910, iii (Surg. Sect.), pp. 209-48.

thus be seen that I fully realized three years ago that the introduction of large doses of arsenic into the system produced a very marked effect on the symptoms of syphilis, and the treatment by arylarsonates was also, at that time, strongly advocated by Hallopeau and others, and was employed largely in this country at the Rochester Row Hospital by officers of the Royal Army Medical Corps. As I pointed out in that discussion, the insurmountable objection to these arsenical compounds was that they not only deprived the patient of his manifestations of syphilis but occasionally also of his eyesight at the same time. Last year, at the Annual Meeting of the British Medical Association,[1] I expounded my views on the treatment of syphilis with special reference to salvarsan, and as less than a year has elapsed since I read that paper I fear that I have not much to add to what I then said. The gist of my communication was that salvarsan was a most valuable addition to our category of anti-syphilitic remedies, but that it was only an addition, and that its influence on the disease was hardly as striking as had been alleged. I recognized then, as I do now, its extraordinary effect on the symptoms of the disease, but I expressed the opinion then, as I do now, that salvarsan, *per se*, was not the cure that it was represented to be. I have been exposed to considerable criticism as to my early attitude to this treatment, but I see no reason to regret the line I took, which was that its merits were somewhat over-estimated and that the claims originally made on its behalf were not justified.

Having seen many innovations both in medicine and surgery, and having found from extending experience that the claims made for new methods of treatment do not always come up to the sample, so to speak, I moderated the transports of my enthusiasm, and proceeded to give the treatment an impartial trial. At first we were told that syphilis was going to be cured by one injection of salvarsan, and the title of "Therapia sterilans magna" was bestowed upon it. It certainly, as anyone who has employed it must have realized, caused the disappearance of the early symptoms of syphilis with wonderful rapidity, and might have created the impression that it *had* effected a cure. But more mature experience showed that the disappearance of symptoms was only temporary, and relapses were continually met with. Then the number of injections was increased, and two, three, or more, were advocated at short intervals, and now I find cases recorded in which as many as nine injections have been administered in the space of

[1] *Brit. Med. Journ.*, 1911, ii, pp. 673-76.

twelve weeks (a somewhat expensive course for a hospital patient). I consider, therefore, that I was fully justified in criticizing the term "Therapia sterilans magna," but the best evidence that I have not assumed an attitude of uncompromising hostility to salvarsan is the fact that I have treated over 300 cases by this method in hospital and in private practice, and am consequently entitled to speak of it with some degree of authority. Not that I attach so much importance to the number of cases treated in this manner, for without a matured experience in other methods of treatment a fair comparison cannot be arrived at. Like Mr. D'Arcy Power, I do not rely on salvarsan solely, but propose to follow it up with chronic intermittent mercurial treatment for two years or more, according to the blood test. To the devoted disciples of Ehrlich the combination of salvarsan and mercury does not commend itself, and some of them go so far as to cast doubt upon the curative powers of mercury over syphilis. They concede that it abolished symptoms of syphilis, and rendered the disease latent, but there the concessions stopped, so if this is the case we are to conclude that no case of syphilis has ever in the past been cured by mercury. From a somewhat extended experience in the mercurial treatment of syphilis I have no hesitation in saying that it *is* a cure for syphilis if administered for a sufficiently long time, and the reason that cases of tertiary syphilis and of parasyphilis are so frequently met with is that the period over which treatment has been prolonged has been obviously insufficient. I think the doctrine formerly laid down, that mercurial treatment continued for only two years was sufficient to effect a cure, a most pernicious one, and for years past I advocated its continuance for the space of five or even seven years. The duration of treatment will now materially depend upon the Wassermann test, and such long periods as those indicated above will not be necessary in the majority of cases. But when first I drew attention to the inadequacy of the two years' limit the Wassermann test had not been invented, and the prolongation of the treatment for five years or more was only with the view of insuring the patient, if possible, against any of the late manifestations of the disease.

Considering that the salvarsan treatment was only initiated in 1909, and that the method of its administration has been considerably modified since that date, I maintain that no one at the present time is justified in the belief that it is a cure for such a complex chronic disease as syphilis. Until recently a negative Wassermann test was held by many as a proof that the disease was cured, but now in the

presence of a negative Wassermann reaction, what are styled provocative injections of salvarsan are administered, the effect of which is often to render the reaction once more positive and to indicate that further treatment is required. I find it further stated by one of the most enthusiastic advocates of salvarsan that in the late stages of the disease the drug should be used only with the object of eradicating symptoms, and that a cure is only to be expected in those cases in which the disease is attacked in its infancy. This is rather a climb down from the position originally taken up. I see no positive proof that arsenic is any more destructive to the spirochæte than is mercury, and am curious to know whether intravenous injections of mercury would not be found to have an equally damaging effect upon the spirochæte. Sixteen years ago I gave an account of a number of cases of syphilis treated by intravenous injections of mercurial solutions, and from the rapid disappearance of symptoms in these cases, I was led to conclude that the effect of the treatment on the spirochæte was considerably to modify the powers for evil of that organism.

I am of the opinion that salvarsan should not be employed until the surgeon has made himself fully conversant with the technique, and agree with Mr. Power that the intravenous injection of salvarsan is a safe method of procedure *if care be taken to administer it in a rational manner* and to reasonably healthy persons. But I should hesitate in recommending it as a routine treatment, and do not consider that anyone should undertake it until he has had the opportunity of seeing the injection administered frequently by one who has acquired the requisite experience. The slightest mistake in technique may be fraught with the greatest danger to the patient, and might lead the surgeon to regret that he had ever employed it. The simpler the apparatus employed for the intravenous injections the better, and all that is required is a funnel, some rubber tubing with a glass window, a clip, and a needle. There is a contingency to be guarded against, and that is passage of the needle through the distal wall of the vein, and the consequent escape of the solution into the subcutaneous tissues. This happened to me once from the patient moving his arm, and the consequence was a solid œdema of the whole arm which persisted for a fortnight. I should therefore hesitate before handing over the sole care of the needle to the patient, as suggested by Mr. D'Arcy Power, but think it absolutely essential that the needle shall be held in place by the surgeon until the completion of the injection.

I have had two fatal cases at the Lock Hospital, but in neither of

these could I say that death was *not* due to the severity of the disease. In one case the injection of 0·5 grm. was shortly followed by vomiting and extreme collapse, so much so that an immediate fatal result was feared; however, after some hours the patient rallied, but two days later intense jaundice supervened, and death occurred eight days after the injection. It is well known that jaundice does occasionally supervene shortly after the administration of the drug, and it is quite possible that in this case it was an evidence of acute arsenical poisoning.

I also had my attention drawn to another fatal case which did not occur in my own practice, and which can only be characterized as a terrible tragedy. I have mentioned this case in a previous communication, and will give the merest outline of it to this meeting. The subject was a perfectly healthy man, who had contracted the disease two years previously and had been treated with mercury. He was desirous of getting married, but as his Wassermann reaction was positive, he was advised to have an intravenous injection of salvarsan. The injection of 0·6 grm. was followed by slight nausea, and subsequently by pains in the chest, difficulty of breathing, and cyanosis, and he died in the middle of the night, presumably of pulmonary embolism.

When first I adopted this treatment I encountered a fair proportion of cases in which the reaction following intravenous injections was excessive and alarming; in the light of present knowledge I attribute these disturbing symptoms to the fact that I then dissolved the powder in saline solution, whereas now I make use of redistilled water. Through the kindness of my colleague Mr. McDonagh, who supplied me with the tubes, I have had the opportunity of treating seventeen hospital cases with the new modification known as neo-salvarsan. This has the advantage of being perfectly soluble in warm water, requires the addition of no reagent, and appears to be followed by less reaction than the original preparation. In one case some somewhat disturbing symptoms followed this treatment; the case was that of a healthy young man, aged 21, suffering from recently acquired syphilis, the chancre being present and also a slight papular eruption; an injection of 0·6 grm. of neo-salvarsan was given, which was followed by some slight reaction; four days later he was given a second injection of 0·5 grm., which caused no reaction, and five days later he was given a third injection of 0·4 grm.; this was followed by a rise of temperature which for the next three days ranged from 101° to 103° F., accompanied by drowsiness. Five days after the third injection he became distinctly jaundiced, the stools became white in colour, the urine was

markedly bile-stained, and considerable itching of the skin was present. These symptoms had all disappeared by the end of a fortnight, at which time he left the hospital quite free from symptoms. This was not in my opinion a case of jaundice due to syphilis, for though it is a condition which is met with in early stages of the disease, it is not so intense as in this case, and is more transitory in nature. I am rather inclined to ascribe it to the toxic effect of large doses of arsenic upon the hepatic cells. Before quitting this method some allusion must be made to the preparation "joha," which is a recent method of introducing salvarsan intramuscularly: 1½ c.c. of joha are equivalent to 0·6 grm. of salvarsan. Its advantages are that from its limited volume it is less likely to be followed by the extensive necrosis which was occasionally observed to follow intramuscular injections of salvarsan; it is said not to be followed by pain or any toxic symptoms, it does not deteriorate by keeping, and the technique is perfectly simple. My experience of this substance is limited to six cases, in all of which the injections were followed by a rapid amelioration of the syphilitic symptoms, though in one case the patient recorded that following injections into each buttock he was confined to his bed for three weeks with excruciating pains down both legs.

I have dealt at some length with the salvarsan treatment, but as I stated previously, I am not content to rely upon that treatment alone, but follow it up with that form of mercurial treatment which is most suitable to the individual case. A plan of campaign of this nature has the approval of that most distinguished syphilographer Professor Neisser, who in his Cavendish Lecture last year expressed his opinion as follows: "It appears to me beyond all doubt that a surer, more brilliant and more lasting curative effect will follow if we combine the two remedies." I have for years past advocated intramuscular injections of mercurial preparations as the best means of exhibiting that drug, and consider that the insoluble salts are infinitely superior to the soluble, and that of the insoluble preparations the palm must be given to calomel suspended in olive oil.

Mr. Jonathan Hutchinson: With regard to the treatment of syphilis by mercury there has been the greatest controversy as to the best method of administration. Some observers declare that intramuscular injection is superior to all other methods, others pin their faith to inunction, both classes decry the internal use of mercury in the form of grey powder, &c., as being inefficient. In this country, largely

owing to my father's teaching, the vast majority of cases have been submitted to the third or intra-oral method. Now what view was held by its advocates before the introduction of the Wassermann test, which has come as a searchlight on the whole subject? Briefly it was this, the mercurial course should be treated seriously by patient and doctor alike, it should be commenced directly the diagnosis could be made (if possible before the secondary symptoms developed), and it should be continued steadily for about two years. In most cases, provided the patient was abstemious and led a regular and healthy life, the mercury caused little or no inconvenience, and while it was taken it prevented the occurrence of any symptoms (there was a fair proportion of exceptions to this—especially with regard to superficial ulceration of the tongue and throat). Wherever "reminders" of any kind occurred the period of treatment was prolonged, or the form of mercurial varied. Our belief was, that under these conditions a real cure of syphilis was obtained in something like 80 per cent. of the cases. We admitted that in a certain number, even of the most careful patients, this treatment failed to prevent later tertiary symptoms, sometimes of a grave nature, though it is a matter of universal experience that in many of the cases of tabes, &c., the treatment of the precedent syphilis has been obviously inadequate and has fallen far short of the requirements laid down above. But I think it has been generally admitted that in a certain number of cases the syphilitic virus was not destroyed by the internal use of mercury, however prolonged. This is equally true of mercurial inunction and injections, and personally I have never been able to convince myself that there was any decided superiority in either method. It may here be noted that my father and I have published two independent series of cases in which the patients contracted syphilis a second time after the first attack had been treated by a long and steady course of mercury given by the mouth, pointing clearly to a cure having been attained.

Since the invaluable blood test was introduced by Professor Wassermann, a great many patients who had undergone in former years what was then considered to be adequate mercurial treatment (given by the mouth) have been submitted to the test. My own cases have been tested almost entirely by Dr. Fildes, of the London Hospital Medical College. In the great majority of cases the result has been satisfactory, the test being absolutely negative. In some, either those in which the test was faintly positive or distinctly so, I have advised the intravenous administration of salvarsan; in most of these the injections have been

successful in securing a negative result to the test, but in one or two cases even two full doses of salvarsan have failed. I prefer to quote on this subject the results obtained from hospital patients, by Dr. McIntosh,[1] since it is for obvious reasons more easy to carry out the test repeatedly on them, and because Dr. McIntosh's investigation was a wholly independent and unbiased one of 160 patients treated with mercurial pills alone. "Examination during the first year gave 92 per cent. of cases positive. Cases examined at the end of the second year gave 54 per cent. of positive results, while cases treated for over two years reacted positively in 30 per cent." Thus, 70 per cent. were ultimately cured if we accept the evidence of the Wassermann reaction. How does this compare with the results of mercurial injections and inunction? Major Harrison has demonstrated that after seven courses of injection with "Lambkin's mercurial cream" a positive Wassermann reaction was still obtained in no less than 55 per cent., and that of 111 cases treated by various methods 64 were still "positive." The evidence of Continental observers is very much the same; Jesionek and Meirousky found only 60 per cent. of cases with negative Wassermann test after from four to eight courses of mercury, Seligmann and Pinkus only 55 per cent. of cures after four to ten courses. Hence, we may conclude with McIntosh, Pürckhauer and Boas that the exact form in which mercury is administered makes little difference, that "the therapeutic effect is practically independent of the form of administration." Mr. D'Arcy Power, I think, arrived at the same conclusion in his opening address, although he expressed a preference for the use of injections. Mr. Power quoted, apparently with approval, one of the many elaborate systems of treatment with varying numbers of injections interspersed with oscillating intervals. I would urge that there is not the smallest scientific reason to be adduced in their favour. The important point is, when mercury alone is relied upon, to keep the patient under its influence steadily through a long period of time—not less than two years—and the simpler the method of giving it the better.

But Professor Ehrlich's discovery has entirely changed our views, and I cannot agree with Mr. Power that "in the light of our present knowledge salvarsan should not be used by itself, or in the place of mercury." Salvarsan is the only remedy that will speedily render the Wassermann reaction negative, and there is abundant evidence that after two intravenous injections the reaction remains negative in most

[1] McIntosh and Fildes, "Syphilis from the Modern Standpoint," 1911, p. 157.

cases. We may then presume that a complete cure has been effected. Granted that mercury achieves the same end if properly administered in about 70 per cent. to 80 per cent., nothing is more certain than that it takes a long time to do so, that whatever form is employed the Wassermann reaction will remain positive for many months. When one thinks of the terrible possibilities of syphilis, of tabes, general paralysis, &c., it seems obvious that we are bound to employ the most rapid and efficient method of destroying the poison, and to use it at the earliest possible moment. I see that Dr. Mott holds precisely the same view. I maintain, therefore, that in every case of early syphilis we are bound to advise the patient to undergo two intravenous injections of salvarsan, whether they be followed by a course of mercury or not. Dr. Fildes and Dr. McIntosh, from whose valuable work I have extensively quoted, are in favour of relying on salvarsan alone, of course with the subsequent confirmation of the Wassermann test.

My own experience of salvarsan in late syphilis agrees entirely with that of Mr. D'Arcy Power. In cases which have resisted mercury and iodides it has generally proved successful. To the surgeon in past years none have given more trouble than the cases of relapsing glossitis and ulcers of the mucous membrane of the lips, palate, &c. Mercury and iodides may here have ameliorated the condition, or have become quite powerless. In fact, for many of these cases one has ceased to trust to these remedies and relied on local treatment—i.e., some form of cauterization, combined with the removal of all sense of irritation. And yet all these patients give a positive Wassermann reaction, though ten or twelve years may have elapsed since infection, and all kinds of "specific treatment" have been tried. I have seen really brilliant results again and again in such cases from salvarsan injection; often a single injection has completely cured the condition. It should be noted that against true leukoplakia salvarsan fails as all other remedies do. I have long held that whilst leukoplakia may occur in those who have had syphilis the latter has no direct causal relation; the keratosis of the mucous membrane is set up by the irritation of tobacco, and should not even be placed in the vague category of parasyphilitic lesions, since it often occurs in those who have never acquired the disease.

In cases of severe bone-pains and nodes in the early stage of syphilis, salvarsan is as a rule remarkably successful; I have known persistent and intense cephalalgia in the secondary stage disappear like magic after the first injection. In nearly all tertiary lesions, if active or resistant to iodides, &c., salvarsan should be tried and will often cure. It is well

known that congenital cases are, speaking generally, more resistant to salvarsan than the acquired ones. In some, indeed, it appears almost impossible to obtain a negative Wassermann reaction. I am afraid that in interstitial keratitis and deafness due to congenital syphilis the results have been very disappointing, but I cannot speak from much personal experience in this matter.

When the surgeon had only mercury to rely upon there were two main classes of case which resisted his best endeavours, first the relapsing lesions of the tongue and mouth in acquired syphilis, secondly the interstitial keratitis and other symptoms of the inherited disease in young adolescents. So far as my present experience goes salvarsan has enabled the surgeon completely to master the former group of cases (and for this we are profoundly grateful to Professor Ehrlich), whilst unfortunately the second group retains its intractability untouched. It will be noted that Mr. D'Arcy Power records the comparative failure of salvarsan in the treatment of arthritis due to inherited syphilis, a condition often met with at the same period of life as interstitial keratitis. My own experience has been that this form of syphilitic joint disease yields quickly enough to internal treatment with mercury, but it is a very different thing with regard to interstitial keratitis. Here a rapid cure—i.e., in a few months' time—is occasionally obtained, but it is not uncommon for one eye to be attacked whilst the patient is under mercurial treatment for keratitis in the other, thus proving the obstinacy of the disease. In the treatment of what is termed malignant precocious syphilis salvarsan is a great addition to our resources, indeed I think it bids fair to render the term obsolete.

Dr. Norman Moore has dealt gently with our cherished views—or illusions—with regard to the absence of syphilis from Europe before the end of the fifteenth century, and its introduction by Columbus's sailors and others, between 1490 and 1500. We still refer with a certain amount, perhaps, of conceit, to the Old World and the New. With regard to the prevalence of syphilis it seems certain that no distinction can be drawn. In Haiti, in Mexico, in Fiji, in India and China, it appears to be of equally ancient origin—from what we should term prehistoric times. The mercurial treatment of syphilis was familiar in India in the tenth century A.D. That syphilis was unknown in Italy and England before 1490 is shown by the great writers and dramatists of these countries. Shakespeare and Ben Jonson, for example, refer to it frequently, though I venture to suggest that there is no proof that Shakespeare meant syphilis in all the twenty-one references to

"the pox" which Sir Henry Morris has quoted. I would have limited the clear references to syphilis in Shakespeare to about half-a-dozen, but these include the wonderful description of the tertiary symptoms in "Timon of Athens," a description which has no parallel in English poetry until we come to Swinburne's "Dolores" of three centuries later. But whilst Shakespeare and Ben Jonson describe syphilis so well, I believe there is not a single passage in the whole of "Chaucer" and "Boccaccio" which can be strained into an allusion to it. The inference is not to be resisted, there was no syphilis amongst Boccaccio's and Chaucer's countrymen. One of Shakespeare's best allusions to syphilis escaped our President's notice, and I believe is little known; it occurs in the pathetic last speech of the immortal Pistol:—

> "Doth fortune play the housewife with me now?
> News have I, that my Nell is dead i' the spital of malady of France."

And here arises an interesting problem with regard to Shakespeare himself. "Timon of Athens," in which we find such an accurate and poignant picture of the effects of syphilis, was a late play (1608), as was "King Lear," in which occurs the terrible description of the female sexual organs (Act iv, Scene 6, lines 130 *et sqq.*). Both plays seem written by a bitter misogynist. We know that Shakespeare before he wrote them passed through a period of grave mental and probably physical trial; we know also from his own statements in the Sonnets that some scandal was attached to his name. No one has offered a satisfactory explanation of these facts. I venture to suggest that it may be found in Shakespeare himself having suffered from syphilis. The poet often stayed at the Crown Hotel in Oxford; here in March 3, 1605, he stood godfather to the future Sir William Davenant, the son of the innkeeper's wife. It was rumoured that Shakespeare was really the father of Sir William Davenant, who used in later life to boast of this parentage. It is a strange fact that the portraits of Sir William Davenant are strongly suggestive of inherited syphilis in their physiognomy.

Mr. J. E. R. McDonagh: The problem of venereal disease is one of the most, if not the most, important which besets every civilized nation at the present time. The greater part of the general public know little or nothing about this complaint, and therefore care the less, while a few who do know and do care are prevented from airing their opinions *pro bono publico*, for fear of the popular prejudice aroused thereby. The reason of this is twofold.

First, because any venereal affection is looked upon as a punishment for sin and not as a disease; secondly, because the nation's great affairs are managed by persons least suited for the purpose, and because the axiom, "What was good enough for our forefathers is good enough for us," is still maintained with reverence. In no country in the world is scientific progress so hampered as in ours. If any members brought up the subject of venereal diseases for discussion in Parliament it would be probably sufficient to prevent them retaining their seats at the next election. In this country some terrible accident must happen before the authorities responsible can take measures to prevent a recurrence which ought to have been taken before. The sound rule that "Prevention is better than cure" is more often preached than practised. If a man is killed by a train the news is on all posters within a few hours. If thousands die of lingering diseases caused by syphilis no notice is taken. Again, recently a few deaths have been caused by anterior poliomyelitis. Quite rightly there have been numerous meetings to prevent further cases occurring, and the Metropolitan Asylums Board has made the disease notifiable. Hundreds and thousands have died as the result of syphilis, and yet not a hand has been lifted up or a voice raised to stamp out the scourge.

Since prevention is better than cure, on what lines should progress run in trying to combat venereal disease? The following would be useful:—

(1) To teach all boys the dangers accruing to extra-matrimonial intercourse, and that abstinence therefrom does in no way endanger their constitution or detract from their manliness—on the contrary, that it has just the opposite effect.

(2) To advocate temperance and healthy sport.

There can be no doubt that the diminution in recent years of venereal disease in the Army is not due to having abolished the C.D. Act, but to the diminished consumption of alcohol, and to the institution of giving lectures to the soldiers. One would not be far wrong in stating that about 90 per cent. of infections take place while the victims are under the influence of alcohol. The same probably applies to the civil population, but we have no means by which we can positively assert as to whether syphilis is on the increase or decrease.

The problem of prostitution has baffled the minds of men for centuries, and while glancing over their work one cannot but fail

to be impressed with the utter failure which has resulted from the regulations apportioned to that class. State control and medical supervision of prostitutes has in no wise diminished venereal disease, since it has stimulated clandestine prostitution which avoids regulation, and is a potent factor in the incidence of infection. Apart from legalizing a trade which is itself immoral, it is, at the same time, grossly unfair and useless to have laws affecting women only and not men, the latter of whom must have been the prime cause of disease in the former. In this country regulation of prostitution died a quick death, and in France and Germany, where the laws have always been most rigid, the system is rapidly on the wane. If laws of any kind are to be framed they must apply equally to both women and men.

Considering how widespread venereal disease is, and what a danger everyone runs, it must appeal to all sane people that our chief duty is to those who are free and then to those who are afflicted. Saving the free can most easily be done by rendering the affected as free from infection as soon as possible. This means early recognition and immediate treatment of the disease with the best means at hand.

Early recognition of a disease requires a sound knowledge of that disease, and so far as venereal diseases are concerned, we must all admit that the knowledge thereof in our profession is very scanty. The medical man cannot be blamed, because venereal diseases are not taught in the general hospitals, and but few beds are set aside for the purpose. Every general hospital should have its own venereal ward, and systemic courses of instruction should be given by men who devote themselves to that study.

Another step forward which strongly appeals to me is to make venereal diseases notifiable on these lines: Have a central bureau made up of venereal specialists and let every case be reported to headquarters by the medical practitioner in charge, giving all details of the case, without mentioning names. The medical practitioner would then be advised as regards treatment, and facilities made in necessitous cases to have the treatment carried out and gauged by the Wassermann reaction. Just one other point concerning regulation. Under no circumstances is the opinion of a chemist or quack more often sought than in those brought about by venereal diseases. Only too frequently a patient, told by a chemist that his sore is only due to a strain, seeks medical advice when he is well in the secondary stage of syphilis. During the interval he has been a source of infection to others and has greatly lessened his own chance of getting cured. Any medical advice given by

a chemist or unqualified practitioner should be treated as a criminal act, and the offender fined or imprisoned.

The main reason why the time is now so ripe to try to lessen syphilis is because the methods of diagnosis are as perfect as possible, and because we have in salvarsan and neo-salvarsan remedies which, by means of a single injection, render a patient within a few hours non-infectious. As it is during the primary and secondary stages that syphilis is spread, and as the victims are usually young, one seldom meets with a case in which salvarsan is contra-indicated. As mercury takes some time to render a patient non-infectious, this alone compels us to use the arsenical preparations, and renders them superior to mercury.

The use of salvarsan requires skill and precision, the lack of which has led to many erroneous ideas as to its safety. It is a known fact that the loudest decriers of salvarsan in this country have been those who have never given an injection. It is so essentially British to say much on a subject a knowledge of which is non-existent. Salvarsan can be injected either into a muscle or into a vein, the latter for preference, the reason being that a second injection can be given after a few days' interval, which is not the case when intramuscular injections are employed, because it is impossible to estimate how much has been absorbed from the first injection. The whole secret of the intravenous injection is invariably to employ only distilled water which has been redistilled a few hours before the operation, as by so doing the unpleasant symptoms—such as vomiting, rigors, headache, &c.—which used to follow each injection can be wholly avoided; so that it is perfectly safe to give 0·5 grm. of salvarsan dissolved in 200 c.c. of saline at weekly intervals for the first three injections, and at ten to fourteen days' interval for each subsequent one. As each case varies, which makes it impossible to say beforehand how many injections a patient must have to cure him, the number must be regulated by the result of the Wassermann test, which should be carried out at frequent intervals after each injection. Broadly speaking, the average case requires between 2 grm. to 4 grm.—that is, four to eight injections.

Neo-salvarsan, which has now superseded salvarsan, is a condensation product of the latter with formaldehyde sulphoxalate of sodium, which gives rise to a powder which is easily soluble in water and is neutral. The after-symptoms following neo-salvarsan are *nil;* much larger doses can be given and at much quicker intervals, as the drug is more rapidly excreted and less toxic than salvarsan. The course I now follow is to

give either one injection or two injections weekly. I always use as big doses as possible—namely, 0·9 grm. to 1·5 grm.—and am guided as to how many injections to give by repeated examinations of the blood at specified intervals.

The regulation of treatment by means of the Wassermann reaction is of paramount importance; I have done some hundreds of tests since last October, with a view of finding out some rules to go upon, and the following is a résumé of my results, which I published in the *British Medical Journal* :—[1]

Cases with a primary sore and which give a negative Wassermann reaction will give a positive reaction after an injection of salvarsan, which is in the majority of cases most marked about the forty-eighth hour. If only one injection is given, by two months the reaction is negative again, to become positive later when symptoms reappear. Should a second injection be given while the reaction is negative, a positive is produced within forty-eight hours, and as a positive reaction cannot be produced in a patient who has not had syphilis, the occurrence of such indicates that the patient has not been cured. Therefore the injections should be repeated with as short intervals as possible until the reaction is negative, forty-eight hours, the seventh, fourteenth, twenty-first, and twenty-eighth days, after the last injection. In the primary and secondary stages this can be achieved in nearly all cases with from two to nine injections. In tertiary cases it is by no means always possible even with nine or ten injections to obtain a negative reaction, therefore one must be guided entirely by the case in deciding whether a tertiary syphilitic shall be advised to have salvarsan with a chance of a cure, or whether it should be given to abolish symptoms only.

One very important point I have ascertained is that it is the rule for a patient who has had syphilis and has been so far treated with mercury as to have been driven into the latent stage with a negative Wassermann reaction, to give a strong positive reaction after one or two provocative injections of salvarsan, and require four to nine injections before a permanent negative reaction could be obtained. So constant is this that salvarsan can be used as a test of a cure. It shows also that mercury never cured a case of syphilis. The cases which required two provocative injections were cases of arterial syphilis. Cerebrospinal syphilis, syphilitic epilepsy, hemiplegia, &c., usually have very little reagin circulating in the blood, therefore no reliance can be

[1] *Brit. Med. Journ.*, 1912, i, p. 1287.

placed on a negative Wassermann reaction for diagnosis, an examination of the cerebrospinal fluid being far more important. From all this you will see that it is useless to give one or two injections of salvarsan and then test the blood after an indefinite period. If the reaction is negative, it only means that you have driven your patient into the latent stage, from which he may at any future time emerge into the active again.

It is known to all that a woman can give birth to a syphilitic infant without having herself shown any signs of the disease. Once a woman has given birth to a syphilitic infant she is always liable to bear syphilitic children, whether the father is syphilitic or not. Such women not infrequently develop their first syphilitic symptoms as tertiary manifestations at or about the menopause. I showed some cases before this Society two years ago.[1] During the child-bearing period the Wassermann reaction may be negative, even if the mother has just begot an undoubted syphilitic infant which gives a positive reaction. In my experience not more than 70 per cent. of mothers of syphilitic children give a positive Wassermann reaction, therefore the researches of Bauer, Engelmann, and Reitschl, to which Dr. Mott has referred, are not confirmed. If a provocative injection of salvarsan is given to such women a positive reaction afterwards is the rule; therefore, it is important to treat a suspected mother thoroughly.

Congenital syphilis is diagnosed more often than it exists, and the opinion prevails that it is not very common, but the fact is overlooked that an enormous percentage of those that would be syphilitic die before birth, and a very large percentage of the remainder soon after birth.

Before concluding my remarks I would like to mention two points:—

(1) That no two cases of syphilis behave alike to treatment. Of two individuals in exactly the same stage with exactly the same symptoms, one may require four injections to cure him, the other nine.

(2) If salvarsan or neo-salvarsan is prescribed with the object of curing the disease, it is imperative to give the injections as soon after one another as possible, and not to stop until the Wassermann reaction is negative, and to employ as large doses as possible. Because if two injections are given now, and two some months later, it will then be necessary to give continuously just as many as would have been required had the sporadic injections not been given; and also the risk is run of manufacturing an arsenic-resistant breed of spirochæte.

[1] *Proceedings*, 1910, iii (Derm. Sect.), p. 90.

In conclusion, let me state that, having given over 200 injections of neo-salvarsan I find that it is in every way preferable to salvarsan, and its use should be augmented with intramuscular injections of mercury until the Wassermann reaction is negative, forty-eight hours, the seventh, fourteenth, twenty-first, and twenty-eighth days after stopping treatment; also, for the sake of safety, a provocative injection should be given six months or a year later, and the blood tested again on the above-mentioned occasions.

May I now be permitted to draw attention to some remarks made by Dr. Mott and Mr. D'Arcy Power? Dr. Mott says that one attack of gonorrhœa does not give an immunity the same as syphilis. There is no evidence that there is such a thing as syphilitic immunity, either to one's own original or a foreign virus, and the reason why so few cases of re-infection are seen is because so few cases are really cured—i.e., they are syphilitic and so cannot be re-infected. This is likewise the reason why Colles's and Profeta's laws stand; both the mother and the child are immune, because they are syphilitic. If a patient is cured he can contract syphilis again, and further, if all the spirochætes in his body are destroyed except a few in the site of the chancre which are unreached by drugs owing to the non-vascularity of the dense fibrous tissue, these may later wake up and give rise to fresh and general infection. I reported such a case in my book "Salvarsan in Syphilis and Allied Diseases," p. 73. For this reason I have always advocated excision of the primary sore.

Mr. D'Arcy Power referred to the beneficial use of mercurial injections in malignant syphilis. Many people's experience of mercury in cases of malignant syphilis is, that the more mercury they give the worse the patient gets, and I think this is true; I have seen several cases descend almost to death's door in spite of the most varied and vigorous mercurial treatment, which were only saved by a course of Zittmann, a treatment which has unfortunately fallen into disuse. In no instance is salvarsan more urgently called for than in cases of malignant syphilis; small and frequent doses should be employed, preceded, if possible, by a course of Zittmann.

Mercurial injections are most suitable in private practice, because the patient cannot afford the time to undergo inunctions and is too frequently upset by taking mercury internally. Internal administration of mercury undoubtedly has a far greater depressing influence than when given in any other form, and in the majority of cases the depressing action of mercury is a factor which requires great consideration.

In my experience the best mercurial cream is the metallic mercury cream of Captain Adams; it is painless, and as much as 3 gr. of mercury can be given weekly. Calomel is excellent, but pain may be intense, however careful one is.

One other point I should like to refer to. Mr. D'Arcy Power maintains that the salvarsan solution should be kept at a temperature of 105° F. In the case of salvarsan it does not so much matter, but in the case of neo-salvarsan it is most important that the temperature should not exceed 80° F. In both cases the higher the temperature the more toxic is the solution.

It certainly does not detract from the value of a Wassermann reaction, that it has to be done by a pathologist, as there is no reason why every syphilologist should not carry out his own tests.

Mr. P. Macleod Yearsley said he would like to know, in regard to the action of "606," whether any Fellows with a large experience of this remedy had met with cases of auditory nerve deafness following its use. Last year Alexander, in the *Annals of Otology*,[1] suggested caution in treating by means of salvarsan patients who were already the subjects of auditory nerve deafness. Alexander quoted in support of his contention several cases, and related Ehrlich's experiments on white mice with arsacetin, which he found to produce degeneration of the central fibres of the vestibular nerve. The chief question upon which he (Mr. Yearsley) wished to speak was that of deafness in congenital syphilis. He did not consider that enough attention had been devoted to congenital syphilitic deafness. One authority had stated that syphilis does not cause deaf birth, but the researches of Baratoux and, more recently, of Otto Mayer, inclined one to the opinion that this statement was not true. But further investigation was required on the matter, and Dr. Kerr Love in Glasgow, and he (the speaker) in London, were carrying out researches thereon. Nothing definite could yet be said as to results, though he hoped they would shortly be able to offer some interesting facts. With regard to acquired deafness in congenital syphilis, in ten cases of children thus affected he had found Wassermann's reaction positive in only four. One of these had no other condition but the deafness, three had interstitial keratitis in addition, and of these only one had Hutchinsonian teeth, and one had active nasal syphilis. Of the six in whom the reaction was

[1] See *Journ. of Laryng.*, 1911, xxvi, p. 389.

negative all had old interstitial keratitis, five had old iritis in addition, four had Hutchinsonian teeth, and one showed nodes on the tibiæ. The reactions were done by a well-known pathologist. He did not think that the importance of congenital syphilis as a cause of acquired deafness, sufficiently severe to need special education in a school for the deaf, was realized as much as it should be. In the course of several years' experience in the London County Council Deaf Schools he had found that out of 576 cases of acquired deafness, of which the causes were definitely ascertainable, no fewer than thirty-nine were due to congenital syphilis, or 6·7 per cent. This figure was nearly three times greater than that given for the Paris institutions by Castex, which was 2·5 per cent. The majority of these cases had to be educated not only as deaf, but also as blind, and they furnished some of the most terrible and pitiful instances of the ravages of which the disease was capable. Surely such cases were preventable? and he was very glad to hear Mr. McDonagh enter so vigorously and fearlessly into the question from the public health point of view. It was pointed out some years ago that when deafness occurred in the congenital form of syphilis it did so in those in whom treatment had been neglected in infancy. Whether salvarsan in the first years of life would diminish this serious complication remained to be seen. That ordinary antisyphilitic treatment was of little use in them was shown by the fact that the ear involvement might appear and progress whilst the child was actually undergoing treatment for the eye complications. The only reliable method of treatment of congenital syphilitic deafness was repeated blistering, although he had had a limited number of successes with pilocarpine in the very early stages. What was required was, obviously, the prevention of such cases, and it would be valuable if an expression of opinion could be obtained in this discussion as to the best methods of proceeding to that end. The third sentence in the opening paragraph of Dr. Mott's remarks dealing with congenital syphilis in the offspring indicated the necessity of restriction of the marriage of syphilitics. Reliable data on this matter appeared to be lacking in this country, and Dr. Mott showed that some sort of State control was necessary in order to secure this end. The question was, would notification lead to better control and more efficient treatment of the congenital syphilitic in his early years, and so tend to the reduction of the number of cases of acquired specific deafness, and so, perhaps, even to its disappearance? Those were questions which he would like to see answered in regard especially to syphilitic deafness.

Mr. J. F. Briscoe: There is not a student of the profession who could not profitably discuss this overwhelming malady from the humanitarian point of view. And if some of us here to-day have learnt from years of practice its deadliness to human life their qualifications to join in the debate are enhanced thereby. We are asked as to its prevalence and intensity in the past and the present day. Has not Hogarth left on the sands of time a pictorial record, "The Scene in a Madhouse"? And there is a similar picture in Germany produced subsequently to Hogarth's masterpiece. The former was painted about 1770 and represents eleven mad people. One is closeted in a cell wearing a crown and holding the sceptre of office. Two ladies are passing his cell, at "Bedlam" it was called in those days. Their fans are held up, and one is viewing him through the spokes with a half-hearted sneer. The other figure is a man in another cell evidently aiming for the Papal See. Are not both of these syphilitic general paralytics, may I ask?

I suppose there cannot be any doubt but that there is less external disfigurement of the body from syphilis nowadays than heretofore, although I state this unsupported by statistics. Whether the treatment of to-day is more rapid of execution I cannot say, but undoubtedly we see syphilitic people less deformed externally than hitherto. I mean to say that rat-like eaten noses, carious skulls, and many of the syphilides and gummata on the external surface are less familiar. But as regards the interior life of the syphilitic patient, have we not a problem for thorough investigation? How many worthy specialists are there who can assert dogmatically that a particular disease is due to syphilis? And if we can compare human pathology with that of the lower animals, I am told that at the autopsy of a great white bear which died at the Zoological Gardens a few years ago a large aneurysm was found. I do not suppose he was inoculated with human syphilis or suffered from a comparative malady of the same nature; and we must suppose he was not an alcoholic, although at the same time domesticated animals do receive "nips" occasionally. Formerly, when we did not know the nature of a disease we assumed syphilis and we gave the iodides. To-day we use a test called the Wassermann reaction and apply our remedies accordingly. I have before my mental gaze a married couple where the virus of syphilis had played its part in the breeding processes. The father was the culprit, as is general in well-to-do marriages. He had sown his wild oats to perfection and

had contracted syphilis. He was treated by a well-known London physician for two years and then legally married a lady. The first year of marriage his wife miscarried and contracted puerperal fever. Chloroform had to be administered at the time to clear out a foul uterus, encouraged, no doubt, by syphilitic changes. The third year of marriage the lady again became pregnant, and in her fourth month she experienced uterine pains and hæmorrhage. This was quelled by iodide and mercury treatment, with rest in the recumbent position more or less, till full time, when she was delivered of a boy who had no external marks of syphilis. I may tell you she was attended by a well-known obstetric physician on both occasions. This was the last pregnancy, for the husband subsequently practised extreme precautions. The boy has now grown up and may be styled, conveniently, a "syphilitic warp" with a damaged nervous system. There is a neuropathic history, but has it not been emphasized by his syphilitic father? He is now a "ne'er-do-well" with extravagant fancies. He is not insane in the legal sense, although he is morally unsound. He can speak three or more languages, and would deceive the very elect with his cleverness. In another half decade or so I shall expect to find he is a general paralytic.

It would be wasting the time of this academy of medicine if every Fellow were to discuss in detail the relationship of syphilis to public health, for should we not all travel over the same ground in concord? Thus I have no intention of prolonging this discussion on the relation of syphilis to public health, since there is not a member of the profession who is not more or less conversant with its dire effects. Those of us who have served our apprenticeship in general practice and have become specialists in any department of medicine or surgery can bring to bear in this debate hideous instances of congenital syphilis. Nay, there is hardly a section of the Royal Society of Medicine in which syphilis does not play the principal part. And of the three scourges affecting the human race—viz., this disease, tuberculosis, and cancer—the first takes the lead to all intents and purposes, for have we absolute proof that it is curable in every sense of the word? The Wassermann reaction is an experimental method and an accepted addition to modern knowledge of this disease, but can we all agree that it is infallible and not open to attack by future critical research? It is true facts we want on this great question to-day before we approach the Legislature; whether, with any known remedy we possess we can remove every trace of the syphilitic virus, or if prevention is the best treatment.

I am inclined to think that it is the exception for a syphilized person to be really cured; but in some cases where cure is said to be established the virus may have become a "filter-passer" and beyond the microscope—nay, out of the pale of the Wassermann reaction. Disease undoubtedly cures itself.

We have seen cases of syphilis untreated pass along on an equal footing with cases which have been treated. Again, we know of the majority of patients who would be hideously damaged, mentally and physically, if they were not placed under care and treatment. But let us regard the Hogarth side of the picture, where the virus may have been locked up for years like the tubercle bacillus in hiding. And with a virus let loose from some accidental cause or stress after the tissues have been at peace for many years—here are properties of this infective disease in its tertiary period which must strike every Fellow who treats syphilis with despair. I was talking to a military man the other day, a syphilitic invalid, who had given up ordinary treatment but was now undergoing what he styled "Nature's cure." He had just arrived from Germany after his course of diet and baths. He eulogized this system of treatment without drugs, and remarked very intelligently, and with a good knowledge of what he was discussing, that by sweating, by the kidneys, and by the bowels he would eventually be cured without any chemical administration. He believed this, and I could not convince him to the contrary. He actually cross-questioned me on the action of the iodide of potash and the salt of mercury.

In medical practice we have to confess that recognized forms of treatment are not always sharply defined, so that in treating any disease we must not only have a thorough knowledge of pathology, but we must also be able to explain the ways and means in which a particular remedy acts on the diseased tissue. Short of this, are we not speculative empirics? There are two methods of treating disease —namely, by drug or serum treatment for our practical purposes to-day, or by prevention. The public will assuredly decide in the near future the particular line they prefer. As it is possible to wipe out tuberculosis by cleanliness, so is it possible to cleanse the race of syphilis. Very shortly, no doubt, we shall discover that cancer is preventable. In hospitals for the insane appendicitis is an unusual complaint, and it is not difficult to prove why this is the case.

In summing up the treatment of syphilis it would be idle waste of time on my part to enumerate the drug treatment, for every student of

physic learns this in the rudiments of practice. Circumstances alter the treatment of cases, for while one might treat soldiers and sailors by gluteal injections, one might prefer for other classes of society mouth, inunction, or bath treatment, associated with dietetic and other hygienic measures. If I am attached to any particular line of drug treatment it is the old-fashioned liq. hydrarg. perchlor. and pot. iodid. in combination with cinchona bark, spirits of chloroform, syrup and glycerine, although I have taken up the new line, salvarsan.

As an appendix to these remarks I cannot refrain from alluding to the cruel consequences of syphilis which we observe in our private and public hospitals for the insane. As a specialist in this direction it is appalling to see and live with folk of your own class in life who have fallen victims to gross changes of the nervous system by, perhaps, one sexual act with an unclean woman. They are tabetics or they are general paralytics, and they are incurable. No syphilis, no general paralytics, as we say in the Psychological Association. And it is to Dr. Mott, our great representative pathologist, to whom the whole profession must bow in adoration of his untiring energies in the elucidation of the syphilitic affections of the nervous system.

In conclusion, I excuse myself from taking up your time with these fragmentary statements, knowing too well how you will support an enthusiast who has endeavoured to assist in ventilating the question of a contagious disease which through prejudice is not included in the list of notifiable diseases. May the days yet come when preventive measures will stay the inroads of this vile malady and lessen mental and physical crippledom.

Dr. G. Pernet said he did not intend to read a paper, but would discuss some of the points which had been raised. Dr. Norman Moore's illuminating analysis of Galen's work constituted a further proof, if any such were needed, as to the Columbian origin of syphilis. He did not think there was any doubt that the disease was brought over from America by Columbus, and much of what had been written concerning the prevalence of syphilis in ancient Greece and Rome, and Egypt, could be put on one side. With regard to the antiquity of syphilis in China, a recent Japanese investigator had looked into the original manuscripts which had been examined by a French naval officer many years ago, who was not a medical man by the way, but whose work was constantly quoted. The Japanese authority could find no evidence as to syphilis having existed on the strength of those manuscripts.

With regard to Dr. Mott's extremely interesting survey of congenital syphilis, he was very pleased to find that he used the term "congenital" and not "hereditary." He did not consider that there was any proof that the disease was hereditary; he was of opinion it was not hereditary, any more than were tuberculosis and leprosy. What Dr. Mott said concerning the germ-plasm should certainly be taken into account, and he thought medical men might well take more interest in biological problems. The term "heredity" was often used in a loose and unscientific manner. In Dr. Pernet's opinion we were merely the scenery for the germ-plasm. Colles, of Dublin, in his admirable clinical work, had had the merit of pointing out that syphilis was not contracted by a mother suckling her syphilitic infant. Dr. Pernet considered that syphilis in the child was always conveyed through the mother, and that there was no direct paternal syphilis.[1] The Wassermann reaction was in favour of the maternal origin. A related matter of great importance was the following: It had been laid down, and rightly so on the available data, that marriage must not be allowed for many years after a man had contracted syphilis. But if the disease was not conveyed directly by the spermatozoon to the ovulum, and bearing in mind modern methods of treatment, he thought the interval between the occurrence of the primary sore and marriage might perhaps be shortened, with the Wassermann test as a guide, but that point required careful consideration and should not be decided upon without mature reflection. In his view, the original Wassermann reaction was the best; the test was approximate, not infallible. With regard to treatment, Mr. D'Arcy Power, Mr. Ernest Lane, and others, had gone into it at such length that he did not propose to say much upon it himself. He considered certainly that the use of salvarsan should be followed up by mercury; in our present state of knowledge, at any rate. As a clinician, he was not prepared to be guided utterly by purely laboratory workers, who generally knew very little practically about syphilis. Salvarsan was valuable, though it had drawbacks. In private practice one must be guided by all the circumstances surrounding an individual case. Sometimes these circumstances did not allow of certain methods being employed. He was therefore very eclectic in the treatment of syphilis. No strict line of treatment could be laid down for private practice which would be applicable to every case in a routine way. It had been his intention to insist on the utter inadequacy of the teaching of syphilis

[1] *Vide* Pernet, "Reports of the Society for the Study of Disease in Children," 1907, viii, p. 74.

in London, and in this country generally, as compared with what obtained in the great centres on the Continent. It was high time this should be remedied. When he was doing midwifery "on the list" in his hospital days, students were never told a word as to the dangers of contracting syphilis extragenitally. He had known several cases of digital chancres contracted in this way. Many young men coming up to study medicine—and this applied to nurses too—were quite ignorant of these dangers. It was nobody's business to enlighten them systematically on the point, nor were digital chancres always diagnosed, certainly not in his early days at hospital. He had known of several cases of amputation of finger-ends unnecessarily carried out owing to ignorance. The question of the prevention of syphilis was another matter of importance. He was not in favour of the State regulation of prostitutes. It had never answered in civil practice, leading to all sorts of iniquities, and had failed utterly from the point of view of prophylaxis. Ideas on the Continent on the matter were undergoing a great change. In Paris, for instance, Professor Landouzy and many others were against the regulation of prostitutes, because, though such regulations might appear to be perfect on paper, in practice they were bad, and like a good many foolish laws led to nothing except tribulations and waste of time. There was a tendency to pass too many petty laws. As to the proposal to notify venereal diseases, he did not agree with Mr. McDonagh. He (Dr. Pernet) was distinctly against it. What was the use of making medical men take the Hippocratic oath? It was the duty of the medical profession, and especially of the Colleges of Physicians and Surgeons, to resist such interference with the rights of the sick seeking the aid of the medical man. What passed between medical man and patient should be inviolate. One speaker had referred to prescribing chemists and quacks, but what could be more calculated to drive people into their hands than the notification of venereal diseases? Dr. Pernet was a medical man, not an amateur policeman.

Mr. C. F. Marshall[1]: With regard to the treatment of syphilis, Ehrlich's experiments in chemio-therapy are of much scientific interest, but the results reported from the use of salvarsan in human syphilis are premature from the scientific, and ill-advised from the social point of view. Owing to sensational reports of alleged cures, many persons have believed themselves cured after one or two

[1] Communicated by Mr. D'Arcy Power.

injections, have neglected further treatment, and suffered in consequence. In such a disease as syphilis the value of a new drug cannot be estimated till it has been tried for at least ten years. The chief tests of the efficacy of such a drug are its power in preventing tertiary or parasyphilitic manifestations and the transmission of the disease to the offspring. These points have been proved for mercury by the statistics of Fournier, so far as statistics and a life-long experience of the disease can prove them. In the case of salvarsan the time is too short to prove these points. Salvarsan has a rapid cicatrizing action on certain lesions of syphilis of the ulcerative type, but it does not prevent relapses, and is of doubtful value in other syphilitic manifestations. As regards the possibility of aborting the disease in the early stage, it is difficult to prove this either for salvarsan or mercury, for several reasons: (1) It is possible that in some cases syphilis may undergo spontaneous abortion; (2) secondary symptoms may be so slight as to pass unnoticed, and tertiary symptoms may occur after some years; (3) the fact of re-infection is not absolute proof of the cure of the first attack, for the experiments of Finger and Landsteiner have shown that immunity is relative and not absolute. Moreover, it is possible that some cases reported as re-infections were cases of chancriform gumma.

Salvarsan appears to be liable to cause severe toxic effects, sometimes ending fatally. The advocates of salvarsan have attempted to explain away the accidents and deaths after injection in various and ingenious ways; by faults in technique, by the solution being too acid or too alkaline, by administration in hopeless and unsuitable cases, by neglect of the contra-indications, by excessive doses, by injection at too frequent intervals, by the presence of microbes in stale saline solution, and by the effects being due to the disease and not the drug, and so on *ad nauseam*—anything to avoid a verdict of arsenical intoxication. One of the latest ideas is that of Milian, who attributes certain accidents (epileptiform convulsions followed by coma and death) after salvarsan to (1) decomposition of the original dichlorhydrate into a monochlorhydrate and possibly other products, all of which he designates by the name of "para-606"; (2) deficient power of the blood to neutralize the acidity of these products. To avoid these accidents he recommends the injection of a strongly alkaline solution, and also treatment of the patient to render his blood neutral. It would almost appear advisable to breed a special type of patient to withstand the injection of salvarsan with impunity! If this drug is

so easily altered in composition that a slight difference in alkalinity may render it safe or lethal—a difference which depends not only on the drug itself, but also on the condition of the body fluids of the patient—it would appear a questionable procedure to use it in a disease which is curable in the great majority of cases by drugs of simpler and more stable composition, such as mercury and iodides.

No doubt many of the deaths after salvarsan (which now probably exceed 100) were due to faulty technique, to administration in hopeless cases and to neglect of contra-indications, but a certain number are difficult to explain except by arsenical poisoning. In some cases salvarsan appears to have caused acute arsenical nephritis followed by uræmic convulsions, coma, and death. In a case reported by Gaucher, 19 mgrm. of arsenic were found in the viscera in a case of tabes which died after salvarsan.

The majority of observers now recommend prolonged mercurial treatment in addition to salvarsan. The latter is, therefore, reduced to the position of an auxiliary drug, and it may be asked whether an auxiliary drug of unstable composition, liable to cause severe and fatal toxic effects, is indicated in a disease which in most cases is curable without it.

Mercury still remains the essential drug in the treatment of syphilis, and iodide of potassium the best auxiliary drug. Iodides are useful in all stages of syphilis, not only in the tertiary period. Iodide of potassium is superior to iodipin or any of the so-called substitutes for it. Other useful auxiliary drugs are quinine, iron, and sulphur. Arsenic is sometimes useful, in the form of Donovan's solution, but the organic preparations of arsenic are of unstable composition and liable to produce toxic effects.

The majority of cases of syphilis can be treated perfectly well by the mouth. Some authorities regard this method, which they refer to disparagingly as the "pill treatment," as inefficient. But the "pill treatment" includes all forms and combinations of mercury and iodides. Moreover, so long as there is evidence of the active action of mercury on the organism, it matters little in what way it is given. In severe cases, or when a rapid effect is required, inunction is the best method, and it is no doubt useful to begin treatment in other cases with a course of inunction. When this cannot for various reasons be carried out, or when mercury cannot be tolerated by the stomach, injections are useful. Soluble injections are safer than insoluble, which are liable to leave

deposits of mercury at the site of injection, which may become suddenly absorbed after some trauma and give rise to severe mercurial poisoning. Gaucher has reported ten cases of gangrenous stomatitis after grey oil injections, eight of which were fatal, and cases of fatal ulcerative colitis after injections of calomel and salicylate of mercury.

In conclusion, it may be confidently stated that no drug has yet been produced which can replace mercury in the treatment of syphilis.

The Royal Society of Medicine.

June 24, 1912.

Sir Henry Morris, Bt., President, in the Chair.

A Discussion on Syphilis, with special reference to (*a*) its Prevalence and Intensity in the Past and at the Present Day; (*b*) its Relation to Public Health, including Congenital Syphilis; (*c*) the Treatment of the Disease.[1]

Major H. C. French, R.A.M.C.: I have the honour of re-opening to-day the discussion on "Syphilis in Relation to the Public Health," including congenital syphilis. This is a sequel to other recent discussions on this disease in the various medical societies of London. That it is the first of an important series of debates contemplated in this newly opened building and lasts for four days, is the best test of the importance that attaches to it in the opinion of the medical profession. It is to be hoped, therefore, that some definite recommendations may now be drawn up, and an earnest attempt made to ensure legislative control of venereal diseases—a subject quite apart from the State regulation of vice. These diseases cost the country millions of pounds, they fill many homes with preventable misery, they overcrowd our workhouses, prisons and lunatic asylums with imbeciles, idiots, criminals, epileptics and other insane persons; they sap the vigour of a nation, and if uncontrolled may eventually endanger its very existence.

I pointed out two years ago in an article on the "Control of Venereal Diseases at their Source in Civil Communities,"[2] that Dr. Holland, in 1854, estimated that in the United Kingdom there were at least a million and a half persons infected with syphilis each year. Dr. Mott

[1] Third meeting (adjourned from June 17).

[2] *Brit. Med. Journ.*, 1910, ii, pp. 1766-68.

states that possibly 3 to 4 per cent. of cases infected with syphilis are followed by parasyphilitic affections such as tabes and general paralysis. Further, we know that 11 per cent. of male private and 8 per cent. of male pauper admissions to lunatic asylums are due to this cause. The Wassermann reaction now throws a searchlight on idiocy, imbecility and epilepsy, due to acquired or to congenital syphilis, which were not previously recognized as due to this cause. As the feeble-minded outnumber certified insane persons the part played by syphilis in the causation of this condition requires investigation.

Dr. Duncan Bulkley states that in New York 300,000 cases of skin diseases gave 11·5 per cent. due to syphilis.

Dr. Le Noir, at the International Conference held at Brussels, in 1899, stated that in Paris there are fifteen syphilitics out of every hundred adult men. Fournier, judging by hospital practice, gives 17 per cent. There is no reason to suppose, therefore, that a large city like London, without any control, and with only 100 hospital beds, suffers less from this disease than Paris with 2,000 beds, or Berlin. In both of these smaller cities control and adequate means of segregation exist.

Taking the British Army as the only existing index to the relative prevalence in civil communities, the average number of cases constantly on the Syphilis Register for two to three years and undergoing treatment is probably 3 to 4 per cent. of troops, but numerous other cases have previously suffered, and have been struck off the Syphilis Register. The percentage of freshly contracted syphilis in my experience in the past few years is much higher amongst troops in England, more especially in London and Woolwich, than amongst those abroad. This is easily explained, and is no doubt due to lack of control at the source, as the disease is not as yet notifiable in England. Further, since diseased persons in civil communities are not segregated, disease is spread broadcast. I would strongly advocate that in all statistics the occurrence of freshly contracted disease be differentiated from relapse of pre-existing illness.

As regards relative incidence amongst European armies where control at the source exists in the civil community: In the years 1886-90 the average admission ratio per 1,000 for all venereal diseases was 27 in the German, 51 in the French, 65 in the Italian, and 212 in the British Army. Ten years later, in 1900, it was 17 in the German, 37 in the French, 60 in the Italian, and 93 in the British.

The routine method of treatment in vogue in the French and German armies from 1886-1900 was mercurial inunction.

Regulation of prostitution existed, and still exists in France and Germany, and existed in England from 1864-86, but was abolished in England in 1886, in India in 1888, and in Italy in 1888 by Crispi, when a marked increase of disease ensued in each of these countries. In India, in 1895, the admission ratio for all venereal diseases rose to 537 per 1,000, but as the result of the Cantonment Act, control of disease at the source has again existed since 1897. In India, in 1910, the admission ratio to hospital for all venereal diseases has consequently been reduced to 59 per 1,000. This enormous reduction lowers considerably the totals of venereal diseases for the whole British Army since 1897 (*vide* Table III).

As regards innocently acquired and congenital syphilis, Dr. Bulkley, New York, states "that in Russian villages where prostitution is unknown, syphilis decimates families, and is spread in an innocent manner." Judging by personal experience in India, from 1896 to 1901, this is frequently the case amongst native women. In Indian villages in these years, plague, famine and cholera were prevalent, and a large number of women suffering from venereal disease then arrived in British Cantonments.

Dr. Bulkley has tabulated 110 epidemics of innocent syphilis with a total of 3,000 victims. The common causes of conveyance, apart from heredity, are "nursing, hand-rearing of infants, breast-drawing, accouchements, vaccination, tatooing, household utensils; dental, barber's and other instruments, kissing, pipes, &c." At Philadelphia, recently, there was an outbreak of eight cases of syphilitic chancres of the lip as the result of playing "kiss in the ring."[1] Fournier, in Paris, found that fully 25 per cent. of all females whom he had seen in private practice had contracted the disease innocently and undeservedly. Of the married females, in 75 per cent. of cases the disease was traced to the husband.

Tarnowsky quotes the case of three families with twenty-two children, from whom only one healthy adult survived. This was in the intelligent class of society. At Moscow, Russia, in a period of ten years there were 2,002 births from syphilized parents. Of these, 1,425 (71 per cent.) died. In regard to congenital syphilis, therefore, we are not justified in supposing that in England we stand on a separate pedestal.

As syphilis causes innumerable miscarriages and abortions, it would appear that from a mere population point of view, as well as for the perpetuation of a healthy race, control of venereal diseases at the source has become absolutely essential. This is no longer a subject of purely

[1] *Lancet*, 1911, ii, p. 907.

academic interest, but perhaps the most important social problem of the day. In Chicago, the Church is objecting to marry persons without a medical certificate of physical and mental fitness. It is considered that a large amount of unhappiness causing divorce is due to venereal diseases, and in this country it constitutes legal cruelty.

Alcohol, Syphilis and Insanity.

Alcohol unquestionably plays an important part in conducing to sexual immorality, and if disease is contracted, in perpetuating syphilis and in causing relapse. In conjunction with syphilis alcohol is responsible for 27 per cent. of private and 31 per cent. of pauper male admissions to lunatic asylums in the United Kingdom. Mr. McDonagh's view, however, is not concurred in that the reduction in venereal diseases in the British Army in recent years is due to the growth of temperance (*vide* Table IV). A reduction in alcoholism was non-existent prior to 1907 in India. Venereal diseases, however, subsequent to the Cantonment Act, 1897, have steadily decreased every year until 1910, both as regards admission and constantly sick ratios. It is true that since 1907 there is a slight reduction in the admissions and constantly sick in hospital for alcoholism. A soldier, however, is only admitted to hospital for alcoholism, but not for drunkenness. He loses more pay on admission to hospital—more than the small fines for being drunk outside. Further, in addition to the loss of sevenpence a day incurred by every soldier on admission to hospital, from April, 1904, soldiers also lose service pay, and since October, 1906, they lose proficiency pay when admitted to hospital, either for alcoholism or venereal diseases.

I do not acquiesce in Mr. McDonagh's further statement, "that about 90 per cent. of infections take place while the victims are under the influence of alcohol." In order to arrive at an independent conclusion, I have recently tabulated 461 cases of soldiers admitted to hospital under my care in the past year at Malta, with freshly contracted venereal disease, and find that 203 were total abstainers, 112 belonged to Section B, Army Temperance, or consumed less than 2 pints of beer daily, 46 consumed 3 pints, and 100 consumed over 3 pints a day. When due allowance is made for all these factors, it is not possible on the evidence to arrive at the conclusion that the recent reduction of syphilis at Malta, and of venereal diseases amongst 70,000 British troops in India, since 1897, and in the Army generally, can be fairly attributed

to increased temperance. My view was also held by Sir Alfred Keogh, late Director-General Army Medical Service, and expressed in his introductory remarks in a recent book.[1]

Prevention.

Coming to the subject of prevention, it is interesting to trace the history of what has been done in this country. In 1896 the Secretary of State for the Home Department was approached with the object of appointing a Departmental Committee to inquire into the subject of the prevalence and of the treatment of venereal disease amongst the population of England. The Government, whilst admitting the importance of the subject, did not think the time had arrived for taking action in the matter, because there was not then a "sufficiently informed public opinion" on the disease to justify them in so doing. As medical men, therefore, it is our plain duty to enlighten, and if possible to guide, public opinion to a correct appreciation of the situation. Having done this, the responsibility then rests on the public and on the State, who must each work out their own salvation.

As the *British Medical Journal* pointed out in 1899,[2] "It would seem that in consequence of this state of things a considerable number of women do not receive proper treatment in the early stages of syphilis, and seek admission to various homes of refuge in London, administered by ladies who devote their lives to work of charity of this kind.

"The ladies have been so deeply impressed with the extent of the misery caused by these maladies in young women, that they associated themselves into a numerous and influential body, determined to their utmost to secure measures as may be thought best, after due inquiry, to check the ravages of syphilis."

The Council of the British Medical Association then appointed a Committee, and urged on Her Majesty's Government the necessity for appointing a Departmental Committee to inquire:—

(1) As to the extent to which venereal disease prevails amongst the civil population of Great Britain, irrespective of its temporary increase or decrease.

(2) To collect information as to the present arrangements for the treatment of venereal diseases, the distribution of hospitals, and the number of beds available in different places, and to make suggestions as to the more efficient provision for the treatment of the disease.

[1] "Manual on Venereal Disease in Army, 1908" (Sir A. Keogh, Melville, Leishman, Pollock).

[2] *Brit. Med. Journ.*, 1899, i, p. 984.

(3) To collect suggestions and to express opinions as to the means that can be devised for preventing or limiting the spread of venereal disease among the civil population of this country.

The above resolution was also forwarded to the President of the "International Congress on Venereal Diseases," which met at Brussels, on September 4, 1899, urging the Congress to support the resolution by requesting the Governments of the respective delegates to pursue a similar investigation with a view of devising a uniform plan of action to mitigate the spread of this terrible disease among the people of Europe." This was finally embodied among the eight resolutions of the Congress. Further, the Royal College of Surgeons of England, in the Annual Report for the year 1897, contains a statement to the effect that the Council of the College had forwarded an address to the Secretary of State for India regarding the prevalence of venereal disease amongst the British troops in that country. In this address the Council observe: "We therefore express an earnest hope that Her Majesty's Government may take effective means to check the ravages of the disease (venereal) which not only undermines the constitutions of those who contract it in the first instance, but by reason of the many ways in which it may be transmitted destroys the health and happiness of countless persons, and induces in the children of those originally infected diseases of a most formidable character."

As the *British Medical Journal* aptly points out: "The influential body of ladies who have taken up this subject are perhaps the best possible exponents of public opinion in this matter. Only a deeply rooted conviction formed from their observation of the terrible misery this disease causes, would have induced these ladies to have come forward as they have done regarding a question of this kind."

So far as England is concerned the matter died a premature death, "whilst Nature breeds perverse all monstrous all prodigious things," as in the age when Milton wrote.

As regards India, however, the voice of these ladies carried the day. There was a meeting on this subject at St. Martin's Town Hall, London. "Admission was by ticket for which a charge was made, and nine-tenths of the audience were women." This effected the passage of the Cantonment Act, India, which came into force in October, 1897, with such marvellous results and stupendous saving to the Indian Government. India, therefore, must be our principal guide as to the effect of control at the source, as there are some 70,000 British troops always stationed there under more or less identical

conditions. In India, in 1895 to 1897, and previously, there were 3,000 soldiers constantly sick in hospital with venereal diseases. These diseases caused 32 per cent. of the admissions and 42 per cent. of constantly sick in hospital from all diseases. These numbers, in 1910, have been reduced to 500 soldiers constantly sick in hospital, and venereal diseases caused only 10 per cent. of the admissions and 25 per cent. (1909, 20 per cent.) of the constantly sick in hospital from all diseases. This represents a yearly saving to that country of £55,615 when reckoned at one shilling *per diem* for hospital diet, and this quite apart from loss of service. During the same period the annual number of invalids from India to England for syphilis have been reduced from 611 in 1897 to 18 in 1910. A trained soldier landed in India costs the State £100, so that the annual saving in invalids alone is enormous. Whereas, in the United Kingdom in 1910, where no control at the source exists, venereal diseases in an average strength of 108,614 troops accounted for 31·8 per cent. of the constantly sick in hospital for all diseases. These latter figures probably indicate the average prevalence in civil communities in the United Kingdom.

The paragraphs relating to sanitary prophylaxis in India are briefly given elsewhere, and the underlying principles considered in detail.[1] The practical result has been that the Cantonment Act in conjunction with prophylaxis by treatment has effected an enormous reduction in India for all venereal diseases from 537 admissions per 1,000 in 1895 to 59 admissions per 1,000 in 1910. This demonstrates for all time the efficacy of adequate control.

In some British Colonies prophylactic methods already exist as regards control at the source. They support the good results obtained in India. Foreign medical opinion on this subject is given in Appendix A.

Briefly considered, some essential principles in the control of prostitution and venereal disease culled from twenty years' practical experience in many countries are as follows:—

(1) Confidential medical notification of disease on prima facie evidence and medical treatment for short periods in hospital in the early actively contagious stages of disease. The steps taken being dependent on environment and the circumstances of the individual case. As syphilis, five times out of six, is spread by clandestine prostitution, according to the experience of France, Belgium and Germany, such notification by medical men more adequately meets this difficulty.

[1] "Syphilis in the Army," 1907.

Cases (without names) are reported to the health authorities when the exact address is known, and arrangements are then made for the segregation and treatment of diseased persons as in the case of other diseases. This was brought forward two years ago.[1] I have practised it for three years at Malta with marked success (*vide* Table II).

(2) The effectual control of openly practised prostitution by the localization of irreclaimable women into certain areas or streets is essential. Such control of openly practised prostitution is attended by incalculable benefit not only to the women themselves, but also to the civil community, in the reduction of venereal diseases. When control does not exist, or is temporarily removed, disease becomes as frequent among such women as amongst clandestines.

(3) The rigid suppression of souteneurs who act as middlemen and live on the earnings of women, and even marry with this object in view. These men are often criminals of the worst description and levy blackmail on their clients whilst they batten on the poverty of the victims in their clutches. A valuable short Police Bill for the suppression of these men and the white slave traffic has recently passed its second reading in the Commons. This will tend to prevent London being made the clearing house for Europe for prostitutes sent from other countries or who move owing to disease.

(4) The protection of orphan children and minors and the suppression of begging in the streets by children under 12 years of age. This includes the suppression of women souteneurs, who adopt orphan children in order to live on their immoral earnings when, from age or disease, they themselves have lost their charms. No girl under 21 years of age should be allowed to reside in a brothel in any capacity.

(5) The suppression of loitering and solicitation in the streets by women, or men acting on their behalf. This is possible in England under the Town Clauses Act, 1847. If men want prostitutes they must go and look for them where they lodge. This would lessen the work of the police, who are now obliged for hours at night to patrol in large numbers certain parts of the town. London is about the only European city where such a state of things exists. As regards educating the young, it was pointed out in Parliament recently "that a young girl is taught how to find her way to Timbuctoo but not how to avoid Piccadilly Circus." The public display of immorality discouraged in our theatres we encourage by the parade of prostitution in the streets.

[1] *Brit. Med. Journ.*, 1910, ii, p. 1766; and *Lancet*, 1911, ii, p. 1389.

(6) The provision of free voluntary dispensaries where women who do not openly practise prostitution (clandestines) may be treated and reclaimed. These should be open at hours which are suitable to the working classes. Quite apart from the publicity involved, many poor persons cannot afford to wait in the out-patient department of large hospitals for several hours. In addition to lock hospitals for irreclaimable women, I would advocate that sufficient beds be set aside for venereal diseases in every large London hospital and special courses of instruction arranged for students, as in Paris.

(7) Removal of disorderly persons, and measures to prevent the return of evicted persons, and to prevent harbouring of diseased prostitutes.

(8) The control of diseased merchant seamen who spread the worst forms of disease at seaport towns. This is quite feasible under Port Sanitary regulations.

(9) Control of persons seeking medical aid from chemists for venereal disease, who spread their complaints broadcast. Civil practitioners should notify soldiers on the active list seeking medical aid at civil hospitals, as they commit an offence under the Army Act, spread disease, and increase military inefficiency. This is the law in Prussia.

(10) Circumcision of male infants and of all recruits entering the Army with phimosis is strongly advocated on Jewish and Mahommedan evidence and markedly protects against syphilis.

Such measures may not completely deal with this difficult social problem, but they are the condensed experience of practical work as opposed to theoretical considerations. They are the bedrock on which an adequate superstructure can be laid. They do not conflict with public morality, but minimize disease, misery and death.

I have attempted to deal to-day with some of the main principles involved in the control of such a protean disease as syphilis which, octopus-like, has a tentacle fixed on each branch of medical, gynæcological and surgical practice.

That the disease can be effectually controlled in a community is fully exemplified by personal experience of this work in India, Egypt, Malta and England. The finding of a Royal Commission in England in 1870, and also in India, conclusively demonstrates the inestimable benefits derived from control and systematized effort. (Appendix A.)

The figures for Malta (Table II) were not available in November last year, when I attempted to deal with some recent developments in the diagnosis and treatment of syphilis in two Hunterian Lectures at the Royal College of Surgeons of England.[1]

[1] *Lancet*, 1911, ii, pp. 1315, 1389.

The reduction in syphilis effected in recent years amongst soldiers in Malta has mainly resulted from the more thorough control of venereal diseases at their source in the civil community, which has enormously benefited. This has been effected by means of a system of confidential medical notification and more effectual segregation of diseased persons, commencing in October, 1909, and applied equally to both sexes. A Government Ordinance has existed in Malta since 1861, and this was amended in 1898, to make it in effect a sanitary ordinance on the lines of the Indian Cantonment Act of October, 1897.

Amongst troops in Malta, in 1908, syphilis caused 18·6 admissions and 2·33 constantly sick in hospital per 1,000. This was not high, but it has been reduced to one-fourth in 1911—namely 4·3 admissions and 0·42 constantly sick per 1,000, and no invalids for syphilis, gonorrhœa, or soft chancre. This result occurred in a garrison of 7,000 soldiers amongst a civil population numbering nearly a quarter of a million of persons, and a fleet 7,000 strong arriving periodically. Not only was the incidence of freshly contracted disease lessened, but all forms of disease, syphilis, soft chancre and gonorrhœa were also attenuated.

In Table II the actual number of soldiers on the Syphilis Register and the actual number of cases contracted in Malta, with such medical notification in force during my tenure of appointment since September, 1909, are contrasted with the admission and the constantly daily sick in hospital ratios.

In can be observed that in 1910-11 there is a progressive reduction both in the incidence of syphilis contracted in Malta as well as in the admission and constantly sick ratios. The two latter, though partly dependent on the incidence of freshly contracted disease, are more largely influenced by administrative measures plus medical treatment; the sum total being largely dependent on the lubricating oil of individual initiative, on the introduction of measures to meet the frequently changing exigencies of local requirements, and on systematized procedure and centralization of work.

The Naval and Civil Authorities also report the marked reduction of disease; and provided that the immigration of diseased persons from outside areas can be controlled, poverty and its twin sister disease will eventually be lessened by a reduction in the cost of maintenance of poor-houses, prisons and lunatic asylums, in which places syphilis is domiciled even to the fourth generation. What has been done in the Island of Malta can equally be done in the British Isles.

In Malta, several factors have contributed to good results, and in the

case of syphilis they have been obtained with mercury, potassium iodide and local treatment. The results under mercury endorse those which I obtained at Woolwich (Table I) in 1905-09, and endorse Indian experience (Table III).

The marked reduction in syphilis from 1909 to 1911 in Malta, in India, 1898 to 1910, and throughout the Army generally as exemplified by these tables, occurred before the introduction of salvarsan.

A "Syphilis Record Book," introduced in 1904, and modified in 1910, exists in each station, and the particulars from the syphilis case-sheet are entered for permanent reference.

These general principles have recently been applied to gonorrhœa, and a "Gonorrhœal Case-sheet" as an official Army form is now in use. Finally, by means of a venereal surveillance form, cases are followed up on discharge from hospital or on transfer to other stations.

It may prove of interest to trace the origin of methods which, in a modified degree or in a different manner, could be easily made applicable to the control of venereal diseases in civil communities.

In July, 1903, I applied to the War Office for permission to publish some printed matter, the results of investigations in India from 1896 to 1901, and previously, on the control of venereal diseases in the Army. The absolute necessity of entirely revising the collection of venereal statistics, systematic case-taking, and accurate diagnosis was emphasized. Up to this date all cases of venereal sore, whether soft chancre or early primary syphilis, were indiscriminately recorded as primary syphilis. If secondary syphilis followed, then a change to secondary syphilis was made if the case happened to be in hospital. This was confusing and misleading. In September, 1903, therefore, a preliminary tentative scheme was brought into force—"Instructions regarding Procedure in Cases of Syphilis." Under this scheme syphilis and soft chancre became absolutely differentiated.

From January 1, 1904, the scheme was made universal throughout the whole Army at home and abroad, and was later incorporated into Appendix VII, Regulations Army Medical Services.

Under this scheme all venereal sore cases after discharge from hospital are now kept under weekly observation, according to time spent in hospital, for two to four months before the diagnosis of soft chancre, or syphilis, is finally made. This is very important in limiting the local spread of disease arising from relapsed chancres, or a recrudescence of disease. Latterly, I have kept gonorrhœa cases under weekly observation for six weeks from the date of discharge from hospital, with

excellent results in lessening disease both in the case of the soldier and the local civil community.

In 1907, I forwarded three copies of a book ("Syphilis in the Army") to India to the then Commander-in-Chief, to the Principal Medical Officer, and to the Sanitary Commissioner with the Government of India, who all took a keen personal interest in the matter. At the Ambala Conference in India on "Venereal Diseases and Enteric Fever," which later met in November, 1907, a large number of the suggestions were given practical effect and applied to the administrative control of venereal diseases in India, with excellent results, more especially as regards invaliding.

The far-reaching and beneficial effect of the above system is now fully manifest in Army Medical Department Annual Reports. These methods, in conjunction with continued treatment and the active co-operation of Army Medical Officers, have effected not only an enormous reduction in all forms of venereal diseases, but have also effected a considerable reduction in the total of all diseases and in disease indirectly due to venereal complaints, or aggravated by them. Venereal diseases, however, still account for 27 to 30 per cent. of the constantly sick in hospital from all diseases in the Army.

If, therefore, the Legislature in this country is later guided by our deliberations, the administrative system of control existing in the Army can easily be adapted or improved on to meet the special requirements of civil communities in England, and the scourge referred to in the Second Commandment that reaches to the fourth generation may be limited to one or be extirpated in this generation. It is first necessary, however, to get legal control of syphilis in the manner that small-pox and other much less dangerous diseases are controlled.

It is not proposed to discuss whether salvarsan (606) or neo-salvarsan (914) is the crux of the treatment of syphilis, or whether a continuance of mercury is permissible, or a combination of both drugs is advisable. These are problems that in the present find their own solution, and which the riper experience of the future will finally decide.

It is absolutely essential, from a public health point of view, to go to the Legislature of the country with concrete proposals and undivided counsels. Public opinion has been recently educated to the immense importance of stamping out syphilis, and the introduction of salvarsan has given a temporary fillip to public interest. Like a spur, however, applied to a jaded horse, public interest, though stimulated to a gallop, very soon relapses to a jog-trot, but poverty and disease continue for ever.

There are two important Bills now before Parliament indirectly bearing on this subject, one dealing with the feeble-minded and the other with white slave traffic. The notification and control of venereal diseases, however, is of even more importance to the community.

It is essential to recognize that it is not possible entirely to eradicate prostitution, since it is primarily dependent on poverty, and its entire suppression would give rise to much worse evils in the community. It is feasible, however, to limit prostitution, to eradicate disease, and to safeguard minors and orphan children. To ignore the question merely increases underlying evils. Inquiries in Brussels extending over twenty years elicited the fact that amongst 1,523 out of 3,505 women the primary cause of prostitution is poverty.

In summarizing the means at our disposal it is requisite to bear in mind that there are three main principles involved in the prevention and control of venereal diseases.

First: Control at the source which is concerned with prostitution before disease is contracted or spread. This embraces (*a*) medical notification of disease; (*b*) suppression of souteneurs and solicitation in the streets; (*c*) protection of orphan and destitute children.

Secondly: Prevention by medical measures—i.e., prophylaxis by treatment after disease has been contracted. This includes (*a*) provision of hospital beds and segregation; (*b*) professorships at large hospitals; (*c*) instruction of students and the public.

Thirdly: Moral and religious considerations. These are placed last, but are by no means least, and are more applicable to youth and adolescence before disease is contracted. At the Brussels International Conference, in 1899, the consensus of medical evidence was distinctly in favour of revised regulations for dealing with prostitution apart from the State control of vice (*vide* Appendix A). The abolitionists of regulation strongly advocated the notification of venereal diseases, and female inspectors of factories, and reformatories for young girls aged under 21, who adopt a vicious life.

In conclusion, I refer briefly to the main stumbling-block, the ethics of the situation, which are either not understood or the realization of which we shirk.

I quote from Mr. Lecky's "History of European Morals" (vol. ii, pp. 280 *et sqq.*) who in referring to prostitute women says: "Herself the supreme type of vice, she is ultimately the most efficient guardian of virtue. But for her the unchallenged purity of countless happy homes would be polluted, and not a few who in the pride of their

untempted chastity think of her with an indignant shudder, would have known the remorse of agony and despair.

"On that one degraded and ignoble form are concentrated the passions that might have filled the world with shame. She remains, while creeds and civilization rise and fall, the eternal priestess of humanity blasted for the sins of the people.

"The evil rarely assumes such inveterate and perverting forms as when it is shrouded in obscurity and veiled by a hypocritical appearance of unconsciousness. The existence in England of certainly not less than 50,000 unhappy women shows sufficiently what an appalling amount of moral evil is festering uncontrolled." Mr. Lecky further deplores the fact "that an epidemic, which is one of the most dreadful now existing amongst mankind, which communicates itself from the guilty husband to the innocent wife, and even transmits its taint to her offspring, should be suffered to rage unchecked because the Legislature refuses to take official cognizance of its existence, or proper sanitary measures for its repression.

"Infanticide is greatly multiplied, and a vast proportion of those whose reputations and lives have been blasted by one momentary sin are hurled into the abyss of habitual prostitution. A condition which is . . . in no other European country so hopelessly vicious or so irrevocable."

TABLE I.—WOOLWICH, ENGLAND: SYPHILIS IN-PATIENTS.

Year	Average daily strength of garrison	Admissions—actual number	Constantly sick—actual number in hospital daily	Ratio per 1,000	
				Admissions	Constantly sick
1904	5,311	331	56	62·32	10·70
1905	4,966	202	30	41·49	6·14
1906	5,096	129	14	15·12	2·72
1907	4,702	87	13	18·50	2·71
1908	5,666	53	6	8·75	1·28

1904: Grey oil intramuscular mercurial injections for in-patients and out-patients.

In 1905-08 I instituted mercurial inunctions for in-patients as a general rule in early stages, and reserved mercurial grey oil injections for out-patients.

TABLE II.—SYPHILIS: MALTA COMMAND.

Year	Average daily strength of garrison	Admissions—actual number	Constantly daily sick in hospital—actual numbers	Ratio per 1,000 admissions	Ratio per 1,000 constantly sick in hospital	Number of soldiers on Syphilis Register	Number of cases contracting syphilis in Malta
1908	6,030	112	14·02	18·6	2·33	158	89
1909	6,392	125	12·41	19·6	1·94	171	87
1910	6,769	83	9·21	12·3	1·36	160	35
1911	6,686	29	2·86	4·3	0·42	146	11

(1) Confidential medical notification of venereal diseases was instituted in October, 1909.

(2) In 1912, to May 31, only five cases of syphilis of very mild type (attenuated) contracted in Malta amongst 7,000 troops.

(3) Treatment in 1908 and to September, 1909, intramuscular injection of grey oil.

(4) In September, 1909, I instituted inunctions of ung. hydrarg., B.P., for in-patients in the early stages in ordinary cases and reserved grey oil injections for out-patients.

TABLE III.—INDIA: SYPHILIS.

Year	Strength	Admissions—ratio per 1,000	Constantly sick—ratio per 1,000	Invalids sent home	Deaths
1895	68,331	86·8	8·84	321	15
1896	70,484	97·7	10·47	448	16
1897	64,531	106·2	11·65	611	26
1898	65,397	88·2	9·51	547	20
1899	67,697	71·9	7·54	417	16
1900	60,553	62·5	6·59	344	15
1901	60,838	58·3	6·03	355	8
1902	60,540	49·9	4·85	286	24
1903	69,613	46·7	5·04	190	12
1904	70,413	49·5	5·45	175	18
1905	70,994	35·7	4·80	75	13
1906	70,193	27·7	3·55	120	11
1907	69,322	22·2	3·02	76	5
1908	68,522	15·8	2·37	59	3
1909	71,556	16·3	2·23	26	2
1910	72,491	14·5	2·01	18	1

(1) Control at the source (Cantonment Act) began October, 1897. The above figures deal with unquestionable syphilis.

(2) From 1895 to 1903 inclusive all venereal sores, whether "soft chancre" or early primary syphilis, were included under a heading *Primary* Syphilis. I do not include them, as soft chancre was not differentiated.

(3) Loss of service pay for venereal disease began in April, 1904.

(4) Loss of proficiency pay for venereal disease began October, 1906.

(5) From 1904 to 1910 syphilis and soft chancre are absolutely differentiated in British Army returns.

TABLE IV.—INDIA.

Admissions and Constantly Sick Ratio per 1,000 for "*all Venereal Diseases*" and *Alcoholism* contrasted.

Year	Venereal Diseases		Alcoholism	
	Admissions	Constantly sick	Admissions	Constantly sick
1898	303·5	27·97	3·3	0·12
1899	250·4	22·55	3·1	0·12
1900	231·3	21·19	3·7	0·14
1901	211·5	18·35	4·4	0·18
1902	209·6	17·60	4·4	0·16
1903	187·3	16·67	2·4	0·11
1904	200·4	17·63	3·1	0·14
1905	154·3	15·37	2·8	0·13
1906	117·4	12·32	2·4	0·11
1907	89·9	10·61	1·3	0·05
1908	69·8	8·85	1·0	0·04
1909	67·9	8·52	0·9	0·03
1910	58·9	7·79	0·5	0·02

(1) Control of venereal diseases at the source commenced October, 1897, Cantonment Act, India.

(2) Service pay lost for admission to hospital for venereal diseases or alcoholism from April 1, 1904.

(3) Proficiency pay lost for admission to hospital for venereal disease or alcoholism since October, 1906.

(4) Note the yearly reduction of venereal disease from 1898 to 1910. Alcoholism remained *constant* from 1896 to 1906. From 1907 to 1910 the reduction is mainly due to (2) and (3).

APPENDIX A.

In regard to systems of regulation of prostitution in foreign countries:—

At the International Meeting at Brussels in 1899, the question before the meeting was: Have the systems of regulation actually in force had any influence upon the frequency and dissemination of syphilis and venereal disease?

Dr. Barthélemy, one of the medical chiefs at St. Lazare Hospital, Paris, said: "It was impossible to apply inspection properly without registration. Free prostitution meant unrestricted syphilization of the people." He denied "that registration made women professional prostitutes, as they were so before. Disease was due to immorality, not to regulation; that passion was an eternal and imperative factor in human life, and that regulation was a means of combating its attendant evils. If it had not yet succeeded, that was not a reason for abolishing but for improving it." He recommended "gentler" methods.

I understand that the old prison hospital at St. Lazare, Paris, is to go, and a hospital built for diseased prostitutes.

Professor Fournier "would not trust to statistics, but appealed to common-sense. An infected prostitute was safe only when she was shut up." He stated that the opponents of regulation (abolitionists) minimized the appalling deformities and dangers of syphilis.

Professor Lassar (Berlin) agreed with Professor Fournier, and considered "that an infected prostitute was a focus of disease which it was the duty of Society to remove."

Professor Neisser (Breslau) shared Professor Fournier's opinions and was opposed to the views of the abolitionists.

The Italian doctors drew attention to the very serious increase of disease in Italy on the abolition of Cavour's system by Signor Crispi in 1888. The same thing occurred in India in 1885 when fifteen of the principal hospitals were closed as an experiment. The experiment being unsuccessful, the hospitals were re-opened until 1888, and then closed until 1897. During this period the increase of disease was appalling. Control again began in October, 1897.

Dr. Bortavelli (Milan) supported regulation.

Professor Oltramana (Geneva) said that the question had lately been put to the vote in Geneva, and regulation affirmed by a majority of two to one. He considered "that the success of regulation depended greatly upon the competence and carefulness of the physicians to whom the work was entrusted."

Professor Holst (Christiania) said that, since the abolition of regulation in Christiania, syphilis had increased 25 per cent., and clandestine prostitution had increased.

Professor Sturmer (St. Petersburg) supported regulation, and said "that unregistered prostitutes came to the dispensaries in a frightful state."

Professor Petersen said that regulation worked well in Russia, and moved "that supervision and inspection are of the greatest importance in preventing the spread of syphilis."

Major (now Colonel) Macpherson, R.A.M.C., produced a diagram to show the curve of venereal incidence in fourteen regulated and fourteen non-regulated towns in Great Britain. The results closely approximated before and after the period in which the Contagious Diseases Acts were in force, but during the period separated widely in consequence of the lowering of the rate in the regulated towns.

Dr. Kromayer (Halle) exhibited a number of tables to show "that the Contagious Diseases Acts in England had a distinctly beneficial effect upon the incidence of syphilis, but had not affected the frequency of soft sores or gonorrhœa."

A Royal Commission in 1870 reported on the working of the Contagious Diseases Acts of 1864, 1866, 1869, and expressed the opinion that the worst forms of the disease had been much reduced amongst the lower classes of prostitutes and that the women had also been benefited in an indirect manner.

"The Acts have purged the towns and encampments to which they have been applied of miserable creatures who were mere masses of rottenness and vehicles of disease." The report further says, "We are satisfied from the evidence that the frequent examination of prostitute women is the most efficacious means of controlling the disease." The Contagious Diseases Acts did not die a quick death in England, as suggested by Mr. McDonagh. They were in force from 1864 to 1886, and their repeal was mainly due to political reasons (*vide* "Cooper's Syphilis," 1895).

To reduce the number of prostitutes the abolitionists of regulation at the International Conference at Brussels in 1899 directed their efforts against immoral literature, alcohol, dancing rooms, and the stage. They recommended the increased care of neglected children, the provision of female inspectors of factories, more employment for women, and the notification of venereal disease.

Dr. Jullien, Paris, produced tables to prove that venereal disease occurred more commonly amongst unregistered prostitutes and that syphilis was most common in women between the ages of 17 and 22. The age of women is an important factor in contagion. Dr. Blaschko, Berlin, pointed out "that the unregistered women were the younger women who were always the most dangerous. It was not Regulation that rendered the courtesan less dangerous; it was Time."

Dr. Sperck, the great Russian specialist, found "that the amount of syphilis conveyed by the registered women was proportionate to the recruitment of their ranks by healthy women. These were soon infected themselves."

There was a strong consensus of opinion "that instead of placing the whole trade of prostitution under police control, they would put the entire administration on a purely medical footing and make the inspection itself an appendage and continuation of the hospital treatment. The action of police should only be admitted where patients failed to continue their attendance, or in the case of women denounced as centres of infection. The work of examination should be in the hands of venereal specialists. Early and effectual treatment was the goal to be aimed at. Two things are therefore essential—namely, improved medical education, to ensure a supply of competent doctors, and diffused information, that is, protection by knowledge."

There were eight resolutions made by the Conference; two of them appear to be essential as a foundation on which to build :—

First, that the Governments of each country should appoint a Commission charged to ascertain the prevalence, means of treatment, and prevention of venereal disease.

Secondly, that the statistics of disease should be drawn up in all countries on a common basis.

Major T. W. GIBBARD, R.A.M.C.: My remarks will be confined to the treatment of syphilis and especially to the use of salvarsan and neo-salvarsan. For nearly two years we have been investigating salvarsan at the Military Hospital, Rochester Row, with the object of ascertaining whether it was a drug which could usefully be introduced into the Army as a remedy for syphilis, and if so, the best method of proceeding so as to obtain the greatest total benefit from its use.

I will not waste your time by detailing the immediate effect of salvarsan on syphilis, because it has already been shown, in innumerable publications, that it acts much more rapidly than mercury, and that the rapid disappearance of *Spirochæta pallida* from local lesions, as well as the behaviour of the Wassermann reaction after its use, proves it to be specific and not a symptomatic remedy. I propose, instead, to devote some of the time at my disposal to a comparison between the subsequent progress of as many of our salvarsan cases as we have been able to follow up with that of a number of patients who were treated exclusively with mercury, in order to demonstrate to you my reasons for recommending the routine use of salvarsan in the Army.

We are particularly well situated for following up our cases of syphilis in the Army. Every soldier who contracts this disease is registered and a special case-sheet, of which I show you a sample, is made out for him. To whatever station he is transferred this syphilis case-sheet accompanies him and is there kept by the medical officer who is charged with the treatment of venereal disease in the station. The soldier is examined at regular intervals and his progress, with any treatment administered, is recorded on the case-sheet. I have taken advantage of this system to follow up the cases of syphilis we have treated with salvarsan. Many of our patients have been transferred to other stations, but every month I have addressed an inquiry to the medical officers in charge, in the form I now show you, as to clinical relapses, and especially as to subsequent cranial nerve disturbances, while every three months I have requested that a sample of blood serum be sent to Rochester Row for the Wassermann test. Progress of such cases as have remained in the London District has been carefully watched at Rochester Row. We have taken the greatest pains to exclude any bias in favour of salvarsan, and I have no reason to suppose that the medical officers who have kindly furnished reports on our patients in other stations have acted otherwise. Many of our patients were unfortunately transferred to the Army Reserve soon after the treatment and were not under

observation long enough to be used in this comparison. A large number also had previously been treated with mercury and must be excluded because most of them were especially severe cases in which mercury had failed to prevent frequent relapses, so they were not average cases. A sufficient number of patients who had received no previous treatment remain, however, to institute a fair comparison.

The particulars regarding the clinical behaviour of the exclusively mercurial cases whose progress I propose to compare with that of our salvarsan cases were obtained from a number of syphilis case-sheets relating to patients who received not less than nine weekly injections of mercurial cream in the first course, then rested for not more than eight weeks, had six mercurial injections in the second course, and so on—cases, in fact, which had been treated thoroughly with mercury. Except for this stipulation, the syphilis case-sheets of these mercurial cases were chosen at random.

The information regarding the Wassermann reactions given by patients treated with mercury was supplied by Major L. W. Harrison, R.A.M.C., from the results of tests he has carried out on the sera of patients who have been treated at Rochester Row, Aldershot, Bulford, and Woolwich.

The clinical results we have recorded up to date have been collected for me by Lieutenant A. S. Cane, R.A.M.C., and are as follows: Excluding 10 cases which were treated with one subcutaneous or intramuscular injection of salvarsan, 65 fresh cases of syphilis were treated, 49 with one or more intravenous injections of salvarsan, and 16 with an initial intravenous injection of salvarsan, then nine weekly injections of mercurial cream, and, lastly, an intravenous injection of salvarsan. These 65 patients were observed for periods ranging from twelve to twenty-one months, and nine relapsed. Forty other cases were treated with salvarsan and observed for periods ranging from nine to twelve months; 6 of these relapsed. Fifty-seven other cases were treated, 5 with one or more intravenous injections of salvarsan only, and 52 with an initial intravenous injection of salvarsan, nine weekly injections of mercurial cream, and lastly an intravenous injection of salvarsan. These 57 patients were observed for periods ranging from six to nine months and none relapsed. Altogether, therefore, out of 162 patients who were treated from the outset with intravenous injections of salvarsan, either alone or in conjunction with mercury in the way I have mentioned, and were subsequently observed for periods ranging from six to twenty-one months, 11

relapsed. The average period during which the relapse cases had remained free from active signs of syphilis was seven months. In comparison with this, out of 102 patients who were thoroughly treated with mercurial injections and observed for six to twelve months, 85 relapsed; the average period during which the relapse cases remained free from symptoms being 4·2 months.

Twenty-three cases of primary syphilis were treated with intravenous injections of salvarsan, and observed for twelve to twenty-one months; none of them showed secondary symptoms. Out of 10 others who were similarly treated and observed for nine to twelve months, 2 developed secondaries, while out of 23 others observed for six to nine months none developed secondaries. Altogether, therefore, out of 56 primary cases treated with salvarsan, and observed for six to twenty-one months, 2 subsequently developed secondary signs, the average interval between commencement of treatment and commencement of secondaries in these two cases being six months. I may mention that the *Spirochæta pallida* was demonstrated in each of these 56 cases previous to the commencement of the treatment. In comparison with this, out of 23 primary cases treated exclusively with mercury, 21 developed secondaries within an average period of 1·8 months.

Roughly, therefore, the incidence of clinical relapses within six months was twelve times as great in the exclusively mercurial cases as in the salvarsan, and the incidence of secondary symptoms when treatment commenced in the primary stage was twenty-four times as great in the purely mercurial series as in the salvarsan.

Good as these clinical results of salvarsan treatment are, I think that better will be shown in future, because many of our patients received one or two intravenous injections and no other treatment, and we expect better results from the intravenous injection of salvarsan in conjunction with mercurial injections. Out of 93 patients treated in this way and observed for six to twenty-one months, 3 only have relapsed.

As regards the Wassermann reaction, Major Harrison's latest results show that out of 83 cases treated from the outset with salvarsan, and tested seven to fifteen months after suspension of treatment, 15, or 16·8 per cent., were found to be positive to the original test, which in his hands gives 96·1 per cent. of positives with untreated secondary cases. One hundred and three cases tested four to seven months after suspension of salvarsan treatment gave 18 positives, or 17·4 per cent. It is impossible to compare these results with those obtained after

exclusively mercurial treatment in a manner which is fair to salvarsan, because there has been no opportunity of testing the sera of the mercurial cases at such long periods after suspension of treatment. It is obviously unfair to compare them, as a distinguished critic of salvarsan has done, with results obtained immediately on the termination of the fourth, or any other course of mercurial injections. The longest period during which mercury is suspended in the first two years of a soldier's treatment is after the fourth course, when as a rule a rest of four to six months is allowed. Forty-two sera were tested at the end of this period and 24, or 57·1 per cent., were positive. Out of 289 sera which were tested only three months after the termination of two years' regular treatment no fewer than 123, or 42·5 per cent., were found to be positive to the original test.

Judging by the Wassermann test, therefore, when salvarsan is used either alone or in conjunction with nine mercurial cream injections, the result is better than after two years' exclusively mercurial treatment by regular intramuscular injections.

We have had 5 cases of reinfection. In each of them the sore was on a fresh site, and occurred within the incubation period of a primary sore from the date of exposure to infection. They may possibly have been chancriform gummata, as Mr. Marshall suggests, but it is not our experience to find so many *Spirochætæ pallidæ* in gummata as were found in each of these fresh sores.

As regards safety, we have given 43 intramuscular or subcutaneous injections, and 1,435 intravenous injections of salvarsan, some of them to patients who were very debilitated with syphilis, but no untoward incident has occurred. In connexion with the subject of death after salvarsan, I should like to mention, however, that a few weeks ago, a policeman suffering from secondary syphilis was admitted to Rochester Row, and subsequently transferred to St. George's Hospital, where he died of large white kidney. It is quite possible that if we had not examined him carefully, in accordance with our usual practice, we should have given him salvarsan, and this remedy would have been blamed for his death.

We have had no cases of cranial nerve disturbance after any of our injections. One of our patients developed right-sided hemiparesis four months after an intravenous injection of salvarsan, but I considered that his symptoms were due to syphilis, and not salvarsan. He was therefore given further calomel injections and salvarsan, and recovered in two weeks. Another patient (a medical man) came to us six months after a subcutaneous injection of salvarsan, which he had received in India.

He was suffering from facial paralysis, which I considered to be due to exposure while motoring. As some of the salvarsan injected in India had just been removed by incision, and I did not think that the original course of treatment had been adequate, I recommended another course of salvarsan. Three days after the first intravenous injection he wrote to me to say that the paralysis had completely disappeared.

For the reasons I have mentioned I would recommend the routine use of salvarsan in the treatment of syphilis, and would withhold it only in the presence of those contra-indications which have been insisted upon by Ehrlich and others who are qualified by their experience of salvarsan to speak on the subject. At the same time, I hold that salvarsan should be administered only by those who are fully conversant with the details of preparing and injecting it. I may add that we are now training a class of medical officers at Rochester Row in the necessary technique, and I understand that salvarsan will not be issued officially to any military hospital till there is a medical officer there who is fully acquainted with this technique.

I consider the early recognition of syphilis of the very greatest importance to the success of salvarsan treatment, and may say that every medical officer is taught both on entering the Service and subsequently when undergoing his Captain's promotion course, how to use the dark-ground apparatus, how to prepare a specimen to send through the post for dark-ground examination, and how to obtain a specimen for the Wassermann test.

I have never thought that a single course of salvarsan injections is sufficient to guarantee a cure. On the contrary, I hold most strongly that subsequent examination cannot at present be dispensed with, and that this examination must be serological as well as clinical. I cannot say what test we shall eventually accept as an indication that the patient is cured, but I think it probable that we shall adopt the provocative injection recommended by Professor Ehrlich and Gennerich, and now advocated by Mr. McDonagh.

We have so far obtained the best results with one intravenous injection of salvarsan followed by nine weekly injections of mercurial cream, and lastly an injection of salvarsan, but are at present building up a series of cases to whom we are administering three fortnightly injections of salvarsan, and during the same month four intramuscular injections of calomel ($\frac{3}{4}$ gr.). It is much too early to compare the results of this procedure with those of other plans we have tried.

Professor Ehrlich very kindly sent me a generous supply of neo-salvarsan, and we are investigating it on the same lines we adopted with

salvarsan, but I cannot say how it will eventually compare with the older remedy. Its immediate effect is certainly as rapid as that of salvarsan, and as it is ready for administration when dissolved in fresh distilled water at room temperature, it is much more convenient to use.

As regards reaction, such as rise of temperature, vomiting, &c., we recently compared salvarsan with neo-salvarsan in this respect. Sixty-two patients were injected with salvarsan and sixty-two with neo-salvarsan. Out of these, in eleven salvarsan and five neo-salvarsan cases there was a temperature over 100° F.; in eleven salvarsan and three neo-salvarsan cases vomiting occurred. It is hardly necessary to say that we invariably use freshly distilled water in the preparation of these remedies.

It is possible to give neo-salvarsan in larger doses than salvarsan, and the dose can safely be repeated at shorter intervals. Major Beveridge, R.A.M.C., has very kindly investigated the question of the excretion of neo-salvarsan for me, and has so far not been able to detect arsenic in the urine later than the third day after an intravenous injection of neo-salvarsan. This probably explains why it can be repeated so soon. With regard to the repetition of neo-salvarsan, Dr. Schreiber in a recent letter to me mentioned that he was not now inclined to administer maximum doses of neo-salvarsan more frequently than every eight days except in the case of very powerful patients. This advice is repeated by Professor Ehrlich in his latest circular in which he recommends that the maximum dose should be 1 grm. to men, the interval between injection of such doses, six or eight days, and the total in one course, not more than 5 to 6 grm.

Sir George Savage: I fear I have nothing new to contribute to this discussion beyond my personal experience. I therefore hesitated before consenting to take part, but perhaps it is fitting that as a senior in my branch of medicine I should in some small way contribute to this most important comparison of the experience of many men. My part is to trace the relationship which may be found to exist between syphilis and mental disorder. This may be considered from several points: The effect produced by the acute poisoning, by the moral effect, and by the chronic degenerative changes produced by constitutional disease; it must also be considered in its acquired and its inherited forms. I recognize and accept the work of Mott as representing my belief in the material pathology. My old teacher Wilks was the first to recognize that syphilis attacked different persons in different ways, and that there was a visceral syphilis. He pointed out that the persons who suffered from the tertiary or constitutional

disease often had escaped the earlier symptoms. Wilks was anxious to know whether certain poisons affected the nervous systems of those who were neurotic by heredity, and at his request I made some investigations at the fever hospitals as to whether those patients who were by heredity neurotic were more delirious during fevers than the others. I failed to get evidence to support this idea. Mott has, however, shown that in alcohol those who suffer in their viscera do not suffer in an equal degree in their brains, and that the alcoholics in an asylum are generally free from visceral degeneration. There is therefore this interesting parallel between the alcoholic and syphilitic person. Another point of interest is that the general paralytics in asylums are not so neurotic by heredity as are the rest of the insane patients. My experience has been that whereas 30 per cent. of the certified lunatics have a clear hereditary taint, not more than 10 per cent. of the general paralytics come of insane stock.

The effect on the nervous system seems only slightly to depend on the treatment. I have seen all the forms of nervous disorder which depended on syphilis in cases which have been thoroughly treated with mercury in the earliest stages and with mercury and iodides for later complications. Whether the latest forms of treatment will prevent severe constitutional symptoms remains to be seen. If Wassermann's reaction is infallible, then I have met with instances in which all history of syphilis was denied but where symptoms indicated the disease. Syphilis rarely acts as the only cause of mental disorder, alcoholic excess, strain, or injury being commonly associated causes. In Tuke's "Dictionary of Psychological Medicine" I have published a table of the relationships which may exist between syphilis and insanity. I modify this as follows: (1) Insane dread of syphilis; (2) insane obsession as to the results of an attack of syphilis; (3) delirium and delirious mania following syphilitic fever; (4) mental decay or premature dementia following constitutional syphilis; (5) syphilitic neuritis, such as optic neuritis, leading to delusional insanity with ideas of persecution or suspicion; (6) syphilitic disfigurement giving rise to ideas of being noticed, jeered at, or suspected as being sources of a general epidemic of syphilis; (7) inherited syphilis with sensory defect and retarded or defective mental development; (8) inherited syphilis leading to idiocy or epilepsy; (9) inherited syphilis causing juvenile general paralysis; (10) constitutional syphilis causing the general paralysis; (11) constitutional syphilis causing locomotor ataxy with mental symptoms; (12) constitutional syphilis leading to senile dementia, with or without paralysis, hemiplegia, aphasia, and the like. In this plan may be seen

the various mental and physical disorders which are met with in asylums as the result of syphilis. I shall not elaborate the cases, but it is important to recognize at least three groups. First, the very rare one in which syphilitic fever gives rise to mania of a delirious type. Such cases must be looked at as parallel to the cases of mental disorder following any specific toxic agent and must be treated as such, more attention being paid to the febrile state than to the specific causes. Next there are the cases in which the dread of syphilis or its results overpower all reason, so that either syphilophobia results or ideas arise that the results of the disease make the patient a social danger or one conspicuous and to be avoided. Last, the great and varied group of cases depending on structural degeneration, always vascular in part.

And now I pass to the more special point of interest—namely, my belief in relationship to the connexion between syphilis and general paralysis. In my earliest lectures in the seventies I distinctly said I could trace no relationship between the diseases; a similar opinion was held by Clouston, of Edinburgh; since then we have both changed our views. In my case the process of education was as follows: I met with cases in which there were ptosis, external strabismus and mydriasis, and gummata were diagnosed; in some cases I followed up the cases and made post-mortem examinations, only to find arterial degeneration, but no evidence of any gummata. In some such cases recovery took place, but in others the recovery was only apparent, the patient reappearing as a typical case of general paralysis of the insane. Then I saw several medical men whose history I knew, as far as syphilis was concerned, and after many years they developed general paralysis of the insane. These facts naturally impressed me so that I took greater pains in investigating the previous histories of the general paralytics. I soon found that the great majority admitted slight venereal sores many years before, and now I am convinced that nearly every case of general paralysis of the insane has had syphilis. I own to the difficulty which is met in the semi-savage tribes into whom syphilis has been introduced, and who almost all suffer from the disease, and yet among whom very few are general paralytics. I believe syphilis to be the dominating cause, but that alcohol, prolonged nervous strain or injury, may be the contributing or exciting causes.

A very practical question arises in insurance cases. Can general paralysis of the insane arise as the result of injury alone? A brain whose general nutrition has been affected by alcoholic excess may rapidly degenerate and lead to dementia after a head injury, and I believe the same may be said of the syphilitic brain. Rapid mental

deterioration may follow from a direct external injury or from an internal one, due to a so-called epileptic or congestive attack. The enormous number of general paralytics admitted to asylums gives evidence of the great importance of studying the various relationships existing between the diseases with the hope that, attacked at its root, one may sooner or later be able to counteract or cure it. It is certain that some strains of the syphilitic poison are more virulent than others, for whereas but a very small number of those infected with syphilis develop general paralysis of the insane, there are instances of women who not only give rise to syphilis, but in a large proportion these sufferers also later have general paralysis of the insane. Besides true general paralysis of the insane there are many cases of patients who, having suffered from syphilis, exhibit well-marked evidence that there is brain disorder which leads to mental weakness but does not produce general paralysis of the insane. These cases of parasyphilitic brain disease have been variously named, some being called pseudo-general paralytics. As a rule their one constant symptom is progressive mental weakness, resembling in many ways the mental disorder which arises from progressive arterial degeneration. It interested both Gull and Sutton to consider if with progressive arterio-capillary fibrosis changes there were to be met any definite mental disorders. They, as far as I recollect, could not detect any regular evidence of special mental trouble in cases such as those of Bright's disease. This has led me to insist on the special form of decay which is met with in general paralysis of the insane which is not confined simply to vascular changes.

A rather interesting feature of the special nature of the disease occurs in its relationship to memory. The degeneration due to alcoholic excess is marked by loss of memory, whereas in general paralysis of the insane very often the memory will last far into the second stage of the disease. In the pseudo-general paralytics I think the memory fails more than in the true cases. Allied to these cases I have been struck with what have been described as cured cases of general paralysis of the insane, or of cases in which the disease has become chronic or arrested.

I have seen a good many cases in which the history of syphilis was clear, then has followed some local intracranial nerve trouble, which has passed away with treatment, yet the patient has never become normal. He may remain chronically restless, or he may be merely a mental cripple, and in such a state he may live on for many years. I have seen a good many instances of men who, having contracted syphilis after middle age have developed some of the restlessness and exaltation met with commonly in general paralysis of the insane, and yet have

only passed in the end to senility. I used to call these cases of senile general paralysis of the insane, and now I rather look upon them as cases of accelerated senile decay.

I shall not enlarge on syphilitic epilepsy, as my experience of this is limited, but I have seen a certain number of patients in whom, with epilepsy developing in mature life there has been a distinct syphilitic history.

Having now considered the results of acquired syphilis I turn to inherited syphilis. First, I have met with cases of general paralysis of the insane in early manhood in cases in which I felt I could exclude the personal acquirement but in which there was a history of parental syphilis. Thus, these seem to form a connecting link between ordinary general paralysis of the insane and the juvenile variety. My experience bears out that of many observers that in juvenile general paralysis there is always a history of parental disease. In a certain number of children of syphilitic parentage I have thought some of the cases of so-called meningitis which have ended fatally were really allied to the cases of juvenile general paralysis of the insane. I am not one who is fully convinced that nothing acquired by a parent can be transmitted to the children, and I have been astonished at some of the histories of children who were morally imbecile in whom vice had been the most marked trait in a parent. I know it is almost impossible in such cases to exclude the effect of surroundings. I have already spoken of children with well-marked evidence of inherited syphilis in whom some sensory defect was present, and in whom mental deficiency was present. Deafness, with disease of the middle ear alone or associated with some eye trouble have been present in several children who were morally defective. It is difficult to gauge fairly the effect of inherited syphilis in producing backward and feeble-minded children, but I have met with families of defectives in whom there was a clear history of parental syphilis. In some of these children there were some of the stigmata of inherited syphilis. I have known healthy children, however, who have been begotten by fathers who later have died of general paralysis of the insane. The danger to the offspring depends on the proximity of the begetting to the development of mental disorder. I have known a child begotten in the early excited stage of general paralysis who was idiotic, whereas children begotten by the same father years before were perfectly normal.

So far, then, I have given as my experience that inherited syphilis is the cause of juvenile general paralysis of the insane and may be the cause of moral, intellectual, or physical deformity or defect. Now, as

to idiocy. I was at first surprised to find that the experience of men like Dr. Caldecott, of Earlswood, and Dr. Turner, of Colchester, showed that syphilis seemed to play a very small part in the production of idiots. Not more than 1 or at the most 2 per cent. of the idiots have any specific history. It has struck me that the many miscarriages occurring with syphilis may have stopped some potential idiots. I cannot pass over the fact that I have come across some cases of what Clouston called postponed idiocy (what, in fact, may be dementia præcox) in which there has been inherited syphilis. In these cases there is commonly some neurotic heredity as well, so that I can say that in certain cases in which inherited syphilis is combined with neurotic heredity a tendency to early and premature mental decay may occur.

To sum up, then, syphilis may act as a direct acute poison, producing acute mania. It may lead to mental disorder without any traceable material brain change in syphilophobia and certain obsessional disorders. It may, by inheritance, give rise to juvenile general paralysis and some forms of mental and moral weakness. It may lead to very marked disease with progressive mental degeneration assuming a specific form in general paralysis of the insane, or a less special form in pseudo-general paralysis or progressive dementia. In my belief there is not only arterial disease but some particular disease in general paralysis of the insane affecting the nerve elements, and at present no anti-syphilitic treatment is of any avail when true brain syphilis is established.

Dr. Douglas White: I propose to utilize the short time at my disposal in directing your attention to the social aspect of syphilis. In this aspect it cannot be wholly isolated from other forms of venereal disease, which, equally with it, form a standing menace to our civilization, both in this and other countries.

In a former paper, Colonel Melville and I attempted to analyse the present state of affairs in this country; to show the extent of the prevalence of venereal disease, and to sketch the principles and methods by which it should be combated. While there are valid moral objections to any form of State regulation of vice, such as prevails in most Continental countries, yet the final condemnation of such methods, in the eyes of practical men, lies in its total practical failure to lessen the inroads of the disease which it seeks to prevent. (There can be no doubt that, although in the French and specially in the German Army, such diseases are less prevalent than in our Army, yet in the general civil population the prevalence is greater there than here.) The main causes of this failure are plain. Just as any regulative system becomes

severe and relatively efficient, in just such a proportion vice tends to avoid regulation and becomes clandestine; so for instance, in Paris, there are now only forty regulated houses, as compared with 200 forty years ago; in the meantime clandestine vice has more than doubled in volume. Besides this, the most dangerous age from the point of view of disease occurs at 18 in women, at which age very few, if any, women come within the purview of regulation.

We arrived at the conclusion that no method was available for the elimination of such diseases but to offer extended facilities for treatment at the general hospitals and dispensaries throughout the country. I lay stress on the general hospitals, because special or lock hospitals will not meet the requirements; the average patient who acquires these diseases does not wish to wear a label which all may see.

At the present time it can hardly be said that serious attempts are being made to deal efficiently with the mass of venereal disease at the general hospitals. Its vast importance would justify the raising of such patients to a position of special consideration at the hospitals, as is now done in the Army, to the no small advantage of both the patients and the medical staff; but in the hospitals these diseases occupy the place of dishonour rather than that of special attention. I do not mean that no attempt is being made to cope with them, but the effort is not concentrated and systematized. Nor can it be denied that much is left to be desired as regards the teaching of the students. Here also more systematic education is required, and that more particularly with regard to practical treatment, the administration of injections and various forms of special medications. Specialization should be encouraged, and posts created for specially qualified persons.

The advent of Erhlich's specific not only further justifies, but urgently demands, a radical reconstruction of our whole hospital outlook on syphilis; for by means of this, if we could get hold of all cases of primary and secondary syphilis, the disease, at least *as a contagious disease*, could be eliminated in a very short space of time. This, it may be observed, holds true even if we adopt the less optimistic views on the efficacy of salvarsan.

By some people the present conditions are regarded with some degree of complacency, because there is some evidence that syphilis has somewhat decreased in the general populace in the last half-century; this in turn gives rise to the hope that the disease, if left alone, will gradually eliminate itself. I believe such complacency to be without justification, and I wish to place the facts shortly before you, as they are found in the official returns.

The returns of *infants* dead from syphilis under one year do show a considerable diminution—about 33 per cent. in the last twenty-five years. This is so far satisfactory; it is very probable, indeed, that syphilis in infants was over-diagnosed in the early days; but this would hardly account for the decrease. (It is noteworthy that of infants who die of syphilis, the males preponderate by 5 to 4 over females. This, however, is only in consonance with the general fact that in the first year of life males die off more than females, and in the same proportion. There are 4 per cent. more males born than females: by the end of the first year of life this male preponderance is eliminated. In this process syphilis takes only its proportional share.) At the present time 1,200 infants under one die of syphilis annually in England and Wales.

The death-returns for the *total* population show a somewhat similar result; but for our purpose this return is most misleading. First it includes the infants, which form three-fourths of this whole return. Secondly, it does not include tabes, general paralysis of the insane, aneurysm, or other diseases than tertiary visceral deposits. The number of adult deaths thus included amount to 450 a year. This small number is no doubt tending to diminish.

But in the past decade there has been an increase in the number of deaths due to aneurysm, tabes, and general paralysis. From aneurysm more than 1,000 die annually, from tabes about 600, and from general paralysis of the insane about 2,400. This makes 4,000 in all from these three complaints, while the official returns from adult syphilis only show 450. If now, all these are taken together, we find that, for the decennial period, adult deaths from syphilis have increased in number, and this increase has just about kept pace with the increase in population.

If the figures for aneurysm are to be trusted as indicative of previous syphilis, they are still more startling, for the death-rate per million living from this cause has been absolutely steady for thirty years past. Now an adult death from tertiary or quaternary causes represents syphilis contracted on an average fifteen years previously. So from the last decennial return the obvious inference is that there was no diminution in the incidence of syphilis during the years 1885-95.

(Taking the adult deaths from syphilis as a whole, the proportion of the sexes is almost exactly three men to one woman, and this I believe to represent pretty accurately the proportional incidence of syphilis among men and women.)

As against the above inference that syphilis in adults is not decreasing, we have the returns which show the number of recruits rejected per annum for syphilis. These show a pronounced diminution. They

are now only one-fifth of what they were twenty-five years ago, and one-tenth of what they were fifty years ago. It is difficult to believe that these figures do not indicate some true decrease in the general incidence of syphilis. They are taken at a time of life when the incidence of syphilis among men is at or near its maximum (19-20), and the class from which recruits are drawn is neither too high nor too low in the social scale to be reckoned as typical. Two considerations, however, will tend to lower the significance of these figures. First, syphilis was almost certainly greatly over-diagnosed in the older days, recruits being often rejected on account of skin affections which were then, but are not now, regardly as syphilitic. Secondly, recruits have gradually learnt that it is useless to present themselves for enlistment while suffering from obvious disease.

How far these points tend to discount the significance of the figures it is impossible to say. On the whole, considering the conflict of evidence, we must admit that we do not know whether syphilis is decreasing in the civil population or not; anyhow, there is no ground for an easy optimism.

The severity of the complaint, specially of its earlier stages, has declined in the last half-century. I well remember how an eminent surgeon, examining me on the subject, laid his hand on my shoulder and said, " My boy, you don't see syphilis now as we saw it forty years ago." Yet it may be doubted whether its social and economic effects have decreased in a similar ratio; nay, the opposite may be the case; for its ultimate disastrous effects to the community are as bad as ever, while its primary and secondary manifestations are less alarming to the individual and call with less urgency for the immediate treatment which they equally require.

Now as to the present incidence. By the use of Blaschko's figures for Berlin, combined with the recruiting figures for both countries, I concluded that London probably has a total annual incidence in venereal diseases of not less than 200,000. Of this total we should be about right in putting 40,000 to the credit of syphilis. Considering the relation which London holds to the rest of the country in the Registrar-General's returns of deaths from syphilis, I do not think we shall be far out if we say that in the whole of Great Britain and Ireland the annual incidence of syphilis is about 130,000. If this is even approximately true, then the matter is worthy of the immediate attention of the profession. What are we to do?

If all fresh cases of syphilis are to be treated with salvarsan, as they ought to be, then probably every bed devoted to this purpose could

accommodate 100 persons in the year. This would mean 400 beds for the purpose, distributed over London. For so important a purpose this sort of demand ought to be easily met. In the past, it is true, difficulty has been experienced in the practical working of wards for venereal patients; perhaps this might be avoided by partitioning such wards into cubicles, which would be both pleasanter for the better class of patients, and also inhibitive to the more aggressive sort. The period of stay also in the hospital would be too short for the development of a disorderly spirit. The first need, therefore, is for increased hospital facilities.

If, however, any such effort is to be a success, it is necessary also that the public should be educated to the dangers of venereal disease. The daily Press vigorously prosecutes campaigns against tubercle and cancer, of the method of propagation and cure of which we are comparatively ignorant. Of syphilis we know both how it is propagated and how it may be cured. Its importance to the community I believe to be greater than either of the others. The Press could do a great deal in assistance of such a campaign. But more than that, we need systematic teaching of young adults. Lecturers ought to be sent round to teach the students at secondary schools, public schools and universities the unmixed advantages of chastity, and the dangers of promiscuity, in such a way as would conduce both to the raising of morality and the prevention of disease in the future parents of the race. By such means men and women would at least learn to come for cure on the first suspicion of disease.

If, then, as I urge, our true policy be simply that of attracting people by every means to their own cure, it follows that we must set our faces against anything which may savour of coercion. Any coercive detention would frighten away the very people whom we wish to attract; and as far as syphilis is concerned, coercive detention would be needless, since active infectivity is so rapidly destroyed by salvarsan.

Lastly, I would urge the necessity of obtaining statistics of venereal disease, in order to ascertain our present position and our future progress. Notification without names is the only practicable method; full notification would simply lead to concealment.

Whether it would be possible to obtain the necessary data without the assistance of the Government I cannot say. It would certainly be difficult to do thoroughly except through a Government department, but a start might be made by getting the hospitals to give annual returns.

I strongly suggest that our knowledge of this disease is far enough advanced, both as regards its cause and its cure, to justify the leaders of the profession in setting out on a vigorous endeavour to apply that knowledge to the inhibition of this continuous national scourge.

Mr. F. E. Fremantle remarked that most of the points he had intended to make and the evidence he wished to bring forward had been covered by the better facts which had been submitted by Dr. Douglas White and Major French, figures which at the present time could scarcely be beaten for their comprehensiveness. He hoped it was fully realized how indebted the profession was for the magnificent work on this subject by their colleagues in the Royal Army Medical Corps; the work they had done in this connexion stood out as a great example in preventive medicine, one from which, as in other departments of public health in the past, much could be learnt for use in the public health of civil life. With regard to statistics, Dr. Douglas White had already shown that the figures published were of very little value, and he (the speaker) would again emphasize the fact that out of the 1,685 deaths recorded in the Registrar-General's Returns as due to syphilis in 1909, 1,238, or over 75 per cent., were in persons under 20 years of age. It was obvious, therefore, from what was known by clinical medicine, that by far the greater number of deaths from syphilis which occurred over 20 years of age were not notified on the Register as such, and that the figure 1,685, as representing the deaths from syphilis in 1909, was very misleading. It was an important matter when thinking of the way the figures could be improved. To take another analogy, the Prussian Government in 1900 decided to endeavour to obtain more accurate and fuller statistics on the subject, and accordingly they issued questions to all medical men, but received replies from only 63 per cent., which gave a total of 40,902 patients; and yet by looking at the figures they concluded that there were probably half a million cases of first attack in Prussia in the year, which showed they had good evidence for believing that the return given was very small in proportion to the number of cases which they suspected to exist. It brought one back to what one often felt in connexion with public health, that the official returns were not to be relied on in certain cases, and that it was necessary to take a less definite but more comprehensive survey from the general opinion of the medical profession as a whole.

It had often been said that the question of disease must be separated from the moral question, and in considering causes that was certainly the case. But when considering means of prevention, the two questions must be brought together; for although syphilis was often conveyed in other ways, it was obvious that it was most frequently conveyed through the medium of prostitution, and prostitution must, therefore, be primarily attacked. There was a history available which went back to the earliest days, and it was of interest from the historical standpoint

to note that the Jewish Code, in Leviticus xv, contained an early, if not the earliest known, mention of venereal disease; and though presumably that disease was not syphilis the restrictions which applied to one applied also to the other. It is important to note that the distinctive feature of the Israelitic religious law was the discouragement of irregular sexual intercourse. It attempted to work against the tendency to such irregular intercourse by moral methods; and if there were time he would be able to show that throughout history the really effective control had always been by way of general moral influence, which had greatly reduced the amount of prostitution and other irregular intercourse. He did not suggest that any educative methods or means of exercising moral control would stamp out prostitution; but education of public opinion along this line must find a prominent place.

The absolute failure of all suppressive measures was well known, whether in the form of registration or of weekly medical inspection. It was well to tell those who sometimes suggested that those methods had not been properly carried out, that in Berlin, where the police system was very complete, they had absolutely failed, insomuch that when they were trying to suppress brothels the police nevertheless had to deal with 16,000 charges of *Kuppelei* every year. That was sufficient cause for putting such measures aside in this country, even though earnest people suggested a return to them. It was only forty-four years ago that the Royal Colleges of Physicians and Surgeons together brought forward evidence to the Government, in considerable volume, in favour of the extension of the Contagious Diseases Acts. But in 1882 there was a popular movement against them, and the Acts simply died of inanition, and were finally repealed in 1886. We had now, therefore, to return to the methods of attraction—to attract people to reveal themselves and be treated.

Was it possible to get any further forward in the way of notification? New York City had recently adopted a measure of notification, primarily as a result of the report of Dr. Hermann Biggs, General Medical Officer to the Department of Health in 1911. He represented the necessity of increasing the amount of accommodation for cases of venereal diseases; a vote for £11,000 was passed for making such provision, and hospital plans had been approved since February of the present year. Resolutions were at the same time adopted, requiring notification to the Department of Health. In addition to compulsory notification by officers of institutions, official and charitable, there was to be voluntary notification by all physicians, excluding the name and address of the patients. Still, both compulsory and voluntary notifications must

include particulars as to the age, sex, nationality, marital state, and as to the disease, the character, stage, and duration of the infection and, if possible, the date and source of infection. The promotion of voluntary notification was sought to be increased by the provision, for those who notified on a proper form, of free bacterial examination of discharges and the free provision of vaccines. And circulars were to be distributed on the subject. He asked those who proposed notification what they would gain by a system such as this. There was compulsory notification, but the majority of cases were left to be notified voluntarily. He believed the number so derived would have no known proportion to the actual number, and one would not know what provision to make for those whose cases were not voluntarily notified. It was of interest to consider the analogy of the notification of tubercle in this country. Provision had been made for the notification of tubercle, but those who moved about amongst general practitioners knew there were many doctors who refused to notify cases of tubercle. And surely that would be infinitely more the case with syphilis or other venereal disease? It was easy to see what attitude would be taken by a wealthy man of business desirous of consulting a medical man for syphilis, when his prosperity largely depended on his good reputation. Such a man might have indulged once, through no exceptional fault of his own, and would fear even the remote danger of the fact being known through his visit to the physician: surely he would do his utmost to prevent even anonymous notification, and would probably feel it safest to consult an unregistered practitioner. The result of such a measure must be to create fear in such people, and to some extent to drive practice in connexion with venereal disease into the hands of unqualified persons, or at least to those who would not notify.

He believed there would be a much more efficacious means by taking advantage of the working of the new Insurance Act, assuming that the matters in dispute between the profession and the Government were settled; especially as actuaries said that one-third of the population would be insured. It did not seem possible to suggest a method of securing treatment in hospitals for any large proportion of the population, because knowledge of the disease which was afflicting them deterred many from going to hospital for treatment. He therefore thought the great hope for ascertaining the amount of venereal disease extant and taking means for getting them treated was under the working of the Insurance Act. This should be tried for the next four or five years before attempting notification under the Public Health Acts.

The Royal Society of Medicine.

July 8, 1912.

Sir Henry Morris, Bt., President, in the Chair.

A Discussion on Syphilis, with special reference to (*a*) its Prevalence and Intensity in the Past and at the Present Day; (*b*) its Relation to Public Health, including Congenital Syphilis; (*c*) the Treatment of the Disease.[1]

Dr. H. R. Dean: The question of the importance of syphilis in the parents as a cause of mental deficiency in the offspring has led to the expression of very divergent opinions. The majority of authorities appear to have held that syphilis was a relatively unimportant factor. Others, from a study of cases which have come under their notice, have inclined to the view that syphilis was a very potent cause in the production of idiocy.

E. Mendel[2] (1868) quoted an interesting case described by Carl Friedrich Haase in 1828. A young woman who had been infected by her husband had three miscarriages. The fourth pregnancy resulted in the birth of a living child which died with marked hydrocephalus at the age of 7 months. After quoting the opinions of several writers, Mendel remarks that "clinical observations in this connexion are limited to a few cases, the number of which stands in marked contrast to the frequency with which pathological changes are found in the brains of children who succumb to hereditary syphilis. In any case the majority of hereditary syphilitics die long before there can be any question of mental deficiency. In those cases, however, in which hereditary syphilis is latent or cured, but which at a later period develop symptoms of

[1] Fourth meeting (adjourned from June 24).

[2] E. Mendel, *Arch. f. Psychiatr.*, Berl., 1868-9, i, p. 308.

mental disturbance, it is generally impossible to refer such disturbance to hereditary syphilis, for the objective symptoms of this disease are then variable, indefinite, and in no sense specific." Mendel, as may be seen from this extract, saw very clearly the difficulties which beset the proof of the view which he adopted.

It was not, however, generally considered that syphilis was a very important factor in the causation of idiocy. Critchett[1] in 1860 stated that "there does not appear to be any reason for supposing that actual idiocy is at all a common consequence of inherited syphilis. About three years ago we looked through the patients at the Redhill Asylum without finding a single one whose teeth were characteristic, and Dr. Down informs us that he has recently made another inspection with a like result."

Sir Jonathan Hutchinson (1863)[2] found an idiotic condition in only 3 out of 170 cases of congenital syphilis. The same observer (1879)[3] examined the teeth of the idiots at the Earlswood Asylum, but did not find the specific characteristics in any considerable number of cases.

Kerlin (1880)[4] made a careful inquiry into the histories of the parents and grandparents of 100 cases of idiocy. In only two cases was a history of syphilis elicited, while 4 only of the 100 patients showed some evidence of a syphilitic infection.

Judson Bury (1883)[5] described 6 cases of mental deficiency in children who were the subjects of congenital syphilis. He came to the conclusion "that hereditary syphilis is a more frequent factor in the production of mental deficiency than has hitherto been recognized."

Shuttleworth (1888)[6] examined the records of 1,000 cases at the Royal Albert Asylum at Lancaster. In 10 cases only was there reason for suspecting inherited syphilis, and in 4 cases only could the evidence be called satisfactory. Shuttleworth, however, expresses the following opinion: "In spite of these figures, I am inclined to believe that inherited syphilis plays a larger part in the production of mental enfeeblement in childhood than institution statistics would lead us to suppose."

[1] Critchett, *Med. Times*, 1860, i, p. 575.

[2] Hutchinson, "Diseases of the Ear consequent on Inherited Syphilis," 1863.

[3] Hutchinson and Judson Bury (Bucknell and Tuke), "Manual of Psychological Medicine," 1879, p. 151.

[4] Kerlin, "Enumeration, Classification, and Causation of Idiocy," Philad., 1880.

[5] Bury, *Brain*, 1883, vi, p. 44.

[6] Shuttleworth, *Amer. Journ. Insanity*, Utica, N.Y., 1888, xliv, p. 381.

A few cases were recorded by Fletcher Beach (1888),[1] who, however, concluded that "syphilis is not a common exciting cause of imbecility."

Down (Lettsomian Lectures 1887),[2] in discussing the causes of idiocy, states that in not more than 2 per cent. of idiots were there signs of inherited syphilis.

Piper (1893)[3] examined 316 idiots and found evidence of syphilis in 5 per cent.

Hahn (1898)[4] examined 540 idiots at the Alsterdorfer Asylum; of these 40 (7·4 per cent.) were found to be syphilitics. Of 100 deaf-mutes at the Hamburg Asylum 4, and of 60 blind children, 10 showed evidence of congenital syphilis.

Wachsmuth (1901)[5] was unable to find even one congenital syphilitic among 185 idiots whom he examined.

Ziehen (1908) records the result of a careful statistical inquiry as to the frequency of congenital syphilis in cases showing a slight degree of mental deficiency. Ziehen[6] found that syphilis was probably present in 17 per cent. and certainly present in 10 per cent. of the cases examined.

A very different result was recorded by Shuttleworth and Fletcher Beach (1910),[7] who could only trace inherited syphilis in 1·17 per cent. of their cases.

From this review of the subject it will be seen that a very wide divergence of opinion exists. It appears, however, to be quite certain that only a small proportion of idiots show the classical signs and symptoms of congenital syphilis, and if we are restricted to the usual methods of examination we must come to the conclusion that congenital syphilis has little connexion with idiocy. On the other hand, the view that congenital syphilis is an important cause of idiocy has been put forward by several writers. This opinion has been based for the most part on cases of idiocy in which, while the usual signs of syphilis have been wanting in the patient, it has been possible to establish a definite history of syphilis in the parent. The number of such recorded cases is, however, small.

[1] Fletcher Beach, *Amer. Journ. Insan.*, Utica, N.Y., 1888, xliv, p. 387.

[2] Down, *Brit. Med. Journ.*, 1887, i, p. 150.

[3] Piper, "Zur Aetiologie der Idiotie," Berl. 1893.

[4] Hahn, *Deutsch. med. Wochenschr.*, Leipz. u. Berl., 1898, xxiv, p. 262.

[5] Wachsmuth, *Arch. f. Psychiatr.*, Berl., 1901, xxxiv, p. 787.

[6] Ziehen, "Psychiatrie," Leipz., 1908, p. 613.

[7] Shuttleworth and Fletcher Beach, article "Idiocy and Imbecility," Allbutt and Rolleston's "System of Medicine," 1910, viii, p. 875.

The opportunity of collecting further evidence was afforded by the introduction of the Wassermann test. In the five years which have elapsed since the discovery of the Wassermann test it has been established beyond all reasonable doubt that a positive reaction may be regarded as conclusive evidence of a syphilitic infection. It is stated that positive reactions have been obtained with the sera of patients suffering from frambœsia, trypanosomiasis, leprosy, and in certain cases of malaria. These diseases are, however, of rare occurrence in this country, and we may safely conclude that a patient whose serum gives a positive Wassermann reaction has certainly been infected with syphilis. The Wassermann reaction is, moreover, a remarkably constant sign of syphilis, for it is well known that syphilitic patients during a latent stage of the disease, at a time when no sign or symptom of the disease is apparent, may give a definite reaction to the serum test. By the aid of the serum reaction we are able to detect syphilis in an individual who not only may show no sign of syphilis but may appear to be in perfect health. Still more remarkable are those cases in which a positive serum reaction is from first to last the only evidence of infection. It has been established that mothers of syphilitic children who appear to be in perfect health and who have never shown any sign of syphilis give in a large majority of cases a positive reaction to the serum test. The work of the last five years has established two very important facts :—

(1) A positive Wassermann reaction (if certain diseases, rare in this country, can be excluded) may be accepted as specific evidence of syphilis.

(2) A positive reaction may be obtained with the serum of an individual who shows no other evidence of syphilis.

If we are prepared to accept the truth of these two statements it is obvious that we have in the serum test an invaluable aid in determining the ætiology of a variety of morbid conditions.

The examination of the blood serum of idiots by the Wassermann reaction has been the subject of several papers :—

Raviart, Breton, Petit, Gayet and Cannae (1908)[1] examined 246 cases, of which 76 (a little more than 30 per cent.) were found to give a positive reaction.

Kellner, Clemenz, Brückner and Rautenberg (1909)[2] examined 216 cases, of which 13 gave a positive reaction by Stern's method, while

[1] Raviart, Breton, Petit, Gayet and Cannae, *Rev. de Méd.*, Par., 1909, xxviii, p. 840.

[2] Kellner, Clemenz, Brückner and Rautenberg, *Deutsch. med. Wochenschr.*, Leipz. u. Berl., 1909, xxxv, p. 1827; and Brückner, *Münch. med. Wochenschr.*, 1910, p. 1944.

9 only gave a positive reaction by the original Wassermann method. To the 13 cases must be added 3 cases which were deficient in complement and were found to be positive by the original Wassermann method, that is to say, a positive result was obtained in 7·4 per cent. It should be noted that of these 216 cases half were over 30, and 40 cases only were under 14 years of age. Of the patients under 14 years of age 20 per cent. gave a positive result, of those over 14 only 5 per cent.

Lippmann (1909)[1] examined 78 cases at the Uchtspring Asylum and obtained a positive reaction in 7 cases—that is to say, in 9 per cent. An examination of the cases at the Dalldorf Asylum gave a positive result in 13·2 per cent. Lippmann also examined 77 cases by clinical methods and decided that 40·2 per cent. showed signs of congenital syphilis.

In 1909[2] I had the opportunity of examining 330 of the inmates of the Wilhelmstift, an asylum for idiots at Potsdam. A positive result was obtained in 51 cases (15·4 per cent.). Among the 51 cases which gave a positive reaction, 7 were found which had definite signs of syphilis, and 3 or 4 in which syphilis might have been suspected but not with certainty diagnosed. There were 2 cases with definite signs which gave a negative reaction. That is to say, among the 330 patients were 9, or including doubtful cases 13, which from physical signs and symptoms would have justified the diagnosis of syphilis. The results in detail were as follows :—

	Cases examined	Positive
Simple idiocy of all grades	287	44
Congenital spastic diplegia (Little's disease)	15	1
Marked hydrocephalus	14	4
Epilepsy	1	1
Microcephalic cases	4	0
Mongols	1	0
Deaf and dumb	7	1
Progressive muscular dystrophy, with mental symptoms	1	0

All the cases which gave a positive serum reaction were subsequently very carefully examined with the object (1) of discovering any sign of syphilis which had been previously overlooked, and (2) of detecting any symptom or group of symptoms common to all the positive cases. Of the positive cases, one was subject to epileptiform convulsions and showed slight choreic movements, one had strabismus and nystagmus,

[1] Lippmann, *Münch. med. Wochenschr.*, 1909, lvi, p. 2416; *Deutsch. Zeitschr. f. Nervenheilk.*, Leipz., 1910, xxxix, p. 81.

[2] Dean, *Proc. Roy. Soc. Med.* 1910, iii (Neur. Sect.), p. 117.

one had a right-sided hemiplegia, one had spastic diplegia and conformed to the type of Little's disease, one was a deaf-mute, two were aphasic. Among the remaining cases I was unable to detect any evidence of a local lesion.

An examination was made of the cerebrospinal fluid from 12 cases which had given a positive serum reaction. In only one case was a positive reaction obtained. I also obtained for examination specimens of serum from the parents of 10 of the positive cases. The results were as follows:—

Patient	Age of patient	Result of examination of Father's serum	Result of examination of Mother's serum
B.	9	Positive	Positive
Har.	15	Not examined	Positive
Kr.	11	Positive	Positive
M.	11	Positive	Not examined
V.	13	Not examined	Positive
O.	11	Negative	Not examined
Sc.	16	Positive	Not examined
R.	12	Negative	Not examined
N.	9	Negative	Negative
He.	14	Not examined	Positive

Thus among 13 parents of children giving a positive reaction 9 were found to give a positive reaction. Six mothers were examined and 5 gave a positive reaction. Seven fathers were examined and in 4 cases a positive reaction was obtained. It will be noticed that in the above table in the case of the patient Har. a positive reaction was obtained at an interval of fifteen, and in the case of Sc. at an interval of sixteen years after the birth of a syphilitic child. The period during which a positive reaction may be obtained is known to be extremely variable in the case of the acquired form of the disease. In the congenital form it might be expected that the percentage of positive results would bear a close relation to the age of the patients examined. A grouping of the 330 cases according to age gives the following results:—

	Examined	Positive	Percentage of positive results
(1) Patients aged 10 and under (of these two only were less than five years old)	94	20	21·27
(2) Patients from 11 up to 15 years of age inclusive	142	24	16·9
(3) Patients from 16 to 20 years of age	66	4	6·06

Of patients aged from 21 to 30 years, 24 were examined, with 3 positive results. The remaining 8 patients ranged in age from 31 to 44 years, and all eight gave a negative reaction.

The above table appears to show that the percentage of positive results diminishes rapidly after the sixteenth year, and that a larger percentage of positive results might be expected from the examination

of a series of very young patients. In any case, the average age of the patients investigated must be regarded as an important factor in any estimation of the prevalence of congenital syphilis, and it seems to me possible that the very contradictory results already published may be reconciled by taking the age factor into consideration. Of the 51 cases in which a positive serum reaction was obtained, 7 only showed conclusive evidence of congenital syphilis from a clinical standpoint. In the remaining 44 cases a diagnosis of syphilis rested on the evidence of the serum test.

I had hoped that by a careful examination of those cases which had given a positive result to the serum test, it might be possible to detect some symptom or group of symptoms which was common to all. This I failed to do. Very few of the positive cases showed any evidence of a gross lesion in the central nervous system; and this, I think, is quite in accordance with what one might expect, for the gross changes in the brain which are known to be due to congenital syphilis are not compatible, as a rule, with a continuance of life. If a causal relationship exists between congenital syphilis and idiocy, the condition which arises may perhaps be classed as parasyphilitic. The absence of the ordinary signs of congenital syphilis in idiocy is closely paralleled in the already authenticated parasyphilitic diseases. It is, of course, well known that tabes and general paralysis commonly occur in patients where the early symptoms of syphilis have been mild, or even unnoticed. Among the cases of the juvenile form of general paralysis, collected by Mott (1909) [1] quite half were found to show no sign of congenital syphilis, but nevertheless to have been born of syphilitic parents and to have brothers and sisters who exhibited the ordinary signs of the disease.

It seems to me reasonable to think that many cases of idiocy should be classed with that form of syphilis which manifests itself alone by a selective toxic action on the elements of the central nervous system. I do not wish to attach an exaggerated importance to the results of the examination of the serum in one series of cases, but when it can be shown that a considerable percentage of idiots afford evidence of a syphilitic infection, and since it is well known that the virus of syphilis is capable of exercising a selective action on the central nervous system in cases in which there is no other evidence of the disease, I think it is not unreasonable to infer a causal relation between the two conditions.

Further evidence has been published by Atwood (1911) [2] who

[1] Mott, *Arch. of Neur. and Psychiatr.*, 1909, iv, pp. 13-23.

[2] Atwood, *Journ. Amer. Med. Assoc.*, Chicago, 1910, lv, p. 464.

examined 204 cases in America. A positive result was obtained by Noguchi's method in 30 cases (14·7 per cent.). The results of an examination of three cases which gave positive reactions were published by Bellingham Smith and Woodforde (1911),[1] and Chislett (1911)[2] examined 14 idiots, 8 of whom gave a positive and 6 a negative reaction. Chislett also records the results of an examination of an entire family. The father had general paralysis of the insane, and the Wassermann reaction was positive. The mother had no knowledge of the occurrence of any primary or secondary symptoms. She had had a tertiary ulcer on the left leg eight years after marriage. The eldest son, aged 16, was said to have been "very nervous and stupid at school." He showed no sign of syphilis, but gave a positive reaction. A girl, aged 12, was deaf in one ear, but otherwise normal; her serum gave a positive reaction. A girl, aged 10, gave a negative reaction, and appeared to be quite normal. A boy, aged 8, had rhinitis and conjunctivitis, and gave a positive reaction. The two youngest children, aged 6 and 4 respectively, were healthy and gave a negative reaction.

Knöpfelmacher and Schwalbe (1912)[3] examined 29 cases of hydrocephalus, 8 of which gave a positive reaction.

The results obtained in Denmark by Thomsen, Boas, Hjort and Leschly (1911)[4] were very different. These workers examined 2,061 feeble-minded persons, of whom only 31 (1·5 per cent.) gave a positive reaction. On the other hand, E. Krober (1911)[5] examined 262 idiots in the Hephata Asylum at Gladbach, and obtained a positive reaction in 21·4 per cent.

Although the results obtained by different workers in different countries are not in entire agreement, sufficient evidence has accumulated to make it appear extremely probable that congenital syphilis is an extremely important cause of mental deficiency. It must be remembered that the majority of idiots who give a positive Wassermann reaction show no other sign of syphilis. They are, in fact, cases of latent syphilis, and we are aware that, during the latent stages of the acquired disease only some 40 to 50 per cent. of the patients give a positive reaction. I am therefore inclined to think that the actual percentage of positive results obtained by examining a series of idiots

[1] Bellingham Smith and Woodforde, *Proc. Roy. Soc. Med.*, 1911, iv (Child. Sect.), p. 166.
[2] Chislett, *Journ. Ment. Sci.*, 1911, lvii, p. 499.
[3] Knöpfelmacher u. Schwalbe, *Zeitschr. f. Kinderheilk.*, 1912, iii, p. 428.
[4] Thomsen, Boas, Hjort u. Leschly, *Berl. klin. Wochenschr.*, 1911, xlviii, p. 891.
[5] E. Krober, *Med. Klin.*, Wien, 1911, vii, p. 1239.

by the serum test comes very far short of the number which are actually infected. If this assumption is correct we shall have to recognize syphilis as the causative factor in a very considerable percentage of cases of idiocy. The problem appears to me to be worth further effort, and an examination of another large series of cases could hardly fail to afford interest. Particularly valuable information would doubtless be forthcoming if it were found possible to make an examination of all the members of a family in which a case of idiocy had occurred. In any case, the results which I obtained in Berlin show that it is desirable to examine the blood serum at the earliest possible age. The low percentage of positive cases obtained by some workers must in all probability be attributed to the fact that a large number of adult patients have been included in their results. I am inclined to think that an examination of a series of very young patients will give a very high percentage of positive results. Additional and valuable evidence will no doubt be obtained if it is found possible to include an examination of the blood of the parents.

We may classify the cases in which congenital syphilis is the cause of disease of the nervous system into three groups:—

(1) The first group includes infants who are born with marked evidence of syphilis. In these cases the brain, together with other organs of the body, is the seat of marked change. These children, as a rule, die within a short time of their birth.

(2) This group includes children who appear to be healthy at birth but who develop mental defects at the time of the second dentition or at puberty. To this group belong the cases of juvenile general paralysis.

(3) In this group may be placed those cases of mental deficiency, imbecility and idiocy, in many of which the Wassermann reaction constitutes the sole evidence of a syphilitic origin.

It is well known that in many cases the syphilitic virus appears to exert a selective toxic action on the central nervous system, and we might expect this toxic action to exert its influence most injuriously during that period when the brain, the most highly specialized organ of the body, is undergoing development.

Syphilis is a widespread disease, and as former speakers in this debate have pointed out, there is no reason for supposing that its prevalence is on the wane. On the other hand, there is a very general belief that the type of the disease is changing. While the more obvious and gross manifestations of the disease are less often seen there is

reason to think that parasyphilitic disease is increasing. The connexion between syphilis and general paralysis of the insane has been established. Is it not reasonable to think that further research may establish a connexion between syphilis and other diseases, which at the present time are not suspected of a syphilitic origin? The remote effects of syphilis may be even more numerous than we suppose. Organs other than the brain and spinal cord may be the seat of parasyphilitic disease. The Wassermann reaction affords a method by which this problem can be attacked, but it is obvious that results obtained by the serum test must be subjected to rigorous criticism. The occurrence of a positive Wassermann reaction in any one patient is in itself no proof that the condition which it is desired to investigate has been caused by syphilis. The presence of a syphilitic infection in such a case may be a mere coincidence. It is only after a very large number of cases have been investigated that the coincidence of a certain group of symptoms with a positive Wassermann reaction can justify us in forming an opinion. Such an investigation must be carried out on a large scale, for the examination of a very large number of patients is a necessary step to obtaining the required statistics. A commencement has been made, and the results obtained by the examination of patients with aortic disease may be here quoted.

Donath (1909)[1] examined 27 cases of aortic insufficiency, aortitis and aneurysm of the aorta; a positive serum reaction was obtained in 85 per cent. of the cases.

Brückner and Galasesco (1910)[2] obtained a positive reaction in 17 of 22 cases of aortic regurgitation.

Longcope (1910)[3] obtained a positive reaction in 18 of 22 cases of aortic regurgitation.

These results are perhaps sufficient to show the possibilities of a systematic use of the serum test. The cases examined have, however, been too few for the results to be of real value, and in the majority of instances only those patients have been examined in whom a suspicion of syphilis was entertained.

An inquiry on broader lines is needed, and such an investigation should include the examination of cases in which syphilis is not suspected. By such means it might prove possible to enlarge our knowledge of the

[1] Donath, *Berl. klin. Wochenschr.*, 1909, xlvi, p. 2015.

[2] Brückner and Galesesco, *Compt. rend. Soc. de Biol.*, Par., 1910, lxviii, p. 74.

[3] Longcope, *Bull. Ayer Clin. Lab.*, Philad., No. 6, p. 60.

pathological changes produced by syphilis. An investigation on these lines has been undertaken by Churchill (1912)[1] who has examined 102 infants and children, patients at a children's hospital in America. A positive Wassermann reaction was obtained in no fewer than 39 cases.

As regards the treatment of congenital syphilis, it is obviously desirable that it should be commenced at the earliest possible moment. The serum test affords a means of early diagnosis and leads to the treatment of children in whom the disease is latent during the early years of life. Valuable information can without doubt be obtained by examining the blood of the mother during pregnancy.

Knöpfelmacher and Lehndorff (1910),[2] who have devoted particular attention to this subject, have examined 135 mothers of syphilitic children and have obtained a positive result in 65·2 per cent. Of these 135 mothers 31 only showed definite signs of syphilis, while in the remaining 104 a diagnosis was only possible as a result of the serum test.

Stroscher (1910)[3] obtained a positive result in 100 per cent. of the mothers of syphilitic children.

Mulzer and Michaelis (1910)[4] found that 96 per cent. of infants with manifest congenital syphilis gave a positive Wassermann reaction, while children with latent syphilis react like adults in the early latent period. They also found that 83 per cent. of mothers of syphilitic children gave a positive reaction.

In an earlier paper Knöpfelmacher and Lehndorff (1909)[5] reported two cases in which women after a series of syphilitic children gave birth to healthy children who in both cases were found to give a positive Wassermann reaction. Such cases must be regarded as cases of latent congenital syphilis, and it is in such cases that the use of the serum test should have a special value in leading to early treatment.

Bimfel (1909)[6] examined the blood of 230 mothers. Each case was examined at least twice during pregnancy and once during the puerperium. Among 21 cases in which there was a suspicion of syphilis a positive result was obtained in 13 and a negative result in 8 cases. Eleven of the women who reacted positively gave birth to three children

[1] Churchill, *Amer. Journ. Dis. Child.*, Chicago, 1912, iii, p. 363.

[2] Knöpfelmacher u. Lehndorff, *Jahrb. f. Kinderheilk.*, Berl., 1910, lxxi, p. 156.

[3] Stroscher, *Derm. Zeitschr.*, Wiesb., 1910, xvii, p. 485.

[4] Mulzer u. Michaelis, *Berl. klin. Wochenschr.*, 1910, p. 1402.

[5] Knöpfelmacher u. Lehndorff, *Med. Klin.*, Wien, 1909, v, p. 1506.

[6] Bimfel, *Wien. klin. Wochenschr.*, 1909, No. 36, p. 1230.

with symptoms of syphilis (serum reaction positive) and eight children without symptoms (serum reaction negative). Eight cases of secondary syphilis were examined, and a positive result both in mother and child obtained in 7. Of 9 cases of latent syphilis all gave a positive reaction; in six of the children a positive reaction was obtained, in two a partial reaction.

If it can be established that congenital syphilis is a frequent cause of idiocy it is reasonable to hope that very great success will follow the application of therapeutic and prophylactic measures.

We now possess in the Wassermann reaction a means of diagnosis which enables us to detect syphilis in cases in which it cannot be recognized by any other method. Wassermann has suggested that the serum test should be applied to every woman who is admitted to a lying-in hospital. When we consider the numerous cases in which syphilis is quite unsuspected we must admit the value of his suggestion. If a positive reaction was obtained, treatment of the mother would be commenced at once, and treatment of the child might begin from the earliest possible time after its birth. It can hardly be doubted that benefit would follow from the wholesale adoption of such measures.

Mr. John H. Dauber: I should like first to refer shortly to Mr. Jonathan Hutchinson's suggestion that Shakespeare was himself the subject of syphilis, because no previous speaker has touched on this subject, although few of us, I hope, will accept Mr. Hutchinson's view. The evidence he adduces is so slender as not to warrant, in my opinion, such a suggestion. That Shakespeare paints with a master hand a picture of syphilis signifies nothing, because in other plays he has depicted with equal force and accuracy certain mental diseases—e.g., Melancholia in "Hamlet," Senile Dementia in "King Lear," Monomania in "Macbeth," as Dr. Foster Palmer has so ably pointed out in his interesting monographs on these plays. Shakespeare did not himself suffer from all the vices or diseases he portrays. As to Sir William Davenant being the illegitimate son of Shakespeare, rumour is not proof. Many a man lays claim to a parentage he has no right to. As a general rule men do not stand as godfathers to their illegitimate children; they keep in the background. "King Lear" was a late play certainly, but the character of Cordelia was penned by no misogynist. The women of the late plays come out strong for good or evil. It has been said that specialists see their specialism in everything and everybody. It has been left to Mr. Hutchinson to see even in Shakespeare himself a case of his own speciality.

This afternoon has been set aside for the discussion of "Syphilis in its Relation to Public Health." I am venturing to speak in the hope of inducing the Society to share my view, or rather my strong conviction, that owing to the recent discoveries in the field of syphilis the time has arrived when we, as a profession, should once again take action, and ask the Legislature to assist us in our campaign against syphilis, by placing infected persons under some sort of direction, restraint and tutelage, in order to check the spread of the disease. Several of the previous speakers have expressed a similar opinion that, if we are to deal successfully with syphilis in the future, our hope lies more in the efficacy of preventive than curative measures. You will remember the following lines in Southey's poem on the "Battle of Blenheim":—

> "'But what good came of it at last?'
> Quoth little Peterkin.
> 'Why, that I cannot tell,' said he;
> 'But 'twas a famous victory.'"

It would be a great pity, in my opinion, if this discussion, now drawing to a close, should be, like the battle of Blenheim, barren of practical results instead of being converted into useful action. I venture to suggest that if our profession is content to employ its energies solely in the cure of individual cases, instead of adopting a strong line having for its objective nothing less than the prevention of the spread of syphilis and the eventual stamping out of the disease, it will make the greatest mistake and will not be doing justice either to itself or to the public.

In malarious countries medical men are no longer satisfied with treating individual cases of malaria; their main object is prevention, not cure, they try to get to the source of the disease, by rendering it as difficult as possible for the Anopheles to multiply by destroying its breeding places. In England syphilitic prostitutes wander free and unfettered. If we allow the seed of syphilis to be sown broadcast we must expect a plentiful crop of syphilitic disease.

The opinion is often expressed amongst the laity that the medical profession keeps its knowledge too much to itself and that it should instruct the public more than it does at present. It seems to me it is our bounden duty now to speak out boldly and insist that the public know the truth about this question. Then the responsibility will rest with them; at present it rests with us if we do not enlighten them. We can try to get public opinion on our side by saying to them: Here is a disease conveyed from one to another through any contact infection

by a definite micro-organism, highly contagious when introduced by any means into the blood, lymphatics, or tissues. With the exception of cancer it is the most dreaded disease under the sun, and in one respect it is worse than cancer, being transmitted direct from parent to offspring. It is a disease often most difficult to eradicate from the system when once acquired, sometimes needing years of prolonged and careful treatment. Elaborate laboratory tests are necessary at frequent intervals to determine whether the patient is cured. It is productive of the most widespread mischief when well established, sometimes never leaving the patient till it kills him after years of misery. In its later phases, when the nervous system is attacked, it is practically incurable. It often predisposes to cancer, but on the other hand it is, unlike cancer, a preventable disease.

In this country the Legislature generally moves in response to public opinion. Men will deliver themselves from any tyranny when they have learnt to hate it sufficiently. We must teach them so to hate the tyranny of syphilis that they will rid the country of it. Our forefathers in the Middle Ages stamped out leprosy. Future generations of men would for ever bless us if in our time we could succeed in stamping out syphilis. When men are in earnest most things are possible. Within the last few years we have ourselves seen that wise legislation has completely exterminated hydrophobia. The medical profession, unaided by the Legislature, could never have accomplished even this result. The State lends its assistance to us in the treatment of many diseases. The acutely infectious diseases come under its control. The treatment of insanity is regulated by the State, and it is now the earnest conviction of many that the State should assume some control over patients suffering from syphilis. Quite recently the Legislature has seen the importance of dealing with tuberculosis, and has made it compulsorily notifiable. It is a punishable offence now to expectorate promiscuously in public places—an action only, under certain circumstances, of danger to the public—and it is most noticeable how this objectionable habit has diminished everywhere as the result more of direction than compulsion. Yet syphilitic men or women may disseminate syphilis without the slightest check being placed by law upon their action. Germany has already taken a strong line in this direction of prevention. Persons may not marry in that country within ten years of acquiring syphilis, and within the next twelve months a law will come into force making it a criminal offence under heavy penalties for a syphilitic man or woman to knowingly infect a healthy person,

while in the German army and navy, as is well known to all of us, complete and ample instruction as to the prevention of venereal disease is systematically given, and every means taken by the authorities to arrest or limit its spread. In this country, at the present moment, there is an entire absence of all legislation on the subject, and our powers as medical men are therefore exceedingly limited. We can only deal with those individual cases which come before our notice. We can do nothing unless aided by the Legislature to check the spread of the disease.

At my hospital (the Hospital for Women, Soho Square) most of the cases of venereal disease that come before me are those of innocent women who have been infected by their husbands. These women, in my opinion, need some protection. When a woman marries she is aware that she runs certain risks at childbirth and during and after pregnancy, but it is not part of her bargain to run the risk of being infected by venereal disease. It may wreck her life or produce life-long disability. This should not be asked of her.

If syphilis were to become a notifiable disease some restraint could be placed upon the actions of syphilitic patients under legal penalties. It ought to be a felony for a person knowing him or herself to be syphilitic and capable of infecting another, to communicate the disease to an innocent person. It is a common saying that health is superior to wealth, but how different are the laws for the protection of health to those for the protection of property! "Salus populi suprema lex" was the old Roman maxim. May it in time become ours; it is not now. Syphilis might be banished altogether if the country were once convinced that it was an unnecessary scourge. If it determined to exterminate it, it could do so—

> "With caution judge of possibility:
> Things thought unlikely, e'en impossible
> Experience often shows us to be true."

Are we as a profession to be satisfied with our present limited powers? This is the question, to my mind, before us. At present we are somewhat like firemen called in to extinguish a conflagration, which as fast as we put it out in one direction is being continually rekindled by others in another, so that but little progress is made and the flames continue to spread. In my opinion we should apply to the Legislature to stop these incendiaries over whom at present we have no control, otherwise our work is almost useless. It seems to me that the medical profession will resemble Nero, who fiddled while Rome was burning,

if it contents itself with merely discussing the dosage of salvarsan, or the merits of a special hypodermic mercurial cream, while refusing to touch the great question of the prevention of the spread of the disease.

If the public dislike the words "venereal," "syphilitic," and so on, let us rechristen the disease altogether and start afresh. Are our hands to be tied in dealing with this disease because it usually first attacks the generative organs? The continuity of the race depends upon the integrity of these organs and they exercise an all-powerful influence over our lives. Certain sections of the community regard illicit sexual intercourse with more bitter hatred than they do many actual crimes and felonies. The puritanical party have such a horror of any sort of "Contagious Diseases Act," which they persist in considering as equivalent to the "State regulation of vice," that they would apparently rather see the innocent punished with the guilty than that the guilty should go unpunished. They consider that venereal disease is the appropriate punishment for sexual vice, that it is a great check upon sexual immorality, and that it would be the greatest mistake to remove it. The idea that illicit sexual coitus should be indulged in with impunity is repugnant to these people as contravening their own self-made ideas of justice. It is not uncommon for frail human beings to attempt to father upon Providence their own crude notions of morality, justice, and punishment, but if we are to arrogate to ourselves an intuitive knowledge of Divine ordinances, all scientific and social progress is impossible. We may just as well fold our hands and cease to endeavour to ameliorate the conditions of life. It is not by these methods that malaria, the plague, yellow fever, and other fell diseases have been combated. If we can induce these people to abandon all preconceived ideas and preformed judgments and look at this matter in an unbiased, practical and scientific manner, as if this world and our happiness in it were the "be-all and end-all" of all human activities, then we may perhaps convince them that their attitude is anti-social and detrimental to the common health.

The old Contagious Diseases Act failed because it dealt with one sex only. Too much power was given to the police, there was perhaps some petty tyranny, the Act fell into bad odour, and in London at least the results were felt to be disappointing; but that the Act was of great public utility in many of our seaport towns and abroad few will deny, and its repeal was strongly opposed by all who had seen its beneficial effects amongst our soldiers and sailors.

Most of us know the conditions that prevail abroad. Take Brussels, for example. Habitual prostitutes are compelled to become écartées;

they have a police licence which they must produce on demand to a police officer. This card shows when they were last medically examined, if they are healthy, and the district to which they must confine themselves. But as only the regular prostitutes are certified, and the disease is not notifiable, and the male sex is exempt from compulsory inspection, it is doubtful if Brussels is freer from syphilis than London.

I would urge that infected men must be under compulsory medical treatment, as well as infected women. Neither sex should have preference or privilege. The Suffragettes might see to this. Both sexes whilst infective must submit to preventive treatment.

The first step we can take is to demand that syphilis shall no longer be exempt from the action of the Infectious Diseases Notification Act. I fail to see why the disease should receive preferential treatment and especial favour. But we must, as a profession, be unanimous in our demand. It will avail nothing if we approach the Legislature with divided counsels. A resolution that syphilis should become a notifiable disease was passed unanimously at the beginning of last year by one of the local medical societies in the south-west of London. A short while ago I was invited to attend a meeting of the Society of Medical Officers of Health for the Metropolis, and the opinion prevailed there that to deal effectively with the prevention of syphilis some form of notification must come into force. In the Westminster Division of the British Medical Association this subject has been under discussion by the Council, but owing to pressure of work in connexion with the National Insurance Act it has been temporarily postponed, but Dr. Allan, ex-President of the Division and Medical Officer of Health, induced the Westminster City Council to apply last year to the Local Government Board for permission to supply the Wassermann reaction gratuitously to all medical men in the district applying for it. To this request the Local Government has not yet replied. I instance these facts to show that there is considerable activity already in this direction. Major French, R.A.M.C., spoke to the Royal Society of Medicine last month of the incalculable benefits conferred upon our Forces in India by the Cantonment Act of 1897, and of the success in the control of syphilis in Egypt and Malta by disciplinary enactments. Parenthetically let me say that I should like to see the convincing paper he then read to the Society in the hands of every adult man and woman in the country. There is already a large body of medical opinion in favour of notification.

"Many strokes, tho' with a little axe,
Hew down and fell the hardest timbered oak."

We may overcome prejudice and self-complacency if we are persevering enough. I would suggest, if notification were made compulsory, some such procedure as the following: After notification to the medical officer of health the latter would send notice to the patient as to the steps he (or she) must take to avoid infecting others and to get rid of the disease himself. The patient would be told he must carry out the prescribed medical directions, otherwise he would be liable to penalties; and in the case of a prostitute she would be removed and detained. If a husband or wife had acquired syphilis, it would be the duty of the medical officer of health to warn the infected party that if he or she communicated the disease to the other such action would be punishable; it might even be advisable to warn the uninfected party so that coitus with an infected person might be avoided. It is obviously most important that child-bearing women should not be infected. Cards showing attendance at the hands of a medical man or hospital would have to be produced, and only in the case of obstinacy and blank refusal to carry out medical directions would a police summons be issued, and even then there need be no publicity. Few people resent genuine attempts to benefit them, and medical men could do more by explanation and sympathy than officialism by coercion. It is to be remembered that even a prostitute does not like syphilis, any more than a sailor likes shipwreck. Both are risks incidental to their respective callings.

Major Harrison, R.A.M.C., who has had much experience in the working of the Cantonment Code in India, is insistent upon the fact that this matter of the control and direction of prostitutes must be in the hands of tactful medical officers, rather than of the police. Coercion would be kept in the background as a last resort. Persuasion and argument would be our chief weapons. If sexual immorality there must be, let it at least be a clean immorality, untainted by foul disease which will fall as often as not upon the innocent. Syphilis is already notifiable in Sweden, a country ever in the van of human endeavour and enlightenment, and at the present time notification is on its trial in some parts of Australia. In New York some tentative steps in the same direction are in contemplation, if not already in effect. Is it not right that we in this country should bestir ourselves also? Self-complacency is our besetting sin. Above all things, we hate to have our comfort disturbed. Inaction is always easier than action. But for some of us it is not enough to be told that the difficulties in the way of notification of this disease are insuperable. There are some men, and

alas, too many, who can always see "lions in the path," who almost go out of their way to look for them. The same objections were raised before the passing of the present Infectious Diseases Notification Act. It was declared that "people would never stand it," and much more was said to the same effect. But if the country is convinced that the existence of syphilis is detrimental in the highest degree to its health and happiness it will submit to some discipline and control in the treatment of this disease as of others.

The exact method of procedure following upon the notification of a case of syphilis to the medical officer of health or other approved medical authority would be a subject for future consideration, and much could be learnt from countries where notification is already in force and from our own military medical men in India, Malta and Egypt.

Let us call to mind the fact that little more that 400 years ago syphilis was unknown in England. It is relatively a recent scourge. At present it is rather the fashion to celebrate centenaries. We must see to it that syphilis does not celebrate another centenary in this country. If we can but induce the Legislature to make the disease notifiable we shall, I think, have driven the first nail into the coffin of syphilis.

Dr. J. P. Candler: In connexion with the present discussion on syphilis, I wish to put before this meeting the results of our experience of the Wassermann test on the blood and cerebrospinal fluid of cases of general paralysis of the insane and to offer some remarks on the value of the test with regard to general paralysis and syphilis. The work has been carried out in the Pathological Laboratory of the London County Asylums in collaboration with Mr. Mann, Dr. Mott's chemical assistant, and as Dr. Mott mentioned on the first day of the discussion (p. 83), we have had the opportunity of examining the cerebrospinal fluid of a large number of cases by this test. Already over 100 of these cases have died, and the result of the Wassermann reaction has been confirmed by autopsy, and microscopical investigation when necessary, in 97 per cent. Our percentage of positive reactions in general paralysis agrees very closely with those obtained by others whose findings have been generally accepted as correct.

Examination of the Blood Serum in General Paralysis.

We have lately directed our attention to the examination of the blood serum, as well as the cerebrospinal fluid of cases of general paralysis. We have done so because the serum reaction is of great

importance from the point of view of diagnosis, and because there appears to be considerable difference of opinion as to the percentage of positive results obtained with these cases. Plaut has obtained a positive reaction on the blood serum of general paralysis in 99 per cent. Boas examined the blood serum of 139 cases and obtained a positive result in *every* one. The experience of Carl Browning and Mackenzie is that the blood gives a positive result in 96 per cent., while other observers have only obtained positive reactions in 60 to 70 per cent. of the cases. We have examined the serum as well as the cerebrospinal fluid in 109 cases of general paralysis. The cerebrospinal fluids were sent up from the various asylums for diagnosis, and in all cases which gave the slightest positive result the serum was also examined. The results are in accordance with subsequent clinical diagnosis and in some cases have been confirmed by autopsy.

The results obtained may be summarized as follows: Number of cases examined, 109; number of positive results with cerebrospinal fluid, 109; number with serum, 107. The number of cases giving a positive result on the cerebrospinal fluid includes two cases, B. and E., which gave a slightly positive result on the cerebrospinal fluid when first tested; this positive result, however, was not obtained on subsequent examination. One of these patients, E., has since died, and the case has been shown microscopically to be one of general paralysis. The number of cases giving a positive result on the serum include five cases, G., S., H., T., and C., which on first examination gave a negative result, but which on subsequent examinations gave positive reactions. *Altogether, a positive reaction on the serum in general paralysis was obtained in* 107 *cases out of* 109—*i.e.*, 98·1 *per cent.;* but if we deduct the five cases in which the serum at one time gave a negative result the percentage incidence of positive cases is 93·6 per cent. There are certain points in the reactions obtained in these cases to which we wish to draw attention. The cases which call for mention are seven in number:—

(I) G., male. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result	Date	Serum result
May 17, 1911 ...	+ ...	+ marked	December 29, 1911 ...	−
,, 2, 1912 ...	+ ...	+ ,,	June 3, 1912 ...	+ moderate
June 3, ,, ...	+ ...	+ ,,		

(II) S., male. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result	Date	Serum result
November 10, 1911 ...	+ ...	+ marked	February 2, 1912 ...	−
			May 22, ,, ...	+ marked

(III) H., male. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result
June 15, 1911 ...	+ ...	+ marked
February 24, 1912 ...	+ ...	+ ,,

Date	Serum result
February 10, 1912 ...	−
,, 24, ,, ...	−
(Prevention starting with slightly increased dose)	

(IV) I., male. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result
June 26, 1912 ...	+ ...	+ marked

Date	Serum result
February 24, 1912 ...	−
June 26, ,, ...	+ marked

(V) C., male. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result
June 20, 1912 ...	+ ...	+ marked

Date	Serum result
February 24, 1912 ...	−
June 20, ,, ...	+ marked

(VI) B., female. Clinical diagnosis: General paralysis of the insane.

Date	Cells	Cerebrospinal fluid result
December 14, 1911 ...	+ ? ...	+ slight
May 10, 1912 ...	+ ? ...	−

Date	Serum result
December 29, 1911 ...	−

(VII) E., male. General paralysis of the insane confirmed by autopsy and microscope.

Date	Cells	Cerebrospinal fluid result
August 21, 1911 ...	+ ? ...	+ slight
February 24, 1912 ...	+ ? ...	−

Date	Serum result
February 10, 1912 ...	−
,, 24, ,, ...	−

All the cases in which the serum gave a negative result were given special attention and the tests were repeated after further inactivation and the use of increasing doses of serum (in some cases up to twice the usual amount) but with a similar negative result, except in the case of H., in which some degree of inhibition was observed when a slightly larger dose of serum than usually employed was used in the test. The cases recorded appear to be divisible into two classes: (1) Cases I to V, in which with a strongly reacting cerebrospinal fluid a variable result was obtained with the serum; (2) Cases VI and VII, where with a feeble and disappearing reaction with the cerebrospinal fluid there was associated a negative result with the serum. We do not propose to attempt to explain the reason for the reaction changes which we have described, but we wish to point out that, according to our findings, not only may both the serum and the cerebrospinal fluid in a small

percentage of cases of undoubted general paralysis of the insane fail to give the reaction, but that the reaction may be negative at one period and positive at another in the same individual, and that this phenomenon is rather more likely in our opinion to occur with the serum than with the cerebrospinal fluid. We do not agree with the statement that the blood serum of *every* case of general paralysis will give a positive result, and further we are of the opinion that in cases of suspected general paralysis in which a negative reaction is met with in either fluid it is advisable to repeat the test subsequently on one or more occasions. Plaut has stated that he has met with all grades of intensity in positive reactions with the fluids in general paralysis. We particularly wish to emphasize this statement. We have found that as a general rule both fluids give a well-marked and intense reaction, which can be easily detected by a simple qualitative Wassermann test; but in some cases of general paralysis, which were confirmed by post-mortem examination, the reaction was quite slight. It is this type of case which it is most important to recognize, and which will be missed if the technique is not accurate and the reagents accurately standardized. We wish, therefore, to make a few remarks upon the test with regard to the various causes which may lead to inaccuracy.

All our own observations have been made by a method which follows very closely the original plan adopted by Wassermann. Every precaution has been taken to standardize repeatedly all the reagents used in the test, and to adopt a system of controls to guard against every possible source of error. The same liver extract has been used throughout the whole of the work and the same technique adopted in every examination. We have estimated our results by a quantitative determination of the amount of complement-deviating properties of the serum and cerebrospinal fluid in every case examined; we have never relied on a simple qualitative test. The blood to be tested was always withdrawn from a vein, the serum was removed from the clot as soon as possible and inactivated at once. The cerebrospinal fluid was centrifuged before the test was performed, in order to remove all solid particles. Sheep or ox corpuscles were used with their appropriate hæmolysin and guinea-pig serum for complement. The antigen used was an alcoholic extract of the liver of a syphilitic fœtus which had been prepared by special methods. This extract is exceedingly good and reliable and has been supplied to other workers, who have also reported very favourably on its efficiency.

We are therefore convinced that the negative results we obtained in

cases of general paralysis were correct interpretations of the reaction. The two errors to be avoided are: (1) the return of a negative serum as positive, and (2) the return of a positive serum as negative. The first source of error can easily be avoided provided a proper test is used and adequate controls arranged; the amount of complement absorbed by the serum in the presence of extract accurately arranged; and an extract used whose antigenic and anticomplementary values are satisfactory. The other source of error may be far more difficult to avoid, and the cause rests mainly with the extract. Now as we have previously stated, the majority of sera and cerebrospinal fluids in general paralysis and the sera in well-marked cases of syphilis will give a satisfactory reaction by a simple qualitative test and with a moderately indifferent extract. But the cases which give the trouble are the feebly reacting sera and cerebrospinal fluids in cases of general paralysis and latent syphilis; further, in cases of active syphilis under treatment with salvarsan it is most essential to be able to determine precisely whether the patient's serum is showing the slightest amount of retardation, which is an indication for further treatment. Our experience with syphilitic sera is not so great as with general paralysis, nevertheless, we have met with instances of returning feeble reactions which are of great significance to the physician. One of the most important observations which Plaut has made deals with the inability of certain aqueous extracts to bring out a positive result in every case where it is possible of detection. Fortune has favoured us with a valuable extract, but our own experience leads us to believe that the low percentage of positive results obtained by some observers may be almost solely due to the use of unsuitable extracts. We have been fortunate in obtaining a fairly abundant supply of livers from presumably syphilitic fœtuses. Special care has been given to the preparation of alcoholic extracts, and although the majority of them act well as antigens in showing marked reactions, comparatively few are efficient in showing the moderate or slight reactions which are often met with in the serum and cerebrospinal fluids.

To make sure that an extract is an efficient antigen it is necessary to test it side by side with a standard extract, using several fluids which are known to give weak reactions with the standard extract. Every extract should be rejected which fails to react with weakly reacting fluids. It is therefore necessary to preserve and carbolize as many weakly reacting fluids as it is possible to obtain for the purpose of testing these extracts. Further, it is essential to note that the value of an extract cannot be definitely settled by testing it against a good

reacting serum or cerebrospinal fluid which has been diluted down with saline, for with this it may give a positive result, whereas it may still fail to show up a naturally weakly reacting fluid.

In our opinion a suitable alcoholic extract prepared from the liver of a syphilitic fœtus will give as good results as any other form of extract, but livers of syphilitic fœtuses are not abundant, and further, extracts made from many of these are quite useless, probably from changes due to decomposition products. We believe that good extracts can be obtained from freshly prepared animal tissues, and Browning and MacKenzie speak most favourably of a mixture of lecithin and cholesterol, but of these we have not had sufficient practical experience. We consider the preparation of suitable extracts most important for the success of the reaction.

It is becoming more and more evident that the Wassermann test is going to play a most important part in the identification and treatment of syphilis, and it is absolutely necessary to have the test put upon a proper basis whereby an accurate report on slightly reacting fluids can be safely given. Many modifications of the test are employed in this country, some of which are undoubtedly useless, and there is a great variability in the relative amounts of the various materials used by different workers and also in the methods of estimating the reaction. It would be of great value if this Society were to investigate the whole subject, and by a consensus of expert opinion determine on the most suitable method with dosage for the performance of the test. Attempts should also be made to determine which is the best form of extract to use and how it should be prepared. The publication and universal adoption of *one* method would lead to more satisfactory results and to a greater respect of the value of the test than it has even won at present.

We have to acknowledge our indebtedness to the Medical Superintendents of the London County Asylums whose cases form the basis of this paper, and to the various medical officers who have kindly obtained the specimens for us; especially are we indebted in this direction to Dr. George Evans and Dr. Paine.

Dr. J. W. Barrett, C.M.G. (Melbourne): I thank you very much for the opportunity given me of addressing this meeting. Dr. Mott suggested my attendance because I am for the moment in the unique position of being one of the advisers of the Government of Victoria, and of having been with others responsible for the carrying out of some of the proposals which have been made this afternoon. We conducted,

with the aid of the Government of Victoria, and under the most able direction of Dr. Burnett Ham, Chairman of the Board of Health, a most extensive experiment in regard to the distribution of syphilis. At its conclusion the Government inquired in effect: "What do you now advise us to do?" We were thus put in a position of responsibility, and we found that it is much easier to make suggestions than it is to put the proposals into operation, even when you are given a reasonably free hand. Dr. Mott suggested I should come and give you an account of what was a remarkable experiment. But before doing so I should like briefly to refer to the paper of Dr. Mott, with which, as far as my knowledge goes, I am in complete general agreement. But none of the speakers referred to the Noguchi reaction for syphilis, which was devised at the Rockefeller Institute, New York, and may be seen in practice at the Sinai Hospital. It offers reasonable hope of providing a better means of detecting the presence of latent syphilis than the Wassermann reaction. The physician of the future when diagnosing syphilis will probably depend on the clinical evidence, the Wassermann reaction, and the Noguchi reaction. The Noguchi method is quite simple in technique, and I do not propose to take up your time with it. It will be better to indicate briefly the history of the experiment in Australia, which is recorded in the *Australian Medical Gazette* and *Australian Medical Journal*. But papers are apt to give to some extent the dry bones of a problem, and not the reasons which led to action. The position is, shortly, as follows: Professor Allen made post-mortems in the Melbourne Hospital, of two series of 100 patients each, who had died from all kinds of disease. He found that roughly one-third of the cases in each hundred showed evidence of syphilis; there was aortic atheroma, thickening of Glisson's capsule and the pia mater, and so forth. In my work in Victoria, in the Eye and Ear Hospital, the following position had been reached: Syphilis exists without any clinical manifestation whatsoever. Furthermore, a good deal of syphilis exists without clinical evidence other than various choroidal degenerations, and some of my colleagues had, in the course of fairly extensive practices, traced family development where syphilis was known to exist, and found in some members, say, one or two craters of choroiditis. With this evidence, when we found another case of choroiditis in which neither history or evidence of syphilis could be obtained, we still assumed that it was syphilitic. The position taken up by Professor Allen and ourselves was challenged. It was said: "The evidence is not conclusive; you must show that some other toxin will not produce these

results; you are confusing the issue." This argument became chronic, but with the access of information many practitioners came over to our side, particularly those dealing with children's diseases, and at the Australian Medical Congress of 1909 the following resolution was carried, after a prolonged and interesting discussion: "That syphilis is responsible for an enormous amount of damage to mankind, and that preventive and remedial measures directed against it are worthy of the utmost consideration." The resolution was presented to the Government of the day. Its presentation was followed by a deputation of clergy, who urged that something should be done. The Chairman of the Board of Health, Dr. Burnett Ham, was sent for by the Premier, who asked him whether the facts were really as stated, or whether he had to deal with syphilophobes. Dr. Ham wisely replied that he could not say, but if the Government would provide the necessary means he would make investigation by means of the Wassermann reaction, and obtain conclusive information. The proposal was accepted, and a Committee, including Professor Allen and a number of other medical men, including myself, was appointed to supervise the experiment. It was conducted as follows:—

From June 1, 1910, to May 31, 1911, syphilis was made compulsorily notifiable. Names were not furnished, but the age, sex and clinical conditions were supplied. And in each case blood was sent to the University, where Dr. Hiller made a Wassermann determination. The clinical evidence was thus correlated with the results. During that period also a number of children who died in the Children's Hospital were examined post mortem, and their blood sent to the University, and the two sets of records were compared, to ascertain whether gross lesions attributed to syphilis coincided with the positive reaction. The cases which were to be reported were primary, secondary or tertiary syphilitic lesions, all cases of thoracic aneurysm, aortic regurgitation, apoplexy in the young, locomotor ataxy, and general paralysis; also cases of congenital syphilis, cases where the mothers had frequently aborted, or where many deaths of children occurred in any family. During the year 5,500 Wassermann determinations were made, of which 900 were from the Melbourne General Hospital, 1,100 from the Eye and Ear Hospital and our own private work, and 3,500 from the general profession; 1,900 positive Wassermann reactions were obtained, which we interpreted broadly as meaning syphilis in 10 cases for every 6 positive results. We assumed, taking all classes of cases of this kind, that, on the average, 6 positive Wassermann reactions corresponded

to 10 cases of syphilis. At the Children's Hospital the evidence was conclusive, and determined the position taken up by Professor Allen. In my clinique—that of the Eye and Ear Hospital, which on Mondays and Thursdays included eye cases, and on Tuesdays and Fridays ear cases—we for one year gave ourselves over to the investigation of this matter. We had a staff of some eight or ten surgeons, whose energies were directed to the examination of doubtful cases, to the recording of the clinical symptoms, and to the correlation of the results. At the end of the first eight months there were 52 positive and 10 partially positive results amongst the eye cases. But by this time the area of suspicion had widened: for example, we began to regard many cases of neurasthenia as being based on a syphilitic background. So we waited on Dr. Ham and asked permission to conduct a still more extensive experiment. That permission was granted, and for the last four months of the year all patients who came to the Eye and Ear Hospital on Monday and Thursday and Tuesday and Friday had their blood examined, no matter what disease they suffered from. We were led to this position by facts of this kind: A patient came in with chaff in the eye. After removal of the chaff conjunctivitis set in and persistently remained. A determination of the blood of that patient was taken, and was found to be positive. A man came with a slight cut over the eye: the scar became indurated; the test was positive. A cataract was extracted, and after some days an inexplicable iritis set in; the determination proved positive. The accumulation of this class of fact led us to the opinion that probably many of these troubles were due to latent syphilis, syphilis of which there was no clinical evidence, and that the trauma probably excited a condition which otherwise would not have developed. During those last four months we examined 443 eye cases, and obtained 37 positive reactions and 27 partials. On the former showing this result indicates that in the first eight months we had missed a large number of cases of syphilis, for the corresponding figures for the eight months would have been somewhere about 74 positives and not 52, and 54 partials, not 10. So in a clinique of people who were alleged to be syphilophobes many cases were being missed on the clinical findings. Out of a total of 443 cases on Monday and Thursday there were 35 positive reactions and 23 partials, or a total of 13·2 per cent.; and in the clinique on Tuesday and Friday afternoons there were 107 cases with 9 positives and 8 partials, a total of 15 per cent. The bulk of those people showed no clinical evidence of syphilis.

We had made the nearest attempt we could to ascertaining the incidence of syphilis in the whole community. We regarded the positives and partials as the only evidence of syphilis, and adding nothing for those who failed to give the reaction. The one set of figures gave 13 per cent. and the other 15 per cent. We then reported these facts to the Government, with the additional statement from the staff of the Women's Hospital that half of their operative work was necessitated by gonorrhœa. The Government asked us what course we advised. We first enlisted, informally, the sympathy of the women in the community. The National Council of Women in Melbourne was approached by some medical men and asked to put an end to the practice on the part of educated women of pretending not to know what everybody knew they did know. They did not like the position, but they acted in the most dignified manner. The Council asked women practitioners to address the members on the subject, and to give them a balanced view of the position. After hearing the statement, the Council informed the Government that it would co-operate in any reasonable steps which might be taken to deal with the question of syphilis. As women possess the franchise in Australia this information was important. The next matter was to persuade the Press—the lay Press—to call syphilis by its proper name, and to avoid such expressions as "malignant contagious disease" or "a secret disease." The *Argus* newspaper, to its lasting credit, decided that the proper term would be used in future. The next problem, and the most difficult one, was to separate the moral from the medical, which is essential to the effective handling of venereal diseases. More than half the persons who suffer from venereal disease are not responsible for its acquisition; it is communicated to them by somebody else, in marriage or by inheritance; and if you allow the moral to be confused with the medical, the persons who are responsible with those who are not responsible get branded with the reproach of immorality. The effect is to send them away for secret treatment. There thus arises a false modesty which makes the position most difficult. An acute issue was shortly reached, because the Society for the Prevention of Organized Vice wanted some of us to join in their crusade. We informed the supporters that if their campaign was a moral one we would be glad to help in our individual capacities, but if it was understood that the Society wished to interfere with medical management we would rather they went their way and we went ours.

There appears in the discussion a statement that prostitution is due to poverty. Prostitution is not due to poverty, because in Australia there is no poverty, and I think that, approximately, there is the same

amount and kind of prostitution as in other countries. In Australia a woman can earn good wages at domestic service, and poverty does not cause her to follow this kind of life. Prostitution is due to the desire to get a living without giving the proper return for it; it represents a mental and moral aberration, and must be looked at from that point of view. No doubt in the old countries poverty may be a determining factor, but in a country where there is no poverty prostitution still exists.

Having advanced so far, what was to be the next step? We advised the Government that it should, at public expense, set aside a ward in the Women's Hospital and one in the Alfred Hospital, Melbourne, to which anybody could go as an indoor patient for treatment who was liable to communicate syphilis or gonorrhœa; that medical men should be circularized and invited to send in such patients. These patients would get past the stage at which they could communicate the disease as quickly as possible. Sensible advice could be given to them at the same time. After some difficulty the Government adopted that course. In New South Wales there is an Act providing that a criminal suffering from venereal disease need not be released until cured. That does not apply to persons punished by fine, but only to those who undergo imprisonment.

With regard to a Contagious Diseases Act I am not very enthusiastic, and, in any event, the attitude of the ladies in Melbourne would determine the matter, because they have intimated to us informally, but in the clearest possible language, that they will not contemplate any Contagious Diseases Act or any treatment of women which differs from that of men, and that if women are to be segregated because they are communicating disease, then the men who are communicating disease must be segregated as well. And of course that amounts to a *reductio ad absurdum*. If you have been in Yokohama and seen what happens there, you will realize the difficulty of doing anything of the kind. Men from the fleets of the different nations come ashore in varying numbers day after day and have intercourse with women; you could not control those men, and consequently the machinery would break down. I think, however, that the course followed in some countries is the right one—namely, that information be given regarding the means of preventing infection. This can be done by medical men who are employed by the brothels, and in other ways. I do not think the problem of morality is touched, one way or the other, by the question of infection. The world is not likely to be made more or less moral by allowing people to become syphilitic.

In outline, that is the position we have reached in Victoria. I do not know what the next step will be as I have been away for three months. We shall, however, endeavour to eradicate the disease. We hope, by an educational movement—in which women as well as men take part—to deal with it sensibly. Some of us think that syphilis is the principal cause of death before senility, that it underlies many infections and causes much disaster. And we have the specific evidence of the staff of the Women's Hospital that half their operative work is due to gonorrhœa. It is probable that if you eliminated syphilis and gonorrhœa—and such a result is quite possible—you would have, from the medical point of view, almost a new world to deal with. You have spoken of going to the British Government and asking that something shall be done. We are in the fortunate position of being able to speak about what we have tried; and as people who, having tried to take action, know the difficulties. Professor Allen is in Great Britain, and if you think of going to the Government he will, I am sure, be glad to go with you and, if it will be of any service at all, we can say what our experience has been. It is desirable, I think, to let the lay Press understand the problem and secure its co-operation by a clear and judicial statement of the facts.

The foregoing statement would be incomplete without the acknowledgment of the splendid manner in which the Victorian profession supported Dr. Ham's efforts, and of Dr. Hiller's devotion in the accurate conduct of the Wassermann determinations.

Dr. J. M. Bernstein said that his excuse for entering into the discussion on syphilis was that for many years he had been investigating the subject in as far as it came under his ken as a pathologist and a physician, and now that the diagnosis and treatment had come into the realm of science, syphilis had become part and parcel of the work of the scientific physician. Much of what he might have said had been already dealt with, and based upon more extensive statistics than he could have adduced. He had hoped that one small point would be left to him, but the last speaker, in his fascinating account of the investigation of syphilis without any signs, had taken even this crumb away from him; but he was pleased to have so strong a support.

Much light had been thrown on the prevalence of syphilis at the present time by the serological diagnosis. He had made a point of doing, himself, the Wassermann test, by the original method, on thirty to forty hospital cases weekly for some years, and had concluded that

many mysterious trains of symptoms seen in his own out-patient department were due to syphilis, and often on further investigation the patient could be made to remember an infection in early life.

There were cases, previously not diagnosable, of severe and constant headache in middle life, or vague pains in the spine, sometimes in fathers or mothers of large and healthy families. In these it was sometimes found that twenty or thirty years previously they had been infected with syphilis, but thought they were cured. In many cases with neurasthenic states, men who in middle life were losing their nerve, &c., a surprising number gave a positive result, and in many of them the symptoms disappeared under suitable antisyphilitic treatment.

With regard to congenital syphilis, he had had some considerable experience of this in connexion with the West London Hospital and some special hospitals. At the first of these hospitals for over two years he had examined the blood of infants who were clinically diagnosed by Dr. Saunders to have syphilis. To make the matter more complete, he had examined the blood of the parents, or one of them, and in most cases where the parent's blood could not be obtained the blood of some collateral member was examined. Over one hundred had been examined, and an enormous number of them had given a positive or partially positive result, which latter he regarded as establishing syphilis. In nearly all cases the mothers also gave a positive reaction, and where the child was under the influence of mercury the mother alone gave the reaction. In connexion with diseases of the eye, Mr. Bishop Harman, over eighteen months ago, investigated a large series of cases of children of 8 to 10 years of age suffering from interstitial keratitis, cyclitis, and other eye diseases, the serological work being done in his (Dr. Bernstein's) laboratory by Dr. Brunt, under his supervision. The results showed that a large number gave the positive reaction; all that were clinically syphilitic, and also those who were suggestively so, and a few in whom there was no reason to suspect syphilis. Sometimes there would be a history of three or four children being born blind or idiotic, and where their bloods were examined they gave a positive reaction, and that was so also in many where the disease was not even suspected. With Mr. MacLeod Yearsley he had more recently examined fifty children from the London County Council Schools for the Deaf, their blood being sent to him, and beyond which he knew nothing about the cases. Three or four only of those were positive. The figures would be published by Mr. Yearsley. From the Children's Hospital Mr. Addison had sent him specimens of the blood

of patients suffering from diseases of joints or of bones, the patients being between 3 and 11 years of age. Mr. Addison's original views as to the specific nature of those clinical manifestations had been supported. From Dr. Grainger Stewart's out-patient department he had culled a few cases of congenital tabes and congenital general paralysis of the insane, two of them in girls aged 15 and 17 respectively. They had given markedly positive reactions. In every case possible they had examined the blood of one or other of the parents, and found corroboration. Finally, he had had sent to him by Dr. Simson women who had miscarried time after time, and a marked positive reaction was obtained from the blood of these. Basing the treatment on that diagnosis, they had been able to ensure the woman having her next birth at full term.

In view of the points which had been brought out by specialists on the subject he would touch on the results of the treatment, because no statistics could be large enough yet to help in forming opinions as to the line of treatment which had been so much discussed. He and his colleagues had been among the first to use salvarsan, and he had himself used it in patients from 14 weeks to 60 years of age. In addition, they had treated with salvarsan babies *in utero* in the case of three of the women who had been repeatedly having miscarriages, or who had contracted syphilis during the pregnancy. As a result of that, three babies had been produced which did not react positively at birth to the Wassermann test; though he must add the first died at the age of 7 weeks from summer diarrhœa, the child being illegitimate. He had seen no contra-indications for treatment, though they had treated severe cases of aneurysm, aortitis with regurgitation in younger subjects, syphilitic paraplegia, gummatous meningitis, &c. One case which he was asked by Dr. Grainger Stewart to treat was apparently moribund and certainly comatose from gummatous meningitis; there were twitchings and marked pressure symptoms, and though the blood gave a negative reaction the cerebrospinal fluid gave definite cytological and serological proof of syphilis. Two days after the first injection of "606" the man was conscious and rapidly recovered, the effect being almost magical. Several cases of tabes showed marked improvement, and in some of these he also had obtained a positive Wassermann reaction in the cerebrospinal fluid when it could not be obtained from the blood. In a series of three to four hundred injections he had seen practically no bad results save one case of unilateral ophthalmoplegia. In one case in which he was asked to do a post-mortem examination the patient had died while the injection was going on. But there he was sure,

from his examination, that it was due to the patient being a confirmed alcoholic; his heart was so fatty (as were also his other viscera) that it would not stand the extra bulk of fluid injected. Sudden death has occurred from a similar cause during the injection of normal saline, and he himself has produced it in his experiments with rabbits. He would suggest that the dangers were failure of the diseased heart, such as this one; separation of a thrombus formed in a damaged vein, or a ligatured vein which had become the seat of endophlebitis; and finally septicæmia. There was seldom any need to damage the vein, which can be used time after time for the injections. He thought that the operation of venipuncture was often treated too lightly, and he would suggest that the essential factor in successfully accomplishing this was a sharp and properly bevelled needle. He was inclined to think that where there was reason to suspect a condition of endarteritis, treatment with salvarsan should be delayed until a course of iodides had removed the active mischief.

As to the value of the salvarsan treatment, they had been told lately that eight to ten injections were necessary to cure syphilis, but he felt sure that this was an exaggeration of the true state of affairs. The statistics of the Army Medical School—the real fountain-head of unbiased observations on this matter—which have been put forward by some of the speakers, would bear him out in this. His own view was that primary and secondary syphilis in the majority of cases completely disappeared under two injections (and he had even had similar results with one injection), though a small number were refractory as far as the blood test showed. But in some of the tertiary cases he had found that the Wassermann reaction failed to disappear or returned after some months; and several of these were cases which had failed to get well under a complete and thorough course of mercury. Many of his cases had now been under observation for a period of eighteen months, and he was hopefully anticipating having accomplished a complete cure. His course of action in the future would be that while the patient could be kept under observation and have periodical blood tests performed he would content himself with two injections; but where this was impossible, or where the Wassermann reaction failed to become negative, he would further advise a course of mercurial injections.

There was just a point concerning the discrepancy of results of the Wassermann reaction, occasionally with the same specimen, which had cast some doubts on the value of this test. It was true that the test which has been described as the most scientific method of diagnosis in

medicine, being based on scientific premises and logical deductions, is now, owing to the various antigens that can be employed, less understood than at first; but statistics show that, even on an empirical basis, its value is none the less great. But the discrepancies were due to individual variations in technique, and he felt that in the hands of *carefully trained* workers, using the *original Wassermann method* with its true scientific foundation, there would be in all cases concord. He, for his own part, would refuse to relegate the Wassermann reactions of his own patients, and insisted on doing them himself—a tedious procedure, but repaid by the conviction of the accuracy of the results.

Of practical importance was his observation that, unfortunately, sickness and rigors were still found, even with specially distilled water, though only in a few cases. He could not say that there was any difference between a series of cases treated with ordinary distilled water and another series treated with specially distilled water. He was inclined to think that the lessened incidence of these after-effects had some other explanation, and possibly associated with improvements in the drug.

With regard to the public health aspect, although it was recognized that prophylactic medicine was the ideal medicine—that ideal (which had been aimed at since the days of the Patriarchs) would not be reached; and so there would always be curative medicine, and therefore the necessity of laying stress on diagnostic methods.

With regard to notification, which had been advocated in the discussion, what ought to be notified? Should it be open syphilis or should it include concealed syphilis—where the disease showed no obvious manifestations, but where there was still danger of infection; or should it include all the parasyphilitic lesions, the congenital cases, and all the active sequelæ, &c.? It was all very well to compare the eradication of hydrophobia and even of glanders and other conditions with syphilis, but the conditions in the latter were much more difficult. One spirochæte with its long incubation period, coupled with the secret habits of its host, getting into the country when all the syphilis had, hypothetically, been wiped out, would be sufficient to cause the disease to break out afresh. He did not see how it would be possible to examine every returning emigrant and immigrant by the blood test to see if he was syphilitic, and if so to notify. Already the hospital patient was getting wiser, and very knowing. Not infrequently one suggested to a male patient that he should go to the laboratory and have his blood tested, but he never got there, and one learned afterwards that he told the porter he knew too much to have it done. A

hopeful sign was that the public were getting a better appreciation of the dangers of venereal disease, and it was not infrequent for a man who wished to get married to come to be assured that he was in a fit condition to enter that state. The "matrimonial candidate" was better known in Germany and America, in which latter country, judging from the literature, the subject was perhaps too well ventilated in the public Press. He agreed with one of the speakers that the control of syphilis should be more a control of the person, and that it should be on the lines of an improved *morale* for the younger generation. The absolute control of syphilis should not be in the hands of the Local Government Board, but in the hands of what he might call the Home Government Board. Amongst those people in whom home influences and teachings had been entailed for generations, he was of opinion that a better bill of health could be shown as regards infectious diseases. But though he could not see any possibility of being able to notify all cases of syphilis, it would strengthen their hands if it were in their power to notify those cases which one sometimes saw, such as chefs from hotels and cooks from private houses, who were covered with syphilitic lesions, forming a focus of infection and great opportunities for being very dangerous; some of the worst cases he had met with came from several of the largest and well-known restaurants in London, and yet it was impossible for him to move in the matter, though he would point out that it is within the powers of a medical officer of health to enter and inspect the kitchens of a restaurant, and hence the loyal citizen might find a means of eradicating an infectious case from his erstwhile favourite restaurant.

It was hoped that there would be established large central laboratories to which blood could be sent; the private practitioner had not the means to do that in every case. He himself, as bacteriologist to the City, had been approached by the Westminster City Council with regard to this matter, but up to the present the Local Government Board had not given sanction for such an expenditure, which indeed formed rather a difficult problem. And the laboratory could be used also for the diagnosis of glanders, diphtheria, tubercle, and other conditions. Such central and municipal institutions have already been founded in other countries, and there is much to be said for them, provided they are controlled by a director of repute whose reports would be beyond dispute.

He would wish to apologize for the scattered nature of his observations and for the absence of statistics in support of his view, but if time permits it is hoped that many of them will be further elaborated.

Dr. Arthur Powell: From the fact that Hippocrates, Galen, and other writers make no mention of tabes or of general paralysis, Dr. Norman Moore argues that syphilis did not exist in ancient Rome. Apply the same argument to modern India. Neither tabes nor general paralysis are found among the natives of India, we may therefore, according to Dr. Moore, assume there is no syphilis in India! We know, on the contrary, the cases of syphilis in that country must be numbered by millions. If we have such a variation in type in the present day, may not the type of syphilis in Italy have varied in the lapse of time through attenuation of the virus, continual syphilization of the race, or change in the manner of living, as Dr. Mott suggests the apparent increase of parasyphilitic affections may have arisen in Europe? While syphilis seems to spare the nervous system of the natives of India, my experience is that it affects their arteries much more severely than it does those of Europeans. In Bombay City all cases of sudden death are brought to me by the police. I find post mortem the most common cause of sudden death, with the exception of violence, is rupture of aneurysm of the arch of the aorta. Sudden death from this cause is eight times as frequent as death from valvular disease of the heart. I have had three cases of aneurysm at the same time lying on my mortuary tables. The character of the aneurysm points to syphilis as the cause.

As regards the existence of syphilis in ancient times, I am surprised that no one has referred to the disease described in Leviticus as "leprosy." Whatever that disease may have been, it most certainly was not leprosy. It was a contagious disease characterized by a primary sore in the form of a "boil" or an ulcer, followed by a secondary general cutaneous eruption, and in some cases by a falling out of the hair. The symptoms were liable to relapses and in many cases disappeared spontaneously.

From a public health point of view I quite agree with most of the previous speakers that among the infective diseases syphilis should receive no preferential treatment. It is absurd that a maudlin sentimentalism should single out from all the disease-causing microbes the *Treponema*—the "Lustschräubehen" of a recent German author—as a special pet, with whose propagation no State regulations may interfere.

I cannot agree with Mr. McDonagh that medical supervision and segregation of diseased prostitutes has in nowise diminished venereal disease. I can as soon believe that the removal or putting out of action of the enemy's riflemen on a battlefield will have no effect on the

number of bullet wounds in the opposing army. Major French has already thoroughly dealt with this point, and I will only endorse his views as to the beneficial effect of the Cantonments Act in India. The Contagious Diseases Acts may turn a number of open prostitutes into the clandestine class, but the clandestine prostitute can never have as large a practice as her sister who openly pursues her profession. Should her clients become numerous, her existence must become known to the most inefficient police force. Mr. McDonagh has another objection to State interference in that it differentiates between the sexes. To me this seems no argument. If it be a crime to differentiate between the sexes, we have a good fellow-criminal in Nature or the Creator. The law can only do that which is feasible and expedient. The law attempts to restrain the dissemination of other diseases. It places restraints on the sale and dissemination of dangerous explosives, firearms, alcohol and other poisons. In these cases the main supervision and control falls upon the manufacturer or seller. They happen to be almost without exception males, yet no cry of injustice to that sex is raised. It is the prostitute who sells and chiefly disseminates the *Treponema* and *Gonococcus*. Fortunately we have no profession of male prostitutes in this country; all the profession are females, but it is at the profession, not the sex, the laws are aimed. It is easy for the law to get at and restrain the prostitute; it is difficult, if not impossible, to get at the male syphilitic. The object of the laws is to check the dissemination of disease, and it should take those steps which are not only possible but easy.

More than one speaker has recommended as a preventive measure the teaching to boys the dangers of syphilis. In such a measure a great deal of tact would be required lest an undue syphilophobia should be produced. The dangers of syphilophobia are by no means small. I have held autopsies on eleven cases of suicide due to syphilophobia, and I know many cases of lunacy due to the same cause. I am not sure that some of the suicides which came under my official notice might not be more appropriately termed homicide caused by ignorant friends and medical advisers giving an unjustifiably lurid prognosis.

I am sorry to say it is not only the "penny dreadful" novelist, but medical authors who should know better, who have painted such monstrous pictures of the bogey syphilis. Most of us have met the type of syphilitic who, primed with such old wives' fables, carefully shakes his socks each night to see if any of his toes have been left behind. Even in this debate we have heard one speaker refer to syphilis as being transmitted to the fourth generation!

Treatment.—Five years ago I used a good deal of atoxyl and arylarsonates. With soamin I have seen successes as striking as with salvarsan. I have had two severe, though transient, accidents with soamin in sixty-three cases treated. In the case of a patient where mercury and the iodides have failed, if salvarsan is contra-indicated, I would still venture to advise soamin. Can any one conversant with the literature of the subject say what is the minimum quantity of this drug that has caused optic atrophy? I can find no record of any case in which less than 60 gr. had been administered. We frequently find marked improvement after three or four doses of 6 gr. of soamin in cases that had obstinately resisted mercury and iodides. Mr. D'Arcy Power advises that solutions of salvarsan should be injected at a temperature of 105° F. Mr. McDonagh objects, and says the higher the temperature the more toxic the effects. My experience is that it is advisable to use the fluid at a temperature of at least 105° F. In the past twenty-four years I have given many hundred intravenous injections of saline fluid in cases of cholera. Many of these injections were performed in the patients' own huts, where owing to unavoidable delay the fluid sometimes became too low in temperature. I noticed that rigors followed in many such cases. Acting on that experience, in the last eight cases in which I used salvarsan I injected the fluid at a temperature of 108° to 110° F. In seven of these cases the patient's temperature never rose above normal; in the eighth the temperature rose to 99·4° F., but the patient was quite unaware of any fever. These injections were made last year before my attention had been drawn to the necessity of using freshly distilled water. The water I used had been in stock for some months, but had been, of course, boiled twenty-four hours and again two hours before use. The number of cases is so small that the absence of fever may only be a coincidence, but I have seen rigors follow injections at 98° and 100° F. when the water used had been distilled on the same day.

In case of death following the use of salvarsan I would ask the observer carefully to examine the condition of the heart. Through the kindness of Principal Hewlett, of the Bombay Veterinary College, I had the opportunity of examining post mortem seven horses that had died of atoxyl injections. In five of the seven I found striking and characteristic hæmorrhages below the endocardium of the left ventricle. I have elsewhere drawn attention to this as a common sign in acute arsenical poisoning.

SUMMARY OF THE DEBATE BY THE PRESIDENT.

Sir HENRY MORRIS: In bringing to a close the important debate which has now extended over four sittings, I propose first to contribute some remarks on the history of syphilis, next to comment on some of the points raised in connexion with the Wassermann reaction and para-syphilis, and finally to make a few observations on the treatment of the disease.

HISTORY: PREVALENCE AND INTENSITY IN THE PAST.

The greater part of what I have to say refers to the question of the prevalence and intensity of syphilis in the past, because in the first place I find in it much which interests me, but chiefly because less attention has been given to this than to either of the other two aspects of the subject which were set down for discussion.

Whether syphilis did or did not exist in prehistoric and early historic times still remains an unsettled question. Probably it will always so remain. Intelligible as is a belief that the disease prevailed in Europe in pre-Christian and early Christian centuries, it rests upon very meagre evidence, supported by inferences from facts rather than by facts themselves. Nor has this debate, so far, added any evidence of a more convincing kind.

It is said that about 2500 B.C. a Chinese writer, Nusi King, described the phenomena of venereal disease, and among them the symptoms of lues venerea. But what was the lues? Gonorrhœa, chancroid, lepra, or lupus might perhaps equally have been referred to under a term meaning "a spreading calamity," "a pest," or "a contagious disease."

No reference is made to venereal disease in the Babylonian Code known as the Laws of Hammurabi—the oldest known laws in the world—which date from 2100 B.C., or 500 years before the Laws of Moses. Yet, had syphilis been a scourge in those days it would probably have come under some legal control, because the Babylonian legislation took account of several medical and surgical affections, and its medico-legal judicature was very severe on surgeons guilty of malpraxis, or who even were merely unsuccessful in the performance of operations.

Dr. Albert S. Ashmead, of New York, in discussing "The Question of a Relationship between 'Syphilitic' Llamas of the Department of Puno,

Peru, and Pre-Columbian Syphilis in Man,"[1] says, "The Japanese race has been saturated with syphilis for 1,300 years; the Chinese race since 1124 B.C."; and he supposes that these races, "by their long generational experience with the disease, have acquired a great measure of resistance to the germ."

The descriptions given of venereal diseases in the centuries between remote antiquity and mediaeval times, by Greek, Latin, Arabian, and other authors, concern non-specific ulcers, buboes, and the brenning or burning, by which was meant gonorrhœa; and the inferences drawn from them as to the existence of syphilis are attributable to the confusion arising from grouping all affections which spring from commerce between the sexes under the general term "venereal disease."

Dr. Norman Moore, adopting the conclusions of the three learned men whom he quotes, namely, Jean Astruc, Professor of Montpellier, Dr. John Freind, and Van Swieten, is of opinion that further researches into ancient writings, even by scholars possessing the greatest linguistic attainments in Greek, Latin, and Oriental languages, is not likely to lead to the discovery of proof of the prevalence of syphilis in early times. He regards the existence of the disease in those times as not proven; and indeed negative evidence is all that can be expected or which is possible if there really was no such disease in antiquity. It might then be said of syphilis as Mark Twain said of Shakespeare, whom he speaks of as being "Just a tar baby"[2]: "We can go to the records and find out the life-history of every renowned racehorse of modern times—but not of Shakespeare. There are many reasons why, and they have been furnished in cart-loads . . . but there is one which is worth all the rest of the reasons put together—he hadn't any history to tell."

But we can look to other records besides those written in books, and eaten into the bones of men, as I will show presently.

Dr. Norman Moore considers the endeavour of Francisco Lopez de Villalobos in 1498 to identify syphilis with the condition described by Avicenna (980-1037) in the fourth book of his "Canon of Medicine," under the name of saphati, as altogether unconvincing; and though he inclines to the belief that the period of the first appearance of syphilis in Europe was the end of the fifteenth century, yet he thinks much more evidence than is generally set forth is required before we can accept the statement that this disease was imported from America by Columbus.

[1] *Amer. Med.*, Burlington and New York, 1909, xv, p. 35.

[2] Mark Twain's "Is Shakespeare Dead?" 1911.

Syphilis in Man and Animals Indigenous to South America.

It seems to me that further evidence has been brought forward within the last fifteen or sixteen years by Dr. Ashmead in support of the views (1) that syphilis prevailed in America as well as in Japan in very early times; and (2) that in America it was a disease of animals as well as of man; Dr. Ashmead[1] quotes David Forbes, a great authority on everything connected with the native Indian population, to show that the very special and fundamental racial characters of the native Indians of Bolivia and Peru are in complete accord with the nature of the countries they inhabit, and have needed *ages* for their evolution. Hence, concludes Forbes, these people—the Aymara Indians—must have been established in these countries for a very long time. Of the three great tribes of South American Indians the Incas were the chief, and were the conquerors, in the eleventh century, of the second greatest tribe, namely, the Aymaras of Bolivia and Peru. It is in the Aymara Indians that the indications of what may be called autochthonous syphilis are strongest, and, as Dr. Ashmead remarks, the conclusion which may be drawn from these facts is "that the probabilities of the existence of syphilis in this part of the world before Columbus are almost overwhelming."[2]

Forbes never met with any instance of an Indian disfigured by the disease, their treatment of it being successful. They employ mercury (metallic form) and calomel from native cinnabar. Chewing coca is said to prevent mercurial salivation.[3] He thinks syphilis must have been known among these Indians from a very early period: (1) because they have in their language a name for this disease; (2) because they are quite familiar with its treatment; and (3) because skulls are occasionally taken out of graves dating from the period antecedent to the Spanish conquest on which may be seen depressions or scars pronounced by several medical men to have resulted from syphilitic caries, and which in two instances which came under his (Forbes's) observation afforded proof that the disease had been arrested in its progress and new bone formed during the lifetime of the individual.

The same writers tell us that the llamas of Peru, and the alpacas (animals peculiar and confined to the highlands of Bolivia and Peru)

[1] *Journ. Cutan. and Gen.-urin. Dis.*, New York, 1895, xiii, pp. 415, 416.

[2] *Ibid.*, p. 417.

[3] *Ibid.*, p. 416.

suffer extensively from a disease which is identical with syphilis in man and which is healed by the Indians by a precisely similar mode of cure, consisting principally of inunctions with mercurial ointment; and Forbes says: "The mortality among the alpacas caused by the disease when not extremely carefully treated, is said to be very great indeed, and the bones of the diseased animals are stated to be very much affected by caries exactly as in man. The question whether this disease may have been communicated from the alpaca to man, or vice versa, is an open one. It is well known that such unnatural intercourse is common, and that under the Incas several laws were enacted against it. Even after the Spanish conquest an old law not permitting the llama drivers to start on their journeys unless accompanied by their wives was retained in force, and this regulation was understood to be intended as a safeguard against such abuses."

Commenting on two unsuccessful inoculations of llamas with human syphilis, Dr. Ashmead[1] asks: "May it not be that if the disease" [syphilis] "in pre-Columbian America was originally an animal disease, that there may be breeds of llamas whose disease we suspect it to have been, who have by this time acquired really a measure of resistance or immunity, just as special breeds (Chinese and Japanese) of human beings?"

The llamas of the department of Puno, Peru, were called by the natives "syphilitic llamas," and Dr. Ashmead proposed that other experiments on the Incan and Aymaran Indians of Peru with the virus taken from one of the syphilitic llamas should be made, with the view of determining whether the disease supposed by the natives to be animal syphilis was in reality human syphilis or not. If these experiments have been made, the results, so far as I can find, have not been published.[2]

Dr. Ashmead says that human syphilis as it occurred in Japan in the seventh century was a veritable epidemic, as it was in Western Europe in the fifteenth century, and he continues: "Writers of these periods, in both geographical situations, claim that the disease was veritably epidemic then, and was quickly followed by a spread of leprosy. In Japan it is true, for I have translated several Japanese works on the subject and know it to be a fact."

[1] Dr. Alfred S. Ashmead, *Amer. Med.*, 1909, xv, p. 36.

[2] See *The Medical Fortnightly*, St. Louis, 1909, xxxvi, p. 348.

Inferences from the Pottery of the Incas.

Proof has been sought in the pottery of the Incas of the existence of syphilis in Bolivia and Peru in pre-Columbian and in even very remote times. It is admitted that the Inca pottery and the types of the representations of human features thereupon are of much earlier date than the Spanish conquest of these countries; but the cause of the deformities and disfigurements of the human faces portrayed on these ceramic vases is a question still in dispute. Were they the results of leprosy, of lupus, of syphilis, or of mummified changes after death? Virchow thought they were a strong argument in favour of a pre-Columbian lepra, and he emphasized the fact that the similarity of the changes which lepra and lues brought about on the surface of the body was often very marked, and that in the Middle and later ages mistakes as to the identity of the two conditions occurred. He then made a special point of stating that he himself had never seen a syphilitic bone dating from the pre-Columbian era.

In 1895 Dr. Ashmead reopened the question by a letter to Virchow, and since then has published several communications on the subject of the Inca pottery and pre-Columbian syphilis in America. He is of opinion that these ceramic representations are of syphilis, not of leprosy. One of his correspondents, Professor A. F. Bandelier, a resident of Lima, Peru, and having a first-hand profound knowledge of the country and its inhabitants, wrote[1]: "Syphilis and related infirmities are common everywhere among the Indians as well as among other portions of the inhabitants. The disfigured faces on the pottery are generally regarded as representing that disease, and I never heard leprosy mentioned in connexion with them. In addition to the kind of vases representing such phenomena, others are found of a still more obscene character, and one of them I sent to the Museum from Chan-Chan showing man in connexion with the llama . . . The idea of copying on ceramics the effects of syphilitic affections upon human faces is, without any doubt, pre-Columbian in Peru . . . That even quite a number of vessels representing syphilitic diseases should be post-Columbian is therefore only a proof of the fact that they are survivals of artistic ideas carried out long previous to the Columbian era, and that hence the disease existed in Peru untold centuries ago as well as it exists to-day."

[1] Quoted by Dr. Ashmead, *Journ. Cutan. and Gen.-urin. Dis.*, New York, 1896, xiv, pp. 56, 57.

Dr. Ashmead[1] quotes also Mr. Teoberto Maler, who has been exploring sepulchres in various parts of Yucatan (a peninsular of Mexico between the Gulf of Mexico and the Caribbean Sea) for many years, and who is the correspondent of the German Societies. This gentleman wrote in 1895 of syphilis: "According to the ancient Spanish historians it seems, without any doubt, that syphilis is an original American disease, and the Spaniards found it for the first time among Indians of Haiti, Cuba, &c. It is also true that the ancient Peruvians imitated frequently in clay figures syphilitical accidents—for instance, human faces with the nose eaten away, &c. I saw at Paris, in the Ethnographical Museum of the Trocadero, many interesting specimens of Peruvian pottery of this kind. This naturally does not exclude that the same disease existed also in China or Eastern Asia in very remote times." Of leprosy Mr. Maler says: "It only exists in the Spanish class and mixed people. I never saw or heard of a true Indian family affected with it. . . . The true Peruvian antiquities refer, as I believe, to syphilis and not to leprosy, but without doubt leprosy existed in very ancient times in most of the Asiatic lands."

Dr. Ashmead is of the same opinion, for he writes[2]: "The representations which I have found on the Huacos pottery in the American Museum are, in my opinion, not leprosy, but syphilis"; but he seems to imply that both syphilis and leprosy were very ancient Asiatic diseases, and that they reached America from no other place but East Asia.

Professor Eugen Hollander, of Berlin, takes a different view of the representations on the Inca pottery. In a paper read at the Budapest Congress in 1909, after remarking that the Peruvian amphoræ are of a pre-Columbian epoch, he says that the deformities of the central portion of the human face represented upon them are held by different scholars and physicians, with great divergence of opinion but with equal confidence, to be the result of destruction by lupus, by lepra, and by lues; so that there is much doubt as to the critical estimation of these objects. He himself attempts to show that the mutilations depicted do not represent disease, but are death portraitures of mummies, and in certain instances symbolical representations.

Of the various specimens of Inca pottery on view in the Ethnographical Department of the British Museum, and others, not exhibited, which were kindly shown to me by Sir Hercules Read and Mr. Athol Joyce in their workrooms at the Museum, one only appears to be in any manner a portraiture of a syphilitic face. In looking at these specimens,

[1] *Ibid.*, p. 95.
[2] *Ibid.*, p. 53.

as well as the much larger collection in the Trocadero Museum, Paris, one has to bear in mind that cutting away the nose and upper lip was a form of punishment among the natives; so that the character of the remaining edges, as well as the loss of these features, should be taken into account in judging whether the mutilations represented are due to disease or injury.

If syphilis was known in America, and was also prevalent in Japan and Eastern Asia, in early times, it is a question whether the disease was transmitted from Asia to America or from America to Asia. But if the natives of South and Central America had no communication with the outside world previous to the arrival of Columbus, as the writings of Henry C. Mercer, Teoberto Maler, and D. G. Brinton,[1] afford good ground for saying was the case, syphilis in America must have had an independent and distinctly separate origin ages before America was visited by Columbus.

A Summary of Dr. Ashmead's Evidence.

If we pass in review the evidence put forward in Dr. Ashmead's communications in favour of the existence of syphilis, in early times, in America and the eastern parts of Asia we find it embraces: (1) The traditional belief that many of the figures on the early specimens of Inca pottery were representations of the destructive processes of syphilis. (2) The statements of scientific investigators who are familiar with the countries and language of the native Indians that syphilis certainly existed and flourished in America in pre-Columbian times. (3) That there is no positive trace of pre-Columbian leprosy in America. (4) The traditional belief that the llamas and alpacas suffered extensively from a disease identical with syphilis in man. (5) That the Indians cured this disease, both in animals and man, by a treatment consisting principally of inunctions of mercury. (6) The accounts in Japanese books of syphilis in Japan in the seventh century, which books Dr. Ashmead has himself translated. (7) The failure of Dr. Ashmead to inoculate with human syphilitic virus either prostitutes in Japan or llamas in Peru. Dr. Ashmead had in his clinic in Tokio, Japan, charge of 2,000 licensed prostitutes; he tried, but invariably failed, to inoculate with syphilitic virus harlots who had had syphilis. This showed, he thinks, that a syphilitic could not have a chancre twice. In this way he was able to determine the exact nature of a suspicious sore. Chancroids would repeat themselves; chancres never did.

[1] Quoted by Dr. Ashmead, *ibid.*, pp. 94, 95, 97, 98.

A letter from Dr. Francisco Grana, of Lima, Peru, to Dr. Ashmead[1] tells of a treatise just completed by Tello,[2] on syphilis during the Inca period, based on bibliography and *numerous anatomical specimens*. The specimens included several skulls which display exostoses, believed to be of a syphilitic character; they were taken from tombs (Huacos), together with pottery, textiles, and other objects. These skulls (as well as the human skulls and the bones of alpacas referred to by Forbes) contradict the conclusion to be drawn from the statement made by the anthropologist to the Smithsonian Institute in Washington, which is quoted by Dr. Norman Moore.

Is it not possible that the extreme rarity of bones of ancient skeletons showing changes indicative of syphilis is due to the free use of mercury in antiquity? The ancient use of mercury in a given country, however, by no means necessarily implies that syphilis was a disease of the inhabitants; because it was largely used internally and externally, for internal complaints, for skin eruptions and diseases, and as a germicide for lice and other vermin. In China, Japan, South and Central America, and in India this mineral was much employed as a remedy. Mercury is found in China. In India its wonderful powers caused it to be considered by the followers of a religious doctrine called Ruseshism as "one of the manifestations of God."[3] The Romans and Arabs used it externally. The Hindus and the Chinese from very early times took it internally in medicine. The Yogis of India drank twice a month a potion of sulphur and quicksilver which they said gave them long life.

Is it not probable that as syphilis is known to be much milder in character in hot countries and in the Tropics than in more northerly and colder climates, tertiary syphilitic changes in bone rarely occurred in such countries. And if with a milder form of disease there are associated the prevalent use of mercury and the great measure of resistance which long generations of infection with the disease begets, have we not an explanation of some importance why these bony witnesses of ancient syphilis are wanting or very scarce, even in hot countries where neither circumcision, depilation, regular use of baths, &c., after coition, or other conditions which prevent contagion were commonly in force?

[1] *American Medicine*, 1909, xv, p. 37.

[2] See *Annales de Dermatologie et de Syphilographie*, 5th sér., 1911, ii, p. 125. See also *La Chronique Médicale*, 1911, xviii, p. 489, and *The Medical Fortnightly*, St. Louis, 1909, xxxvi, pp. 347 *et sqq*.

[3] "History of Aryan Medicine," by Sir B. Singh Jee, K.C.I.E., Thakore Saheb of Gondal, p. 146.

Evidence from Contemporary Writers that Syphilis was Imported in 1493.

The Columbian origin of syphilis in Europe would be disproved by showing either the non-existence of syphilis in the New World in pre-Columbian times, or the existence of the disease in Europe prior to the return of Columbus in 1493. Having dealt with the former, I will now say a few words on the latter question. The principal evidence upon which is based the belief that syphilis was first introduced into Europe from Haiti in 1493 are the writings of three distinguished contemporary physicians, an Italian and two Spaniards. Dr. Norman Moore has quoted at length from the work of the Italian (Girolamo Fracastoro) Hieronymus Fracastorius, so that I will make no further reference to it. The two eminent Spanish physicians are Francisco Lopez de Villalobos and Diaz de Isla. They furnish strong proof of the importation of syphilis from Haiti by the fleet of Columbus. De Villalobos, whose habits of life exposed him to the risk of being himself an example of the disease, published his book, "Sumario della Medicina," in 1498. This work contains a supplement on syphilis (entitled "Un Tractado sobre les Pestiferas Bubas") which he calls "pestiferous bubas," and it is important to notice that it is quite separated from his account of "imposthumes," ulcers of the genitals, and gonorrhœa, which is contained in the body of the work. The book is a metrical composition, for like Avicenna (980-1037) before him, and Fracastorius (1530) later, de Villalobos adopted the plan of writing in verse. Only two copies of it are known to exist, one in the Royal Library of Madrid, the other in private hands. Its contents were made known by Dr. Bonifacio Montejo, of Madrid, in the later half of last century.

De Villalobos describes the primary, intermediate, and secondary symptoms of syphilis; speaks of it as being a "new and contagious" disease; and mentions that the period when it first began to attract attention was in 1495, or a little earlier. The impression that de Villalobos made any endeavour to identify syphilis with saphati must, I think, have arisen from his having spoken of the secondary rash as "the Egyptian itch," and his comparison of the pruritus of some syphilitics with that caused by the Egyptian itch. As a matter of fact, he took great pains to make clear the diagnosis between syphilis and the dartrous affection known as the saphati of Avicenna, and which was the frequent precursor of leprosy. With much emphasis he states that the pimples of saphati do not infect, as do those of syphilis, and are of a brighter red colour.

Dr. Bonifacio Montejo has also directed attention to the authentic copies of Diaz de Isla's book (dated 1539 and 1542). The work had previously been little known in Europe except through the faulty Latin translation of Welschius.[1] Diaz de Isla, whose book was apparently written and completed in 1510, speaks of syphilis as having first shown itself in Barcelona, and as having been brought to Europe from Haiti in the middle of April, 1493. Like Fracastorius and de Villalobos, he regarded it as "hitherto unknown, entirely new, and never before read of in books of medicine." He tells that he had under his own treatment, before they arrived ashore, men belonging to Columbus's fleet and others who were suffering from syphilis, and that he also treated in Barcelona, prior to the King of France going to Naples, many patients affected with the disease. He explains how the French camp in Italy became infected by many Spaniards joining it from Barcelona.

Objectors Refuted.

By way of discrediting this evidence it was pointed out that Christopher Columbus landed at Palos, some miles south-west of Seville, and tarried at Seville a fortnight before proceeding to Barcelona. Why did the disease not break out in Seville, it was asked? There is evidence to show that it did. A Sevillian physician, Monardes by name, writing in 1580, says syphilis was called "Serampion de las Indias"; and Dr. Montejo has shown that as early as 1502 there was a hospital set apart for the treatment of the syphilitically affected in Seville and that the disease was called "serampion de las Indias" because, as the record has it, "when this hospital was built there was no such disease, for it only became known after the discovery of the Indies in 1492."[2] For further details of the writings of these Spanish physicians I refer the reader to Mr. George Gaskoin's articles in the *Medical Times and Gazette* for 1867.

Other evidence to discredit the Columbian importation of syphilis into Europe from Haiti was brought forward in the letters of Petrus Martyr, who made out that the disease was known in Spain in 1488, and in Bodmann's "Antiquities of the Rheingau," containing reference to a case as having occurred in Europe in 1472; but both statements have been proved to be forgeries.[3]

[1] George Gaskoin, *Med. Times and Gaz.*, 1867, ii, p. 90.

[2] "Siglo Medico," December, 1860, quoted by George Gaskoin, *Med. Times and Gaz.*, 1867, ii, p. 63.

[3] *See* George Gaskoin's articles in the *Med. Times and Gaz.* for 1867, ii, p. 201, and Iwan Bloch's "History of Syphilis" in "A System of Syphilis," edited by D'Arcy Power and J. Keogh Murphy, i, chap. 1.

Syphilis probably in England long prior to Discovery of America.

But notwithstanding all these facts in support of the Columbian importation of syphilis into Europe, it is impossible to shut one's eyes to other facts which point to the existence of the disease in England, France and other countries a century and a half before Christopher Columbus set out in search of the New World. In England, for example, John of Gaddesden (1340), in his work "Rosa Anglica," when referring to the infection of leprosy from coitus, told of the precautions which should be taken to prevent infection. There is ample proof that there was a contagious venereal disease which went by the name of leprosy; that so-called leprous men and women were capable of communicating an infectious malady to those who had carnal connexion with them; that after coition the symptoms always first displayed themselves in the parts through which the poison was conveyed; that only when the pudenda were diseased did the leprous woman convey the infection in coition; that in true leprosy those parts are not disordered; that the disease conveyed by a (so-called) leprous person in coition was followed by the breaking out of scabs and ulcers all over the body, and bore a greater similitude to leprosy as it is described by the ancients than to any other disease; that some ancient writers, as I stated in my introductory remarks, endeavoured to prove that the pox is only one species of leprosy, and that there may be a transition from one of these diseases into the other; that the rebellious nature of these cases of so-called ulcerous and scabby leprosy led surgeons to try a great number of remedies, but that all of them were useless unless mercury was joined with them; that as the dressing of such ulcers was tedious the patients were ordered to daub the ointments over the sore and cover them with linen till the next dressing; that following this treatment the ulcers were in a little time healed, the patient's mouths became sore, but that otherwise the patients were cured. It was in this accidental way that the method of salivating by unction was discovered. It is thus obvious there was a disease which went by the name of leprosy, which was communicated to man by coition with a (so-called) leprous woman, but which was not in reality leprosy. It is also now well known that many deaths from venereal disease were formerly ascribed to leprosy; that leper hospitals were numerous in England up to the time when syphilis was distinguished from leprosy; and that as more and more patients were recognized as syphilitic, and treated as such, the demand on the leper

hospitals correspondingly diminished. In France, as shown by Raymond, of Paris, many syphilitics were buried as lepers in the leper cemeteries of the Middle Ages.

Another Englishman, Bartholomew Glanville, who flourished about the year 1360, wrote a book ("De Proprietatibus Rerum") describing as leprous, persons with typical tertiary syphilitic symptoms. Among the causes of this sort of leprosy he enumerates the ordinary modes of syphilitic contagion; he describes the infection passing from father and mother to the child, "as it were by Lawe of Herytage"; and speaks of a "childe fedde wyth corrupte Mylke of a Leprouse Nouryce" as being another way of infection. In a word Glanville, in the middle of the fourteenth century, "under the name of one species of the leprosy, gives a summary of the symptoms of the pox, and the several ways whereby it is at this time communicated."[1]

When we think of the lack of facility for travel, of the smaller urban population, of the fewer opportunities of irregular and indiscriminate sexual intercourse, and consequently of the fewer cases of venereal diseases in those days; and when also we remember how comparatively little opportunity there was for interchange of professional opinion and experiences, we can understand how medical practitioners overlooked the association and causal relationship of secondary and tertiary syphilis with a local sore contracted weeks before, which had healed and to all appearance was finally cured, and perhaps had even been forgotten. It is thus also intelligible how medical men came to associate those syphilitic symptoms with the symptoms of leprosy—the disease which seemed to them to have the greatest analogy to the constitutional and local manifestations of what we now recognize as syphilis.

Before surgeons could regard the primary chancre as the cause of the subsequent symptoms of syphilis, and syphilis as a separate and distinct disease, the lessons and the experience of some such group of conditions as those which attended and followed the Columbian importation of the disease were perhaps necessary. Cause and effect would be less likely to be overlooked when all phases of the disease were seen in patients confined on board ship during a long voyage; when the disease spread among troops living near cities and massed together in large numbers; when the course and progress of the disease were intensified and exaggerated by the exposure, deprivations, and hardships of war; and when, perhaps in part owing to the more severe action of

[1] "A Letter concerning the Antiquity of the Venereal Disease," by William Becket, *Phil. Trans.*, 1720-21, xxxi, p. 59.

a virus taken from one race and infecting a different race, the virulence of the disease assumed, as we are told it did in 1493-95, the characters of an epidemic.

Variations in Virulence at different Periods.

The virulence of syphilis has varied not only as between races, but in the same race at different epochs. Dr. Ashmead, speaking from personal experience, says that "a Japanese prostitute whose symptoms may appear very mild would always inoculate the European with a vicious type of the disease, even producing in him the type of epidemic syphilis of the fifteenth century in Europe." This he thinks is because of the shorter generational experience, extending to only 500 to 600 years, and the consequent inferior measure of immunity or resistance of Europeans as compared with other races—like the Japanese and the Chinese, who have been saturated, according to Dr. Ashmead, with syphilis for from between 1,300 to 3,000 years. The disease in the seventh century in Japan was of great virulence, and is said to have been like the epidemic in Europe in the fifteenth century. Fluctuations at other epochs have been largely caused by fluctuations in the nature of the treatment. In modern times, when iodide has supplanted mercury, syphilis has been seen in aggravated forms. During my own professional life the frightful cases of skin, bone and visceral syphilis which one used to see have disappeared under the systematic administration of mercury and the employment of antiseptics.

Shakespeare and Syphilis.

Mr. Hutchinson pointed out that I had omitted from my introductory remarks any reference to one of Shakespeare's best allusions to syphilis. No doubt in the quotation referred to by Mr. Hutchinson in the fifth act of "Henry V," Pistol, when speaking of "the spital of malady of France" was referring to a hospital for venereal diseases, and equally, no doubt, alluded to syphilis as "the malady of France"—"Morbus Gallicus" being one of its many names. My object, however, was not so much to make mention of all the passages in Shakespeare's plays in which some sort of allusion is made to syphilis, as to point out his frequent use of the words "Pox" and "Pox on't" in the manner of an oath and in much the same way as some persons are in the habit of saying "Damn" and "Damn it" in the present day. That Shakespeare, when using the word "pox" nearly always, if not invariably,

meant syphilis, is to my mind quite certain; and this use of the word as an execration, or an ejaculation implying disgust, shows how uppermost in men's thoughts, and how common, the disease was in his day. Elsewhere Shakespeare uses the word "Goujees" meaning "pox," as in Act v, scene 3, "King Lear"; and "Good Year" in the same sense as "Goujees" and "pox" as in "Henry IV," Pt. 2, Act ii, scene 4.

As regards Shakespeare's graphic account of syphilis in "Timon of Athens," and his repulsive allusion to the female sexual organs in "King Lear," why should we associate them with Shakespeare's own personal experiences? The characters in a drama must not be supposed always to represent incidents in the life of the author, any more than does the hero of a novel. The author made out Timon to be not merely a misogynist but a misanthrope, bearing a bitter grudge against not only women but all mankind, because of the ingratitude he had experienced in men; King Lear he described as becoming mad because of the ingratitude of his daughters.

As opposed to the attempt to associate these descriptions with the individuality of the author, or to connect the physiognomy and parentage of Sir William Davenant with Shakespeare, I would point out that if Shakespeare was the author and actor of the plays which go by his name there is nothing in the portraits of the dramatist, nor, so far as we know, was there anything in the voice of the actor, to suggest that he himself was the parent of a congenital syphilitic offspring or the subject of facial and laryngeal syphilis, so realistically described by him. If, on the other hand, William Shakespeare was too illiterate to have written the plays, what will the advocates of the Baconian authorship of them say to the insinuation that the writer of the Novum Organum, and the editor of the authorized version of the Bible of 1611, was describing his own diseased plight in words he made Timon of Athens, in the play of that name, utter?

Does Syphilis heighten the Imagination?

Mr. D'Arcy Power has asked me to ascertain from the psychiatrists the nature of the disease from which the patient was suffering who is described by Horace (Epist. Lib. ii, Epist. ii, ll. 128-30):—

> "Fuit haud ignobilis Argis,
> Qui se credebat miros audire tragoedos
> In vacuo laetus sessor plausorque theatro."

Here was a man whose delight it was to sit in an empty theatre and applaud the wonderful tragedians to whom he imagined he was listening.

But any suspicion as to this delusion having been caused by syphilis is, I think, removed by what Horace tells us a few lines further on :—

"Hic, ubi cognatorum opibus curisque refectus
Expulit elleboro morbum bilemque meraco
Et redit ad sese."

The man was cured by means of pure hellebore, which, so far as I am aware, has never had ascribed to it any curative influence on syphilis. If it were syphilis from which he suffered this patient's recovery lends a degree of support to Dr. Pernet's suggestion that syphilis may have played some part in the development of the musical genius of Beethoven, who was said to have been a congenital syphilitic ; for Horace goes on to say :—

"Pol, me occidisti, amici,
Non servasti, ait ; cui sic extorta voluptas,
Et demtus per vim mentis grastissimus error."

When the patient recovered owing to the treatment he had received at the expense of his relatives, he exclaimed, "By Heavens, friends, you have destroyed, not saved me ; to rob me thus of my pleasure, and take from me by force such a very agreeable delusion of mind."

The Bearing of "606" and Wassermann's Reaction on Tabes and General Paralysis.

Dr. Mott would lead us to the conclusion that the tardy, delayed, or late syphilitic manifestations of disease of the nervous system which are usually termed parasyphilitic and metasyphilitic have increased in these times, and for two reasons : (1) The struggle for existence involving more and more the nervous system makes the cerebrospinal centres the "*locus resistentiæ minoris*" of disease ; and (2) a widespread racial immunity to the severer forms of secondary and tertiary syphilis has been brought about by the general syphilization of the race. This racial immunity is attributed "to the reaction of the cells of the body to the syphilitic virus." The parasyphilitic affections of the nervous system such as tabes and general paralysis of the insane are generally looked upon as degenerative processes and as such are uninfluenced by antisyphilitic treatment. If the same degree of racial syphilization which diminishes the severity of secondary and tertiary forms of syphilis is a condition favourable to degeneration of the cells of certain parts of the spinal cord and brain ; and if, as we are told, no case of syphilis has ever been really cured by mercury, can we look to salvarsan to prevent latent syphilis and the reaction of the

body cells before the degenerative process has been established? If not, the race is in a parlous state, in spite of the advent of "606." If tabes and general paralysis of the insane come on after about the same number of years whether mercury has been given or not, will experience teach us that they will do the same after salvarsan? That they will not occur in persons who have been treated with salvarsan from the outset of syphilitic infection is our only hope of abolishing tabes and general paralysis. We must all join Dr. Mott in wishing "that the early administration of '606' followed by mercury may in a measure do what mercury alone has in a measure failed to do, as regards averting parasyphilitic affections in later life—viz., it may by rapidly and effectually killing off the spirochætes in the blood and lymph prevent the hypersensitizing of the cells of the body and excessive defensive reaction." It may in time, we hope, cause desyphilization of the race. If these parasyphilitic nerve affections were not the result of nerve cell degeneration we might have looked for some improvement from appropriate treatment of them; but how can we expect degenerated nerve cells to recover? A house which has been burnt down may be rebuilt, and the fire may be prevented from spreading to surrounding property by suitable means. But if the degenerative effects of nerve cell reaction to the syphilitic virus have once commenced and the process cannot be influenced by treatment, neither repair of the parts already damaged can occur nor can the cell destruction be prevented from spreading. In other words, tabes and general paralysis, so far as they are due to latent syphilis, will neither be cured nor prevented by any remedy as yet known to us.

Time alone can reveal whether the use of salvarsan at the very outset of infection by the virus of syphilis will ultimately annihilate tabes and general paralysis of the insane; or whether the mere introduction for the briefest period of time of the spirochæte into the tissues and the blood will in a certain proportion of persons in a syphilized race light up the cell reaction which ultimately produces these diseases.

Does Racial Immunity to Active Syphilis favour Tabes and General Paralysis?

If the prevalence of syphilis for many generations, and the systematic treatment of the disease by mercury, create in a race a degree of immunity to severe forms of syphilitic lesions, but at the same time a tendency to cell degeneration, there ought to be evidence forthcoming

in support of these statements from Japan, China, and South America. That there is a degree of racial immunity to severe forms of syphilis in the Japanese seems indicated by the experience of Dr. Ashmead, which I have previously quoted. Is there also a great tendency in that race to cell degeneration either of the nervous system, as shown by tabes and general paralysis, or in the arterial or any other great anatomical section of the body? Is syphilis the only, the exclusive, cause of tabes and general paralysis? Since 1881 there has been an increasing tendency so to regard it. The first recognition of the intimate association of syphilis and general paralysis was made in countries (the Scandinavian) where syphilis had for a long time been a notifiable disease. Dr. Mott is of opinion that syphilis is the commonest cause of nervous diseases in general. Sir George Savage points to certain cases in which head injury in syphilitic cases had been the exciting cause of general paralysis of the insane, and he is uncertain as to whether or not head injury without syphilis can produce it. But he is not logically entitled to draw the conclusion that it is proved that it is not syphilis "alone or always which produced general paralysis of the insane," because among certain tribes and isolated collections of men "syphilis was all but universal, but general paralysis absent." The inverse condition might have justified this conclusion—namely, if among these groups of persons general paralysis had been almost universal and syphilis absent. Sir George Savage has constantly observed in general paralysis a good memory with great mental loss. Such retention of memory is not common in parasyphilitic affections. He has also noticed certain forms of mental degeneration associated with syphilis, starting in some local symptoms, such as ptosis, aphasia, or a local palsy which passed off in some cases completely, and the cases did not end in general paralysis. On the other hand, some such local brain lesions frequently usher in general paralysis. He goes no further than to say that his belief is that syphilis is a great cause of general paralysis.

Wassermann's Reaction as a Specific Test for Syphilis not yet fully Understood.

Dr. Mott tells us (1) that the spirochæte—the special organism producing syphilis—has never been found in the lesions of general paralysis; (2) that general paralysis occurs in persons in whom the antecedent signs of syphilis are usually slight and often entirely absent; (3) that with an experience of 500 post-mortems in bodies diagnosed as being

the subjects of general paralysis, those in which gummatous or other severe syphilitic lesions existed turned out to be pseudo-general paralysis due to gross syphilitic lesions of the membranes and vessels of the brain. Assuming these to be indisputable facts, are they not strong evidence against, not in favour of, general paralysis being a disease of syphilitic origin and due to latent syphilis? On what is based the present reliance in the syphilitic causation of this disease? Is it not to-day the Wassermann reaction? And does not this assume that syphilis, and syphilis only, gives the reaction? And is this assumption warranted by facts and by what is known at the present time? Dr. Mott also tells us (4) that he has never seen a primary sore or a secondary eruption in a general paralytic person; and (5) that Krafft-Ebing has inoculated the virus of a hard chancre into nine general paralytic persons who had never shown any sign or given any history of syphilis, yet not one of them was infected. These two statements (4 and 5) will be held to be proof that these persons were syphilized already and were therefore immune to reinfection with the syphilitic virus. In support of this there is the rarity of a second attack in the same person of ordinary acquired chancre, and the failure of Dr. Ashmead to inoculate Japanese harlots with the virus from a chancre.

And here may be interposed the following question: Are those who are syphilized already the only persons who can resist the infection of syphilis?

Are we justified in asserting that the only state of the body which can resist infection with syphilitic virus is one of already existing syphilization? If I understand Dr. Mott aright, he is of opinion that in the case of a widespread infectious disease, sooner or later the virulence of the disease dies down because there are increasing numbers of the population (1) in whom the local infective process is so mild as to be unobserved; (2) or who have the disease in the primary and secondary stages but in a very mild form; (3) or who possess a complete immunity. If this be so, why suppose that every general paralytic who has been exposed to infection of syphilitic virus, either by experiment or in the ordinary manner in which syphilis is acquired, but who does not take the poison, has previously had syphilis and still has it in a latent form? Why not suppose the third alternative—namely, the possession of complete immunity—as the explanation in many cases? Mr. McDonagh will reply, "There is no such thing as immunity"; either a person has not had syphilis before and will take the infection if exposed to it, or being syphilized already he does not take it afresh. This argument is,

of course, in favour of the syphilitic origin of general paralysis when applied to the statements (4) and (5) mentioned above, but is it not a *petitio principii?* Does it not beg the very question in dispute? To my mind, however, this argument, erroneous as it is, is more consistent with facts than the inference as to the existence of syphilis drawn from the positive Wassermann reaction. This reaction, it would seem, is now very generally accepted as a reliable test of the presence of syphilis. It was confirmed in 107 out of 110 cases of general paralysis. In general paralysis there is a very marked reaction of the blood and cerebrospinal fluid in nearly 100 per cent. of cases. No case diagnosed as one of paralysis which gave a positive result with Wassermann's test was found to be other than general paralysis at autopsy, and this in spite of the fact that in paralytics "the signs of antecedent syphilis are usually slight, and often entirely absent."

Of the value of the Wassermann reaction in the diagnosis of general paralysis Dr. Mott says there cannot be the slightest doubt. But it is a long jump from the almost cent. per cent. positive Wassermann reaction in general paralysis to the conclusion that mild or latent syphilis is the cause of this reaction in cent. per cent. of cases of general paralysis. When Dr. Mott tells us of a large number of cases in his own experience of syphilitic cord and brain disease which fifteen years ago he believed to have been cured, but which subsequently died from syphilitic complications after having been paralysed, we are on safe ground. But what proof is there in many other cases, beyond the Wassermann reaction, that the patients have had syphilis in any form or degree whatsoever? Mr. D'Arcy Power points out that the reaction is not given by every patient even when there are obvious signs of syphilis, and adds that it is positive in 95 per cent. of cases of secondary, in 75 per cent. of tertiary syphilis, and only 50 per cent. in latent syphilis; yet, as stated above, the reaction is positive in almost 100 per cent. of general paralysis. How is it then there is this difference, that in the latent cases in which general paralysis has developed the reaction is positive twice as often as in latent syphilitic cases in general?

Dr. Mott says an important distinction of parasyphilis from syphilis of the nervous system is that in the latter a positive reaction of the cerebrospinal fluid is obtained in less than 20 per cent., whereas general paralysis gives the reaction in 97 per cent., and tabes in 60 per cent. Mr. McDonagh tells us that in his experience not more than 70 per cent. of mothers of syphilitic children give a positive Wassermann reaction; that if a provocative injection of salvarsan is given to such

women a positive reaction afterwards is the rule; he considers that every woman who bears a syphilitic child is the subject of latent syphilis, and tells us that such women not infrequently develop their first syphilitic symptoms as tertiary manifestations at or about the menopause, but that during the child-bearing period the Wassermann reaction may be negative even if the mother has just begotten an undoubted syphilitic infant which gives a positive reaction. Here, then, we have an accepted test for syphilis giving the most intense positive reaction and the most constant positive reaction in what are called parasyphilitic cases; whereas the reaction is not given in the first days following infection with syphilitic virus, nor in 5 per cent. of secondary syphilis, nor in 25 per cent. of tertiary, nor in 50 per cent. of latent syphilis; it occurs in 70 per cent. of mothers, all of whom are said to be syphilitic and liable to develop tertiary symptoms later in life, or it may be absent in the mother and present in her newborn infant, or vice versa, or it may be absent from both the mother and her newborn syphilitic infant; and finally, in contrast with the intensity and frequency of the reaction given by general paralytics, the positive reaction is far less intense and many times less frequent in actual and unmistakeable syphilis of the nervous system.

The parasyphilitic diseases are believed to be more prevalent now than formerly, because of the widespread racial immunity to and latency of syphilis. Thus the position of the Wassermann test for syphilis is this, it gives the most intense reaction *in latent syphilis associated with general paralysis;* when the primary infection and secondary symptoms have been so mild as to have escaped notice; and when the conditions which cause attenuation of the virus and produce racial immunity—viz., (*a*) the continuance of mercury treatment over a period of years, (*b*) the control and suppression of suppurative processes by means of antisepsis and asepsis, and (*c*) teetotalism—have been in force, than when syphilis is present in an active form. In short, and in a sentence, the milder the syphilis—even to the degree of its having escaped the notice of the patient so that he may be quite unaware that he had ever had the disease—the greater is the tendency to tabes and general paralysis, and the stronger and more constant is the Wassermann reaction. An unwelcome inference from all this is that mercurial treatment carried far enough to cure or prevent the symptoms of secondary syphilis may set up a strong predisposition to cell atrophy and to the so-called parasyphilitic diseases at a later period.

Still pursuing the subject of the Wassermann reaction, we find

that certain foreign investigators, contrary to the experience of Mr. McDonagh quoted above, state that all mothers of congenital syphilitic children give a positive reaction, and continue to do so for four years after giving birth to such child or children, and consequently, it is concluded, that in spite of *apparent* health, the mothers of congenital syphilitic children are much more frequently syphilitic than has been supposed. Here, again, reliance is placed on the Wassermann reaction as a proof that the person whose blood or cerebrospinal fluid yields the reaction is syphilitic. Yet some of these women who gave such a marked reaction had no sign of syphilis, "had never suffered in any way, never had a day's illness." I have referred to the uncertainty of the reaction already; a few other instances might be given. Congenital syphilitic children of mothers who have given a strong reaction have not themselves reacted; in other instances the child has given a negative reaction just after birth, but a positive reaction later when symptoms of syphilis appeared upon it. A case of ophthalmoplegia externa and interna gave a negative reaction, but cleared up under specific treatment. A patient with syphilitic arteritis gave a negative reaction until after six weeks of treatment with mercury and potassium iodide; then he gave a well-marked positive reaction. This is the "reaction provocative" of Ehrlich. Mr. McDonagh refers to "cases" which with a primary sore gave a negative Wassermann reaction, but which gave a positive reaction after an injection of salvarsan; he recommends that in the intervals between treatment when the body fluids give a negative reaction a further injection of salvarsan should be given, and the blood tested again and found again to give a negative reaction before the patient is said to be cured; and he further adds that patients who have had syphilis and been so far treated with mercury "as to have been driven into the latent stage with a negative Wassermann reaction" give a strong positive reaction after one or two provocative injections of salvarsan. So constant is this that he says salvarsan can be used as a test of a cure, and that it shows also that mercury never cured a case of syphilis.

With such uncertain, variable, and paradoxical results as I have quoted, are we really in a position at present to say what the precise meaning and value of the Wassermann reaction is? I know nothing of the process of the test beyond having had it explained to me in a clear and skilful manner verbally, and by outline figures; and from having been shown in the laboratory the difference between the negative and positive reaction. It all seemed to me very complicated

and very marvellous, and I wondered how it had ever entered into the thoughts of man to apply rabbits' serum and guinea-pigs' serum to sheeps' corpuscles, then to add an extract of the liver of a congenital syphilitic infant (or of a liver which is not from a syphilitic subject and which I am assured, nothwithstanding Dr. Candler's precautions, does equally well), and mix up with them all some of the serum of a patient whose blood is to be tested, and then to draw a momentous conclusion based on whether the red blood corpuscles of the patient sink to the bottom of a test-tube or break up and yield their colouring matter to the whole volume of the test-tube's contents. It seemed to me—whose line of life is not bacteriological research—as I have said, all very intricate and wonderful, though I am told that in reality it is not so, but on the contrary has all come about by steady, regular, and well-understood steps, thoroughly familiar to laboratory experts. But of this I feel sure, that only very competent and well-practised workers are fit to be entrusted with these investigations.

And what do we learn from them? Why this: That the experts have arrived at no unanimous opinion as to the precise value and significance of the Wassermann reaction. The majority, perhaps, of those who have recourse to it, think, notwithstanding the discrepancies I have detailed, the positive reaction is a more reliable test than the negative; others that the negative but not the positive is the more reliable guide, because as yet we do not know the limits within which "group" reaction occurs with Wassermann's test; others, again, that the negative reaction is not a proof of the cure of syphilis until it has been obtained after, as well as before, another injection of salvarsan or the further inunction of mercury. That the positive reaction is not always given even when syphilis exists in an active form is proved. Nor can we say that only syphilis will yield a positive reaction. The blood of scarlet fever patients has done so, and we are not sure there may not be other conditions also in which the positive reaction occurs.

I learn from conversing with bacteriologists that the Wassermann test is an application of the "complement-fixation" reaction, for the diagnosis of syphilis; that "complement-fixation" reactions are of two kinds—(1) "group" reactions, and (2) "specific" reactions. Moreover, I am told that the Wassermann test represents what is called a "group," and not an absolutely "specific" complement-fixation reaction; that the antibodies in the serum of patients with scarlet fever are capable of reacting with the specific antigen used by Wassermann in his test; that hitherto it has not been possible to define the

limits within which Wassermann's test represents absolutely "specific" reaction; and that, apart from knowledge of the clinical history, it is impossible to judge whether a positive "Wassermann" obtained with a particular serum represents a "specific" or merely a "group" reaction. But note! Only the "specific" reactions are absolutely decisive for prognostic purposes.[1]

What is the Immediate Cause of the Wassermann Reaction?

What is the immediate cause of the reaction? The theory held is, I believe, that the reaction is due to lipoid bodies, the result of the action of toxins, or the spirochæte itself, on the body. The spirochæte certainly need not be present, because the reaction has repeatedly been obtained long after this organism has vanished from the patient's body. Nor is it clear that the toxins generated by the spirochæte are necessary, seeing that the most intense and constant reaction is furnished by the fluids of persons who have had syphilis in the mildest form only, and as much as thirty years before. It would appear to be some state as yet undiscovered or unexplained of the solids or the fluids of the body which is required for the Wassermann positive reaction. And though this state of the solids or fluids or both may be more frequently brought about by the virus of syphilis than by anything else, it would seem that there are other causes also — factors, perhaps, altogether independent of syphilis—which play an important rôle.

[1] Mr. Foulerton writes to me as follows: "The difference between 'group' and 'specific' complement-fixation is well illustrated by the work of Much, of Hamburg, on the complement-fixing properties of the serum of persons, and experimental animals, infected with certain organisms of the "acid-fast" group of bacteria. Thus the serum of a leprous patient will give a complement-fixation reaction when either the parasite of leprosy, or the parasite of human tuberculosis, is used in place of the 'antigen.' In other words, the antibodies (or, perhaps, some of them) which occur in the serum of a leprous patient are capable, up to a certain limit, of reacting with either of the closely related parasites which, respectively, are the cause of leprosy and human tuberculosis. And, conversely, the serum of a tuberculous patient will give a complement-fixation reaction with either the parasite of tuberculosis or the parasite of leprosy. And, so far, the reaction is not a 'specific' reaction, it is a 'group' reaction. But by treating the serum of the leprous patient in a particular way with tubercle bacilli, it is possible to remove from the serum that portion of the antibodies which is capable of reacting with the tubercle bacillus. On submitting the leprous serum, thus prepared, to a fresh test, it will be found that it now gives a 'specific' reaction with the parasite of leprosy only, and none with the tubercle bacillus. The tuberculous serum can be similarly treated with the parasite of leprosy, so that the fallacious 'group' complement-fixation reaction is eliminated, and the diagnostic 'specific' reaction is obtainable."

Remarks on the Treatment of Syphilis.

But however perplexed we may feel in regard to the Wassermann reaction, no doubt seems possible about the remarkable effect of salvarsan upon the spirochætes and their toxins, nor as to its power of quickly and completely causing the disappearance of the symptoms of syphilis in each of its stages. A careful perusal of contributions to this debate reveals a unanimous agreement as to the efficacy of salvarsan, but differences of opinion (*a*) as to the best system of administration of the drug; (*b*) as to whether or not it permanently cures syphilis; (*c*) as to whether it should be given with mercury or alone; (*d*) if with mercury, as to when the mercury should be commenced; and (*e*) in what form mercury is best employed. Salvarsan has certain great disadvantages. Every dose has to be prepared *ad hoc*, and requires great care in its preparation; it needs care and precision and some manipulative skill to inject it properly; it is not free of even serious risks, and it is not to be wondered at that several fatal results have attended its use, seeing that whilst it is powerful enough to create immunity reaction products which quickly attack and kill the spirochæte, it must, to be safe, do this without harming the body itself. Thus it is not a remedy to be employed by every busy practitioner, nor to be used upon patients who cannot or who are unwilling to submit themselves to the due and proper precautions which should be taken to make the treatment safe.

The treatment with mercury without salvarsan will not therefore, in all probability, be entirely supplanted. Nor from the point of view of curing the primary and secondary symptoms of syphilis and of preventing the recurrence of these symptoms does it seem to me to be at all necessary it should be supplanted. That the full, well-regulated use of mercury does accomplish such complete cure is, I consider, amply proved. I have lived long enough to watch the lives and health of many persons whom in my, and their, early days I have had to treat as patients, and to see them now the healthy parents of healthy children. I have had experience of two male patients who, having been treated with mercury and been cured, have contracted a second hard chancre followed by secondary symptoms, and who were a second time cured with mercury. I can recall cases of men who have had syphilis who have married before they have been fully or sufficiently treated with mercury, and their wives after one or two miscarriages have been treated during each subsequent period with mercury and have borne in one case three and

in another case five healthy children who have grown to womanhood or man's estate. In neither of these cases did the mother show at any time any signs of syphilis nor did her health suffer in any way.

I find it difficult to avoid the following conclusions, viz., that in these cases the seminal fluid of the father conveyed the disease to the fœtus of the first pregnancy, but that, in subsequent pregnancies, mercury administered to the mother had the effect of preventing harm occurring to the subsequent children, and that the mothers themselves, as they remained free of any evidence of syphilis throughout their lives, ought not to be described as the subjects of syphilis. And I hold this opinion notwithstanding my knowledge of another class of case, namely, where the woman who, never having exhibited any symptoms of syphilis, and having had a child or children by a syphilitic husband, has borne a child with marked signs of congenital syphilis to her second husband who was himself quite free of any syphilitic taint.

As time goes on one fact may possibly be brought to light which will make it advisable that every case of syphilis should be treated with salvarsan. If the theory that tabes and general paralysis are caused by degeneration of nerve cells due to latent syphilis be true; if this latent syphilis is brought about owing to the spirochætes and their toxins having been incompletely or only very tardily destroyed by mercurial treatment; and thirdly, if salvarsan administered at any period between the primary chancre and the roseolar eruption which ushers in the second stage of syphilis will prevent the establishment of syphilis in the system in a latent form, then it will become the duty of the profession to see to it that salvarsan is used in every case in the early stage of syphilitic infection. Then, if these hypotheses are proved to be true and salvarsan is given in good time, there may be expected to follow in course of years complete elimination of tabes and general paralysis from the category of diseases.

Need of Instructing Medical Students and the General Public.

Attention has been directed by some of those who have taken part in this discussion (1) to the need of giving more attention to the teaching, and of making the teaching in venereal diseases more systematic, in the medical schools of this country; and (2) to the need of a system of registration of syphilis in the United Kingdom.

No doubt the recent discoveries and the recent advances in our knowledge of the diagnosis and treatment of syphilis must lead to

further and special courses of instruction with regard to them. But I must dissent from some of the statements which have been made during this discussion to the effect that no regular teaching whatever has been given hitherto to medical students in England in venereal diseases. Nor can I accept the suggestion that because a medical student contracts a chancre on his finger whilst attending a midwifery case that it is because his medical education with regard to syphilis has been neglected. I know of a very distinguished obstetric physician and gynæcological teacher who met with the same misadventure. Both alike, I have no doubt, were guilty of some slight carelessness or apparently trivial inadvertence. I do not doubt that the student had received much instruction from several of his teachers about the various manifestations of syphilis; nor that the obstetrician I refer to was in the habit of cautioning his students and nurses against the dangers to themselves which syphilis in the mother presents, and the dangers to the infants which maternal gonorrhœa creates. Still, I feel sure that the question of improved or more specialized teaching in syphilis, as well as questions relating to the statistics, notification, registration, and segregation of persons affected with syphilis will, in the interests of public health, soon come under the careful consideration of a Committee of the Royal Society of Medicine, which was recently appointed—after representatives of the Society had held a Conference with certain representatives of the Eugenics Education Society.

Some months ago an inquiry was set on foot by our Society with the aid, and through the medium, of the Secretary of State for Foreign Affairs, as to what is being done in other countries in regard to the registration and segregation of syphilitics, and already many reports have been received from abroad. These reports, together with the information and recommendations contained in the practical and suggestive papers which this important debate has brought to notice, will, I believe, be of considerable assistance to our Committee, and ultimately of much importance and benefit to the public.

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